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Regulation Compliance Report Closure Plan

Presque Isle Power Plant Landfill No. 3, Cells 1 & 2 Marquette, Michigan

Submitted to:

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Submitted by:

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Project 1610536

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Drawing D-10 Final Cover Grades, Proposed Landfill No. 3, Wisconsin Electric Power Company, Presque Isle Power Plant, dated October 2001.

Drawing D-11 Cross-Sections A-A', B-B', C-C' & D-D, Proposed Landfill No. 3, Wisconsin Electric Power Company, Presque Isle Power Plant, dated October 2001.

Drawing D-17 Details, Proposed Landfill No. 3, Wisconsin Electric Power Company, Presque Isle Power Plant, dated October 2001.

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1. Introduction

We Energies owns and operates a solid waste disposal facility located approximately 4 miles west of the Presque Isle Power Plant (PIPP). The landfill is located in the N ½ of the SE ¼ of Section 6, Township 48 North, Range 25 West, Marquette County, Michigan. The landfill property is surrounded by forested uplands and accessed by a private paved haul road from the power plant. The We Energies PIPP Landfill No. 3 is regulated as a Type III landfill by the Michigan Department of Environmental Quality (MDEQ) in accordance with Part 115, Solid Waste Management of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The design, construction, operation, closure, and post-closure care requirements are specified in the MDEQ approved Construction Permit dated February 27, 2002 and the current Operating License. The construction of Cell 1 was completed in 2003 and placed into service on October 8, 2005. Cell 2 was constructed in 2007 and placed into service on October 10, 2008. In 2014, We Energies installed final cover over portions of the north, east, and west perimeter slopes of Cell 1.

In addition to the state regulations, the landfill is also required to comply with 40 CFR Part 257 Subpart D – *Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments* and is defined as a CCR unit and existing CCR landfill in accordance with § 257.53. Future landfill cells are permitted by the MDEQ in the approved construction permit application and defined as lateral expansions under § 257.53 when constructed.

This report fulfills the requirements for a written Closure Plan of the PIPP Landfill No. 3, Cells 1 and 2 in accordance with § 257.102 - *Criteria for Conducting the Closure or Retrofit of CCR Units*. In accordance with § 257.102(b)(1), this report describes the engineering design of the landfill, phased development, a description of the final cover system and how the final cover will be constructed, and how the final cover system will meet the applicable performance standards contained in § 257.102(d). In addition, it also includes an estimate of the maximum inventory of CCR, an estimate of the maximum open area that would require closure at one time, and a generalized schedule based on the anticipated landfill filling rates and disposal volumes.

This closure plan includes the following sections:

Section 1 Introduction

Section 2 Closure Narrative

Section 3 Final Cover System

Section 4 Schedule for Closure

Section 5 Conclusion and Certification

2. Closure Narrative

This section provides the closure narrative as required by § 257.102(b)(i). Closure of PIPP Landfill No. 3, Cells 1 and 2 will be accomplished by leaving the CCR in place and installing a final cover meeting the requirements of § 257.102(d)(3) over the CCR. The final cover system is described in Section 3. The areal limits of Cells 1 and 2 are shown on drawing CD-4 – Final Cover Grades in Appendix A. Closure activities for Landfill No. 3 will commence when CCR disposed in the cell reach final waste grades shown on drawing D-7 – Cell 1 & 2 Top of Waste in Appendix A. At that time this closure plan will be updated to comply with the federal rules.

§ 257.102(b)(1)(iv) requires an estimate of the maximum inventory of CCR ever on the site over the active life of the CCR unit. The design capacity of Cell 1 and 2 is 893,000 cubic yards. Therefore, prior to lateral expansion of the PIPP Landfill No. 3, in accordance with the approved Construction Permit, the maximum CCR inventory of the landfill is 893,000 cubic yards.

§ 257.102(b)(1)(v) requires an estimate of the largest area of the CCR unit ever requiring final cover, at any time during the active life of the CCR unit. The area of Cell 1 and 2 are approximately 12.1 acres and the area of Cell 1 that has already received final cover is approximately 4.2 acres. Therefore, prior to lateral expansion of the Landfill No. 3, in accordance with the approved Construction Permit, the largest area of the CCR unit requiring a final cover during the CCR unit's active life is 7.9 acres.

§ 257.102(d)(1)(i). The final cover system described in Section 3 is a composite final cover system which will envelop the CCR, minimizing post-closure infiltration and the potential release of CCR, leachate, or contaminated run-off from the closed unit. Fugitive dust from exposed CCR before and during final cover construction will be managed in accordance with the Fugitive Dust Control Plan. Surface water that has come into contact with CCR before and during final cover construction will be managed as leachate in accordance with the Run-on and Run-off Control Plan.

§ 257.102(d)(1)(iii). Slope stability of the CCR and final cover is enhanced in the manner in which the CCR is conditioned, placed, and compacted; how the facility is operated to promote storm and contact water management; and how the leachate collection system is designed and monitored to ensure leachate is being removed from the waste and not allowed to build-up within the landfill. The permitted final cover slopes will be at a 3.3% minimum slope at the top of the landfill to promote surface water drainage and prevent ponding due to the settlement of the final cover system. The perimeter side slopes of the landfill will be at a maximum slope of 25% to provide long-term stable slopes that promote stormwater drainage, can be protected from excessive erosion, and safely maintained.

§ 257.102(d)(1)(iv). The final cover system described in Section 3 will minimize infiltration, which in turn minimizes the demand on the leachate collection system. The final cover will be vegetated with grass to promote evapotranspiration and prevent erosion. The final cover

system vegetation will be maintained by fertilizing as necessary to develop a well-established vegetative cover and periodic mowing to stimulate root growth and prevent the establishment of woody vegetation. Final slopes will be between 3.3% and 25% to facilitate mowing. Slopes greater than 10% will be covered with erosion matting after seeding to minimize erosion during the establishment of vegetative cover.

§ 257.102(d)(1)(v). The final cover system described in Section 3 uses readily available equipment and materials and can easily be completed in a single construction season.

3. Final Cover System

This section is included to fulfill the requirements of § 257.102(b)(1)(iii).

Filling to final contours will result in a final slope no greater than 25% sloping downward from the center of the fill area to the perimeter of the site. The top portion of the landfill will be graded to no less than 3.3% sloping from the southwest to the northeast to ensure positive drainage to the perimeter of the site. Drainage features, such as the perimeter ditches, terraces, and runoff channels will be constructed, as necessary, to accommodate surface runoff from phased closure.

The final cover system has been designed to minimize leachate generation by limiting percolation through the final cover barrier layer, promoting subsurface drainage to limit head on the barrier layer, and establishing vigorous plant growth to maximize evapotranspiration. The final cover system has also been designed for stability and to reduce maintenance. Specifically, the final cover system includes a geomembrane barrier layer system consisting of a polyethylene geomembrane. The remainder of the cover system consists of a geocomposite drainage layer, 24 inches of rooting zone/drainage material, and 6 inches of topsoil. The geocomposite drainage layer is incorporated into the final cover system cross-section to promote subsurface drainage and prevent the build-up of head pressure on the barrier layer as well as pore pressures in the final cover system soils.

The hydraulic conductivity of the final cover system is required by § 257.102(d)(3)(i)(A) to be less than or equal to the hydraulic conductivity of the bottom liner system or natural subsoils present or a hydraulic conductivity no greater than 1.0E-05 cm/s, whichever is less. The PIPP Landfill No. 3 is designed and constructed from bottom to top with a composite base liner system consisting of a geosynthetic clay liner and polyethylene geomembrane, a geocomposite leak detection layer, a second polyethylene geomembrane liner, and a leachate collection system. The approved final cover system is a composite final cover consisting of a compacted CCR, polyethylene geomembrane, composite drainage layer, and vegetated soil layers. The final cover system meets the requirements of § 257.102(d)(3)(i)(A).

Construction equipment and methods normally used in developing landfills and performing earth-moving projects will be used. The following sub-sections discuss the construction of the individual components of the final cover system. Layout and details of the final cover system are shown on the drawings included in Appendix A.

3.1 Compacted CCR Layer

The final cover system is constructed on a compacted CCR layer. CCR will be used as the support layer for the geomembrane. The CCR will be placed and compacted with a large vibratory smooth drum roller. The prepared CCR layer shall be free of any angular particles protruding from the surface greater than 0.5 inches, sharp breaks in grade or excessive rutting greater than 0.2 feet, and shall provide a firm, smooth surface for deployment of the geomembrane.

3.2 Geomembrane

The geomembrane component of the final cover system will be a 40-mil textured linear low-density polyethylene (LLDPE) geomembrane in compliance with Rule 915 of Part 115, P.A. 451. The LLDPE geomembrane will provide flexibility of the final cover system to accommodate expected settling and subsidence in accordance with § 257.102(d)(3)(i)(D). Geomembrane panels will be positioned by suspending rolls of material with a front-end loader and unrolling the suspended material by hand or with the aid of an ATV, as the loader remains stationary. The geomembrane will be installed in a loose and relaxed condition. Panels will be overlapped approximately 4 inches and fusion-welded together. At seam intersections and other repair locations, a geomembrane patch extending a minimum of 12 inches beyond the intersection or repair will be extrusion-welded into place. All seams will be non-destructively tested by air or vacuum testing. The integrity of fusion welds will be air tested, and extrusion welds will be vacuum-tested.

3.3 Drainage/Rooting Layer and Topsoil

A geocomposite drainage layer and a 24-inch-thick rooting zone layer or a 12-inch-thick drainage layer and 12-inch thick rooting zone layer meeting the requirements of § 257.102(d)(3)(i)(B) will be installed above the geomembrane final cover.

The geocomposite drainage layer or a granular drainage layer will be installed above the geomembrane cover. The geocomposite will be a double-sided geocomposite and will be deployed such that the seams run perpendicular to the contour lines of the slope to the extent possible. The geonet will be cable-tied every 3 feet along the edge of the panels and every 12 feet for end seams. If a granular drainage layer is used, it shall be a clean sand with a hydraulic conductivity of 1.0E-03 centimeters per second or greater and placed in a single lift using low-ground pressure (less than 5 pounds per square inch) equipment to prevent damage to the underlying geomembrane. The drainage layer will be installed to aid in the removal of subsurface stormwater drainage. The rooting zone layer will be installed above the drainage layer to support vegetative growth and both layers will provide protection of the geomembrane layer. The rooting layer will be placed over the geocomposite or the sand drainage layer in a single lift using low ground pressure dozers. The material will be classified as SW, SP, SM, SC, ML, or CL and have a maximum particle size of 3 inches.

Meeting the requirements of § 257.102(d)(3)(i)(C), topsoil capable of sustaining vegetative growth will be placed and spread into a uniform loose lift thickness of 6 inches. Once placed, the topsoil will be fertilized, seeded, and mulched. On all slopes greater than 10%, a temporary straw mulch blanket will be used to limit erosion and protect the seed prior to the establishment of vegetation.

4. Schedule for Closure

This section is included to fulfill § 257.102(b)(1)(v). The first two phase of construction, Cells 1 and 2 were placed into service in 2005 and 2008, respectively. The first phase of closure, the perimeter slopes of Cell 1 was completed in 2014. In accordance with the MDEQ approved Construction Permit, the landfill has a phased development plan, describing the construction, operation, and closure of each phase of the landfill from the construction of Cell 1 to the closure of Cell 4. In general, the development plan requires active landfill cells which have reached final waste grades be closed as soon as practical to limit the maximum open area, leachate generation, and the potential operational problems. In order to reach the peak design CCR grades in Cells 1 and 2, Cell 3 will be constructed. A schedule for completing all activities necessary to satisfy the closure criteria is dependent on the CCR generation rates, beneficial reuse programs, and disposal rate volumes. However, final closure of Cell 2 will begin no later than 30 days following the final waste receipt for the CCR unit in accordance with §257.102(e)(1).

The development of the landfill in accordance with the Construction Permit is approved by MDEQ. Therefore no additional state or local approvals are required for We Energies to begin construction of the next phase of the landfill or closure of an existing phase. The final cover system described in Section 3 uses standard and readily available equipment and materials and can easily be completed in a single construction season.

5. Conclusion and Certification

We Energies owns and operates a solid waste disposal facility located approximately 4 miles west of the PIPP in the N ½ of the SE ¼ of Section 6, Township 48 North, Range 25 West, Marquette County, Michigan. The landfill is regulated as a Type III landfill by the MDEQ in accordance with Part 115, Solid Waste Management of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The landfill is also required to comply with 40 CFR Part 257 Subpart D – Standards for Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments. This plan fulfills the requirements for a written Closure Plan of the PIPP Landfill No. 3, Cells 1 and 2 in accordance with § 257.102 - Criteria for Conducting the Closure or Retrofit of CCR Units, describing the engineering design and construction of the final cover system, how the final cover system will meet the applicable performance standards contained in § 257.102(d), an estimate of the maximum inventory of CCR, an estimate of the maximum open area that would require closure at one time, and a generalized schedule based on the anticipated landfill filling rates and disposal volumes.

This Closure Plan was completed under the direction of John, M. Trast, P.E. I am a licensed professional engineer in the State of Michigan in accordance with Article 20 of the Occupational Code, Public Act 299 of 1980, as amended. This document has been prepared in accordance with the Michigan Administrative Rules, Department of Licensing and Regulatory Affairs, Professional Engineers – General Rules, Part 3 – Standards of Practice and Professional Conduct; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR Part 257 Subpart D.

TRAST ENGINEER

Appendix A

Drawings

Drawings CD-4 Final Cover Grades, Phase 1 Final Cover Construction Documentation, We Energies, Presque Isle Power Plant Landfill No. 3, dated February 27, 2015

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