Dynegy Midwest Generation, LLC
1500 Eastport Plaza Dr.
Collinsville, IL 62234

January 28, 2022

Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Vermilion New East Ash Pond (IEPA ID: W1838000002-04) Annual Consolidated Report

Dear Mr. LeCrone:

In accordance with 35 IAC § 845.550, Dynegy Midwest Generation, LLC (DMG) is submitting the annual consolidated report for the Vermilion New East Ash Pond (IEPA ID: W1838000002-04), as enclosed.

Sincerely,

Dianna Tickner
Director Decommissioning & Demolition

Enclosures

Annual Consolidated Report
Dynegy Midwest Generation, LLC
Vermilion Power Plant
New East Ash Pond; W1838000002-04

In accordance with 35 IAC § 845.550, Dynegy Midwest Generation, LLC (DMG) has prepared the annual consolidated report. The report is provided in three sections as follows:

Section 1
1) Annual CCR fugitive dust control report (Section 845.500(c))

Section 2
2) Annual inspection report (Section 845.540(b)), including:

A) Annual hazard potential classification certification

B) Annual structural stability assessment certification

C) Annual safety factor assessment certification

D) Inflow design flood control system plan certification

It should be noted that the drawings and attachments of the certification report were included in the operating permit application submittal.

Section 3
3) Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Section 1
Annual CCR Fugitive Dust Control Report

Annual CCR Fugitive Dust Control Report

for

Vermilion Power Plant

Prepared for:

Owner/Operator:
Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

Facility Address:
Vermilion Power Plant
10188 East 2150 North Rd
Oakwood, IL 61858
IEPA ID # W1838000002 - 01,03,04

Report Completed
January 2022

Vermilion Power Plant
ANNUAL CCR FUGITIVE DUST CONTROL REPORT

Reporting Year: 4th Quarter 2021

Completed by: Dianna Tuckner — **Director, Decommissioning and Demolition**
Name — **Title**

This Annual CCR Fugitive Dust Control Report has been prepared for the Vermilion Power Plant in accordance with 35 I.A.C. 845.500. Section 1 provides a description of the actions taken to control CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken. Section 2 provides a record of citizen complaints received concerning CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken.

Section 1: Actions Taken to Control CCR Fugitive Dust

In accordance with the Vermilion Power Plant CCR Fugitive Dust Control Plan (Plan), the following control measures were used to manage the CCR fugitive dust from becoming airborne at the facility during the reporting year:

Table: Control Measures for CCR Management in CCR Surface Impoundments

CCR Activity	CCR Fugitive Dust Control Measures	Applicability and Appropriateness of Control Measures
Management of CCR in the facility's CCR unit	Water dry CCR material disturbed during routine maintenance, as necessary.	Wetting CCR reduces the potential for CCR fugitive dust generation during handling of CCR during routine maintenance if handling is required.
	Water areas of exposed CCR in CCR surface impoundments, as necessary.	Water will be applied to areas of exposed CCR to maintain moisture content to minimize the potential for CCR fugitive dust generation in excessively dry or windy conditions.
	Allow naturally occurring grass vegetation to develop in areas of exposed CCR in CCR surface impoundments, as necessary.	Vegetation provides a wind screen and/or cover to reduce wind entrainment of CCR.
	Apply chemical dust suppressant on areas of exposed CCR in CCR surface impoundments, as necessary.	Mixing an appropriate chemical dust suppressant with water and applying to areas of exposed CCR will minimize the potential for CCR fugitive dust generation in excessively dry or windy conditions.

Based on a review of the Plan and inspections associated with CCR fugitive dust control performed in the reporting year, the control measures identified in the Plan as implemented at the facility effectively minimized CCR from becoming airborne at the facility. The Vermilion Power Plant ceased to operate in 2011.
No material changes occurred in the reporting year in site conditions potentially resulting in CCR fugitive dust becoming airborne at the facility that warrant an amendment of the Plan.

Section 2: Record of Citizen Complaints
In the event the owner or operator of the facility receives a citizen complaint involving a CCR fugitive dust event at the facility, relevant information about the compliant will be logged. Information that will be recorded includes, as applicable:• Date/Time the complaint is received.

- Date/Time the complaint is received
- Date/Time and duration of the CCR fugitive dust event
- Description of the nature of the CCR fugitive dust event
- Name of the citizen entering the complaint (if provided)
- Address & phone number of citizen entering the complaint (if provided)
- Name of the personnel who took the complaint
- All actions taken to assess and resolve the complaint.

No citizen complaints were received regarding CCR fugitive dust at Vermilion Power Plant in the reporting year.

Section 2

Annual Inspection Report (Section 845.540(b)), including:

A) Annual Hazard Potential Classification Certification, if applicable (Section 845.440)

B) Annual Structural Stability Assessment Certification, if applicable (Section 845.450)

C) Annual Safety Factor Assessment Certification, if applicable (Section 845.460)

D) Inflow Design Flood Control System Plan Certification (Section 845.510(c))

ANNUAL INSPECTION BY A QUALIFIED PROFESSIONAL ENGINEER 35 IAC § 845.540
(b)(1) The CCR surface impoundment must be inspected on an annual basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted engineering standards. The inspection must, at a minimum, include: A) A review of available information regarding the status and condition of the CCR surface impoundment, including files available in the operating record (e.g., CCR surface impoundment design and construction information required by Sections 845.220(a)(1) and 845.230(d)(2)(A), previous structural stability assessments required under Section 845.450, the results of inspections by a qualified person, and results of previous annual inspections); B) A visual inspection of the CCR surface impoundment to identify signs of distress or malfunction of the CCR surface impoundment and appurtenant structures; C) A visual inspection of any hydraulic structures underlying the base of the CCR surface impoundment or passing through the dike of the CCR surface impoundment for structural integrity and continued safe and reliable operation; D) The annual hazard potential classification certification, if applicable (see Section 845.440); E) The annual structural stability assessment certification, if applicable (see Section 845.450); F) The annual safety factor assessment certification, if applicable (see Section 845.460); and G) The inflow design flood control system plan certification (see Section 845.510(c)).

SITE INFORMATION	
Site Name / Address / Date of Inspection	Vermilion Power Station Vermilion County, Illinois 61858 10/22/2021
Operator Name / Address	Dynegy Midwest Generation, LLC 1500 Eastport Plaza Drive, Collinsville, IL 62234
CCR unit	New East Ash Pond

INSPECTION REPORT 35 IAC § 845.540 Date of Inspection 10/22/2021	
(b)(1)(D) The annual hazard potential classification certification, if applicable (see Section 845.440).	Based on a review of the CCR unit's annual hazard potential classification, the unit is classified as a Class II CCR surface impoundment.
(b)(2)(A) Any changes in geometry of the structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no changes in geometry of the structure have taken place since the previous annual inspection.
(b)(2)(B) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection	There is currently no active instrumentation at the site
b)(2)(C) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;	See the attached.
b)(2)(D) The storage capacity of the impounding structure at the time of the inspection	Approximately 375 acre-feet
(b)(2)(E) The approximate volume of the impounded water and CCR contained in the unit at the time of the inspection.	Approximately 213 acre-feet
(b)(2)(F) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit	Based on a review of the CCR unit's records and visual observation during the on-site inspection, there was no appearance of an actual or potential structural weakness of the CCR unit, nor an existing condition that is disrupting or would disrupt the operation and safety of the unit.

INSPECTION REPORT 35 IAC § 845.540 Date of Inspection 10/22/2021	
(b)(2)(G) Any other changes that may have affected the stability or operation of the impounding structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no other changes which may have affected the stability or operation of the CCR unit have taken place since the previous annual inspection.
(b)(1)(G) The inflow design flood control system plan certification (see Section 845.510(c))	Based on a review of the CCR unit's records, the CCR unit is designed, operated, and maintained to adequately manage the flow from the CCR impoundment and control the peak discharge from the inflow design flood.

35 IAC § 845.540 - Annual inspection by a qualified professional engineer.

I, James Knutelski, P.E., certify under penalty of law that the information submitted in this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Illinois. The information submitted, is to the best of my knowledge and belief, true, accurate and complete. Based on the annual inspection, the design, construction, operation, and maintenance of the CCR Unit is consistent with recognized and generally accepted good engineering standards. Based on a review of the records for the CCR unit, the hazard potential classification was conducted in accordance with the requirements of Section 845.440 and the Safety Factor Assessment was conducted in accordance with the requirements of Section 845.460.

James Knutelski, PE
Illinois PE No. 062-054206, Expires: 11/30/2023
Date: 01/25/2022

Site Name: Vermilion Power Station

CCR Unit: New East Ash Pond

35 IAC § 845.540 (b)(2)(B)		
Instrument ID #	Type	Maximum recorded reading since previous annual inspection (ft)
No active instrumentation		

35 IAC § 845.540 (b)(2)(C)						
	Approximate Depth / Elevation					
Since previous inspection:	Elevation (ft)			Depth (ft)		
	Minimum	Present	Maximum	Minimum	Present	Maximum
Impounded Water		594			9	
CCR	585		606			21

Luminant

Office Memorandum

Date: October 12, 2021

To: Cynthia Vodopivec

cc: Charles Koudelka
Phil Morris

From: Vic Modeer

Subject: Dynegy Midwest Generation, LLC
Vermilion Power Plant – New East Ash Pond

Documentation of Initial Hazard Potential Classification Certification
Vermilion Power Plant New East Ash Pond.

Purpose

This letter documents the certification of the initial hazard potential classification assessment for the Vermillion Power Plant New East Ash Pond (NEAP).

The *Illinois Administrative Code (IAC), Title 35, Part 845.440* requires the owner or operator of an existing coal combustion residuals (CCR) surface impoundment to conduct an initial hazard potential classification assessment, and the basis for the classification, of the CCR unit as either a Class 1 (high hazard) or Class 2 (significant hazard) CCR surface impoundment.

Results

A breach analysis was performed by Geosyntec to evaluate potential hazards associated with a failure of the NEAP's perimeter containment dike. Breach locations were selected based on nearby downstream areas that could be potentially impacted. The breach failure mode consisted of the NEAP's reservoir full of water and a resultant overtopping of the perimeter containment dike's crest. The overtopping breach failures were modeled along the NEAP's eastern perimeter containment dike for two downstream conditions along the Middle Fork Vermilion River: 1) "Full Riverbank Flow"; and 2) "100-Year Flow" scenarios.

Model results indicate that a breach of the eastern perimeter containment dike would inundate the undeveloped floodplain area immediately to the east of the NEAP. The model results indicate that breach discharge would flow into the Middle Fork Vermilion River and not result in any structures being impacted. Therefore, failure or mis-operation of the NEAP would result in no probable loss of human life. However, a NEAP breach event would result in off-site release of CCR material onto

immediate downstream areas and into the Middle Fork Vermilion River, resulting in environmental damage.

Section 845.120 defines a "Class 2 CCR surface impoundment" as a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Based on the results of the analysis summarized above, the initial hazard potential hazard classification was conducted in accordance with Section 845.440, with the NEAP assigned a Class 2 hazard potential classification. Accordingly, the certification below satisfies the requirements of Section 845.440(a)(2).

Sincerely,

Vic Modeer, PE, D.GE
(IL, MO, IN, KY, OH, LA)
Engineering Manager

Prepared for

Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

CCR INITIAL STRUCTURAL STABILITY ASSESSMENT

VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Prepared by

Geosyntec consultants

engineers | scientists | innovators

134 N. Lasalle Street, Suite 300
Chicago, Illinois 60602

Project Number CHE8404A

October 2021

Geosyntec consultants

TABLE OF CONTENTS

1. INTRODUCTION

Dynegy Midwest Generation, LLC (Dynegy) is the owner of inactive coal-fired Vermilion Power Plant (VPP), also referred to as Vermilion Power Station, located approximately 13 miles Northwest of Danville, Illinois. The New East Ash Pond (NEAP) is an inactive surface impoundment storing coal combustion residuals (CCR). The NEAP must meet the requirements of 35 Ill. Admin. Code 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

The NEAP is an existing CCR surface impoundment as defined by Section 845.120. This Initial Structural Stability Assessment addresses the requirements of Part 845.450 for the NEAP.

1.1. Facility Information

Facility:	Vermilion Power Plant 10188 East 2150 North Rd Oakwood, IL 61858
Owner/Operator:	Dynegy Midwest Generation, LLC 1500 Eastport Plaza Drive Collinsville, IL 62234

2. INITIAL STRUCTURAL STABILITY ASSESSMENT

Section 845.450(a): The owner or operator of a CCR surface impoundment must conduct initial and annual structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted engineering practices for the maximum volume of CCR and CCR wastewater that can be impounded in the CCR surface impoundment. The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: [the standards in (a)(1)-(7)].

An initial structural stability assessment has been performed to document that the design, construction, operation, and maintenance of the NEAP is consistent with recognized and generally accepted good engineering practices. The results of the structural stability assessment are discussed in the following sections.

Based on the assessment and its results, the design, construction, operation, and maintenance of NEAP were found to be consistent with recognized and generally accepted good engineering practices and meets the standards in Section 845.450(a)(1)-(7), except as noted herein.

2.1. Foundations and Abutments

Section 845.450(a)(1): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: 1) Stable foundations and abutments;

The stability of the NEAP foundation and abutments was evaluated based on the review of the History of Construction Report, review of observations from the 2019 annual inspection forms, review of geophysical investigation results, review of available geotechnical data, and performing slope stability analyses.

It was concluded that there had been coal mining activities around the perimeter of NEAP prior to construction of the NEAP. A geophysical investigation was conducted at the site to identify underground void spaces. A few localized voids and potential voids were identified around the perimeter of the CCR unit. Inspection of the ground surface in these areas is included in the inspection procedures. No evidence of ground subsidence has been identified around the NEAP or on the eastern berm since operations started at the NEAP.

The foundation of NEAP and abutments appear to be stable after the review of geotechnical investigations, inspection records, laboratory data, and safety factors for slip surfaces meeting or exceeding the minimum requirements specified by Section 845.460.

2.2. Slope Protection

Section 845.450(a)(2): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: … 2) Adequate slope protection to protect against surface erosion, wave action, and adverse effects of sudden drawdown;

Procedures for operation and maintenance were reviewed. The adequacy of slope protection present at NEAP was evaluated by reviewing inspection reports and conditions observed in the field during the 2019 annual inspection, and subsequent visits made by Geosyntec in 2020 and 2021.

The perimeter dike slopes are generally 3H:1V and are covered with vegetation for slope protection. Dynegy regularly maintains the slopes, including repairing observed surface erosion and addressing areas of poor vegetation growth, as required.

Based on this evaluation, NEAP meets the requirements of Section 845.450(a)(2).

2.3. Dike Compaction

Section 845.450(a)(3): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: … 3) Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR surface impoundment;

Compaction of the NEAP perimeter dike was evaluated using field data obtained from the various geotechnical investigations. The standard penetration test (SPT) N-values for the cohesive component of the perimeter dike ranges from 7 to 93, with an average of 19; the range corresponds to a consistency of soft to hard, with the average value corresponding to very stiff.

The consistencies based on average values are indicative of mechanically compacted dikes. Further, slope stability analyses as required by Section 845.460 result in acceptable safety factors. Therefore, the dike compaction and density are sufficient for withstanding required ranges in loading conditions.

2.4. Vegetated Slopes

Section 845.450(a)(4): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: … 4) Slope protection consistent with Section 845.430;

The adequacy of slope vegetation at NEAP was evaluated by reviewing conditions observed from the 2019 annual inspection forms, and visual observations obtained from additional field visits conducted by Geosyntec in 2020 and 2021. At the time of the 2019 annual inspection, and site visits in 2020 and 2021, the exterior slopes were vegetated and well-maintained. Some woody vegetation was observed on lower portions of the perimeter dike.

Based on this evaluation, NEAP meets the requirements of Section 845.450 with the exception of limited areas where woody vegetation exists. Dynegy has an operation and maintenance plan to remove the woody vegetation in accordance with Section 845.430(b)(4).

2.5. Spillways

> *Section 845.450(a)(5): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: ... 5) A single spillway or a combination of spillways configured as specified in subsection (a)(5)(A). The combined capacity of all spillways must be designed, constructed, operated, and maintained to adequately manage flow during and following the peak discharge from the event specified in subsection (a)(5)(B);*

The spillways at the NEAP were evaluated using hydrologic and hydraulic analyses, and historic design and construction information provided by Dynegy. The NEAP is a Class 2 CCR surface impoundment; therefore, the 1,000-year storm event is the design flow event for NEAP, per Section 845.510(a)(3)(B).

Per the June 22, 2021 Illinois Attorney General (IAG) Interim Order (Order), *II. Interim Injunction Relief (2)(b); Within forty-five (45) days of the entry of this Order, Defendant shall submit to Illinois EPA, for it review and approval, a written scope of work for the removal of free water and dewatering of the Ponds at the Site, including a proposed schedule for implementation.* Therefore, the starting water surface elevation was set at the bottom elevation of the NEAP (589.0 feet) when evaluating the 1,000-year storm event as the IAG Order requires removal of free water from NEAP as part of its normal operating condition.

The primary spillway system for the NEAP consists of an 18-inch diameter steel pipe through the divider dike embankment, which transitions to a drop inlet structure on the upstream side of the embankment. The NEAP auxiliary spillway system consists of a 36-inch diameter reinforced concrete pipe (RCP) through the divider dike embankment, which transitions to a drop inlet structure on the upstream side of the embankment. Both spillway systems discharge to a secondary settling pond non-CCR impoundment on the downstream side of the divider dike embankment. The primary and auxiliary spillway pipes and inlet structures are constructed of metal and concrete, both of which are non-erodible materials. The capacities of the spillways were evaluated using hydrologic and hydraulic analyses. The analysis found that the spillways adequately manage flow

during peak discharge resulting from the 1,000-year storm event to prevent overtopping of the embankments with a starting water surface elevation at the bottom of NEAP. The hydrologic and hydraulic analysis did not consider additional outflow from a portable pump.

Based on these evaluations, the NEAP meets the requirements in Section 845.450(a)(5).

2.6. Stability and Structural Integrity of Hydraulic Structures

> *Section 845.450(a)(6): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: … 6) Hydraulic structures underlying the base of the CCR surface impoundment or passing through the dike of the CCR surface impoundment that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the CCR surface impoundment;*

The discharge pipe for NEAP will be removed as part of the upcoming closure. Dynegy is in the process of submitting the construction permit for the closure activities.

2.7. Downstream Slope Inundation/Stability

> *Section 845.450(a)(7): The assessment must, at a minimum, document whether the CCR surface impoundment has been designed, constructed, operated, and maintained with: … 7) For CCR surface impoundments with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.*

The river level is generally around elevation 573 ft with ordinary high water mark being at an approximate elevation of 580 ft. The toe of the perimeter dike is around 582 ft. It is unlikely that the river level would rise over 590 and stay there for a considerable amount of time to saturate the cohesive soils that could reduce the stability of the perimeter dike. Therefore, it is unlikely that a rapid drawdown condition would occur at the NEAP perimeter dike. Based on this evaluation, Section 845.450(a)(7) is not applicable for NEAP.

3. CERTIFICATION

CCR Unit: Dynegy Midwest Generation, LLC; Vermilion Power Plant, New East Ash Pond

I, John Seymour, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify in accordance with Section 845.450(c), to the best of my knowledge, information, and belief, that the information contained in this plan has been prepared in accordance with the accepted practice of engineering and meets the requirements of Section 845.450, with the exception for Section 845.450(a)(4) where woody vegetation was identified.

John Seymour
Printed Name

John Seymour 10/22/2021
Signature Date

062.040562 Illinois 30 November 2021
Registration Number State Expiration Date

Affix Seal

Prepared for

Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

CCR INITIAL SAFETY FACTOR ASSESSMENT

VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Prepared by

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engineers | scientists | innovators

134 N. Lasalle Street, Suite 300
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Project Number CHE8404A

October 2021

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NEAP is an existing CCR surface impoundment as defined by Section 845.120. This Initial Safety Factor Assessment addresses the requirements of Section 845.460 for the NEAP.

1.1. Facility Information

Facility:	Vermilion Power Plant 10188 East 2150 North Rd Oakwood, IL 61858
Owner/Operator:	Dynegy Midwest Generation, LLC 1500 Eastport Plaza Drive Collinsville, IL 62234

2. INITIAL SAFETY FACTOR ASSESSMENT

Section 845.460(a): The owner or operator of a CCR surface impoundment must conduct an initial and annual safety factor assessments for each CCR surface impoundment and document whether the calculated factors of safety for each CCR surface impoundment achieve the minimum safety factors specified in this Section for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.

1. *For new CCR surface impoundments, the calculated static factor of safety under the end-of-construction loading condition must equal or exceed 1.30. The assessment of this loading condition is only required for the initial safety factor assessment and is not required for subsequent assessments.*

2. *The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.*

3. *The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.*

4. *The calculated seismic factor of safety must equal or exceed 1.00.*

5. *For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.*

A geotechnical investigation program and stability analyses were performed by Geosyntec to evaluate the stability of the NEAP perimeter dike. Available data from field investigations, existing documents and reports, and other information provided to Geosyntec from Dynegy were utilized to perform this assessment.

In general, the perimeter dike of NEAP consists of a fine-grained compacted soil overlying native clay alluvium and sand alluvium ranging from 5 to 20 feet thick extending down to bedrock. The phreatic surface was established considering groundwater level readings from both borings and established wells in and around the NEAP.

One (1) representative cross section was analyzed using limit equilibrium slope stability analysis software to evaluate the stability of the perimeter dike system and foundations. The cross section were located to represent critical surface geometry, subsurface stratigraphy, and phreatic conditions across the site. The cross sections was evaluated for the loading conditions stipulated in Section 845.460(a).

NEAP was constructed in 2003, and it is currently inactive. Therefore, the end-of-construction short-term loading condition was not applicable and not analyzed for this initial safety factor assessment.

Results of the Initial Safety Factor Assessments, for the critical cross section for the applicable loading conditions, are provided in Table 1 (i.e., the table identifies the lowest calculated factor of safety for any one of the two analyzed cross sections for each loading condition).

Table 2-1: Summary of Initial Safety Factor Assessments

Loading Conditions	845.460(a) Subsection	Minimum Factor of Safety	Calculated Factor of Safety
End-of-Construction Loading	1	1.30	Not Applicable
Long-term Maximum Storage Pool Loading	2	1.50	2.42
Maximum Surcharge Pool Loading	3	1.40	2.41
Seismic	4	1.00	2.02
Soils Susceptible to Liquefaction	5	1.20	>1.20

Based on this evaluation, NEAP meets the requirements in 845.460(a).

3. CERTIFICATION

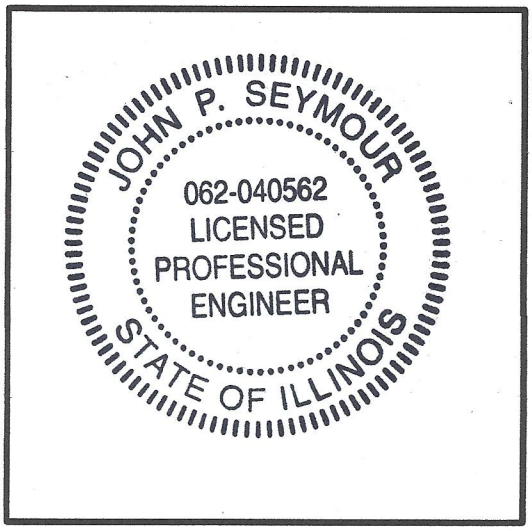
CCR Unit: Dynegy Midwest Generation, LLC; Vermilion Power Plant, New East Ash Pond

I, John Seymour, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify in accordance with Section 845.460(b), to the best of my knowledge, information, and belief, that the information contained in this plan has been prepared in accordance with the accepted practice of engineering and meets the requirements of Section 845.460.

John Seymour
Printed Name

John Seymour 10/22/2021
Signature Date

062.040562 Illinois 30 November 2021
Registration Number State Expiration Date



Affix Seal

Prepared for

Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

INITIAL CCR INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Prepared by

Geosyntec consultants

engineers | scientists | innovators

134 N. Lasalle Street, Suite 300
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NEAP is an existing CCR surface impoundment as defined by *Section 845.120*, This Inflow Design Flood Control System Plan addresses the requirements of *Section 845.510(c)* for the NEAP.

1.1. Facility Information

Facility:	Vermilion Power Plant 10188 East 2150 North Rd Oakwood, IL 61858
Owner/Operator:	Dynegy Midwest Generation, LLC 1500 Eastport Plaza Drive Collinsville, IL 62234

2. INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

Section 845.510(c)(1): Content of the Plan. The owner or operator must prepare initial and annual inflow design flood control system plans for the CCR surface impoundment. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this Section. Each plan must be supported by appropriate engineering calculations.

Section 845.510(c)(2): Amendment of the Plan. The owner or operator of the CCR surface impoundment may amend the written inflow design flood control system plan at any time. The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.

Analyses completed for the initial inflow design flood control system plan of the NEAP are described in the following subsections. Data and analysis results in the following subsections are based on spillway design information shown on design drawings, construction information, topographic surveys, information about operational and maintenance pocesures provided by Dynegy. The analysis approach and results of the hydrologic and hydraulic analyses are presented in the following subsections.

2.1. Initial Inflow Design Flood Control Systems (Section 845.510(a))

Section 845.510(a): The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in subsections (a)(1) and (2).

1. The inflow design flood control system must adequately manage flow into the CCR surface impoundment during and following the peak discharge of the inflow design flood specified in subsection (a)(3).

2. The inflow design flood control system must adequately manage flow from the CCR surface impoundment to collect and control the peak discharge resulting from the inflow design flood specified in subsection (a)(3).

3. The inflow design flood, at a minimum, is:

A. For a Class 1 CCR surface impoundment, as determined under Section 845.440(a), the probable maximum flood;

B. For a Class 2 CCR surface impoundment, as determined under Section 845.440(a), the 1000-year flood; or

C. For an incised CCR surface impoundment, the 25-year flood.

The NEAP is a Class 2 CCR surface impoundement based on the certified documentation of initial hazard potential classification (Luminant, October 2021), in accordance with *Section 845.440*.

An initial inflow design flood control system plan, supported by a hydraulic and hydrologic analysis, was developed for the NEAP by evaluating the effects of a 24-hour duration design storm for the 1,000-year Inflow Design Flood (IDF) using a hydrologic HEC-HMS (Version 4.8) computer model and a starting water surface elevation of 589.0 feet (NAVD 88). Per the June 22, 2021 Illinois Attorney General (IAG) Interim Order (Order), *II. Interim Injunction Relief (2)(b); Within forty-five (45) days of the entry of this Order, Defendant shall submit to Illinois EPA, for it review and approval, a written scope of work for the removal of free water and dewatering of the Ponds at the Site, including a proposed schedule for implementation.* Therefore, the starting water surface elevation was set at the bottom elevation of the NEAP (589.0 feet) when evaluating the 1,000-year IDF as the IAG Order requires removal of free water from NEAP as part of its normal operating condition.

The computer model evaluated the NEAP ability to collect and control the 1,000-year IDF under existing operatrional and maintenance procedures. Rainfall data for the 1,000-year IDF was obtained from the National Oceanic and Atmosheric Administration (NOAA) Precipitation Frequency Distribution Server (PFDS), which is an online interactive map that provides NOAA Atlas 14 rainfall data for a selected location. The NOAA Atlas 14 rainfall depth is 10.5 inches at NEAP per the PFDS for the 1,000-year, 24-hour rainfall event.

The HEC-HMS model results for the NEAP indicate that the CCR unit has sufficient storage capacity and spillway structures to adequately manage: (1) flow into the CCR unit during and following the peak discharge of the 1,000-year IDF, and (2) flow from the CCR unit to collect and control the peak discharge resulting from the 1,000-year IDF. The peak water surcharge elevation is 601.6 feet (NAVD 88), and the minimum crest elevation of the NEAP dike is 620.0 feet (NAVD 88). Therefore, overtopping of the NEAP dike is not expected during the evaluated 1,000-year IDF.

Based on this evaluation, the NEAP meets the requirements in *Section 845.510(a)*.

2.2. Discharge from the CCR Surface Impoundment (Section 845.510(b))

Section 845.510(a): Discharge from the CCR surace impoundment must be handled in accordance with the surface water requirements in Section 845.110(b)(3) and 35 Ill. Adm. Code Subtitle C.

Section 845.110(b): Any CCR surface impoundment or lateral expansion of a CCR surface impoundment is subject to the following requirements:

3. *Rivers, Lakes and Streams Act [615 ILCS 5/23 and 23(a)] and 17 Ill. Adm. Code 3702.*

The handling of discharge was evaluated by reviewing design drawings, operational and maintenance procedures, and the inflow design flood control system plan developed per *Section 845.510(a)*.

Based on this evaluation, outflow from the NEAP is ultimately routed through a NPDES-permitted discharge into the Middle Fork Vermilion River via its secondary settling pond non-CCR surface impoundment. Hydraulic and hydrologic analyses performed as part of the initial inflow design flood control system plan found that the NEAP adequately manages flow during the 1,000-year IDF, as overtopping of the NEAP embankment is not expected during the evaluated IDF.

Therefore, discharge of pollutants in violation of the NPDES permit is not expected during normal and IDF conditions as all discharge is routed through the existing spillway system and NPDES-permitted outfall.

Based on this evaluation, the NEAP meets the requirements in *Section 845.510(b)*.

3. CERTIFICATION

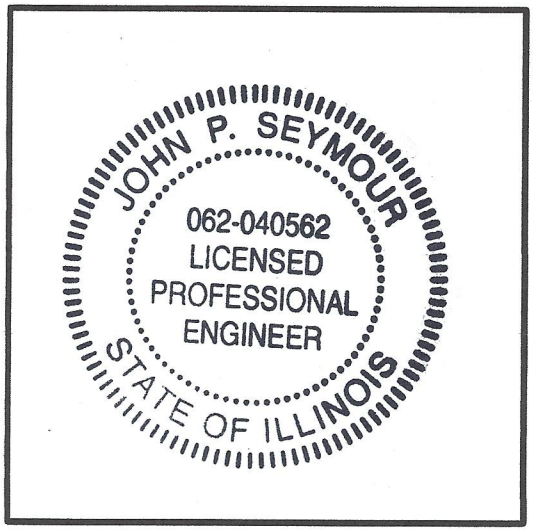
CCR Unit: Dynegy Midwest Generation, LLC; Vermilion Power Plant, New East Ash Pond

I, John Seymour, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify in accordance with Section 845.510(c)(3) to the best of my knowledge, information, and belief, that the information contained in this plan has been prepared in accordance with the accepted practice of engineering and that, for the above referenced CCR Unit, this initial inflow design flood control system plan meets the requirements of *Section 845.510*.

John Seymour
Printed Name

John Seymour 10/22/2021
Signature Date

062.040562 Illinois 30 November 2021
Registration Number State Expiration Date



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Section 3

Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Prepared for
Dynegy Midwest Generation, LLC

Date
January 31, 2022

Project No.
1940100722

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

NEW EAST ASH POND
VERMILION POWER PLANT
OAKWOOD, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VERMILION POWER PLANT NEW EAST ASH POND

Project name	**Vermilion Power Plant New East Ash Pond**
Project no.	**1940100722**
Recipient	**Dynegy Midwest Generation, LLC**
Document type	**Annual Groundwater Monitoring and Corrective Action Report**
Version	**FINAL**
Date	**January 31, 2022**
Prepared by	**Eric D. Plante**
Checked by	**Lauren Cook**
Approved by	**Brian Hennings**
Description	**Annual Report in Support of Part 845**

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APPENDICES

ACRONYMS AND ABBREVIATIONS

§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
BCU	bedrock confining unit
bgs	below ground surface
CCR	coal combustion residuals
DMG	Dynegy Midwest Generation, LLC
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
NEAP	New East Ash Pond
NID	National Inventory of Dams
No.	number
Part 845	35 I.A.C. § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	surface impoundment
SSI	statistically significant increase
TDS	total dissolved solids
UCU	upper confining unit
UU	upper unit
VPP	Vermilion Power Plant
WLO	water level only

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.610(e) (*Annual Groundwater Monitoring and Corrective Action Report*) for the New East Ash Pond (NEAP) located at Vermilion Power Plant (VPP) near Oakwood, Illinois.

An operating permit application for the NEAP was submitted by Dynegy Midwest Generation, LLC (DMG) to the Illinois Environmental Protection Agency (IEPA) by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d), and is pending approval. The NEAP is recognized by Vistra identification (ID) Number (No.) 912, IEPA ID No. W1838000002-04, and National Inventory of Dams (NID) No. IL50291.

A Groundwater Monitoring Plan (GMP; Ramboll Americas Engineering Solutions, Inc. [Ramboll], 2021a), which included a Statistical Analysis Plan, was developed and submitted as part of the operating permit application to propose a monitoring well network and monitoring program specific to the NEAP that will comply with 35 I.A.C. § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845; IEPA, 2021). The proposed groundwater protection standards (GWPS), as presented in the GMP, are shown in **Appendix A**.

Groundwater concentrations observed from 2015 to 2021 were presented in the Hydrogeologic Site Characterization Report (HCR; Ramboll, 2021b) and evaluated in the presentation of the History of Potential Exceedances (Ramboll, 2021c) included in the operating permit application, as required by 35 I.A.C. § 845.230(d). Groundwater concentrations from 2015 to 2021 that exceeded the GWPS set forth in 35 I.A.C. § 845.600(a) are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan, which is pending IEPA approval. The determination of potential historical exceedances of 35 I.A.C. § 845.600(a) and a summary of potential historical exceedances of proposed GWPS are shown in **Appendix B**.

Evaluation of background groundwater quality was presented in the GMP (Ramboll, 2021a), and compliance with Part 845 will be determined after the first round of groundwater sampling following IEPA's issuance of an operating permit.

This report summarizes only the information presented in the operating permit application for the NEAP, submitted to IEPA by October 31, 2021, which is pending IEPA approval.

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of DMG, to provide the information required by 35 I.A.C. § 845.610(e) for the NEAP located at VPP near Oakwood, Illinois. The owner or operator of a coal combustion residuals (CCR) surface impoundment (SI) must prepare and submit to IEPA by January 31st of each year an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year as part of the Annual Consolidated Report required by 35 I.A.C. § 845.550. The Annual Groundwater Monitoring and Corrective Action Report shall document the status of the groundwater monitoring and corrective action plan for the CCR SI, summarize key actions completed, including the status of permit applications and Agency approvals, describe any problems encountered and actions to resolve the problems, and project key activities for the upcoming year. At a minimum, the annual report must contain the following information, to the extent available:

1. A map, aerial image, or diagram showing the CCR SI and all background (or upgradient) and downgradient monitoring wells, including the well ID Nos., that are part of the groundwater monitoring program for the CCR SI, and a visual delineation of any exceedances of the GWPS.
2. Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken.
3. A potentiometric surface map for each groundwater elevation sampling event required by 35 I.A.C. § 845.650(b)(2).
4. In addition to all the monitoring data obtained under 35 I.A.C. §§ 845.600-680, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, and the dates the samples were collected.
5. A narrative discussion of any statistically significant increases (SSIs) over background levels for the constituents listed in 35 I.A.C. § 845.600.
6. Other information required to be included in the annual report as specified in 35 I.A.C. §§ 845.600-680.
7. A section at the beginning of the annual report that provides an overview of the current status of the groundwater monitoring program and corrective action plan for the CCR SI. At a minimum, the summary must:
    i. Specify whether groundwater monitoring data shows a SSI over background concentrations for one or more constituents listed in 35 I.A.C. § 845.600.
    ii. Identify those constituents having a SSI over background concentrations and the names of the monitoring wells associated with the SSI(s).
    iii. Specify whether there have been any exceedances of the GWPS for one or more constituents listed in 35 I.A.C. § 845.600.
    iv. Identify those constituents with exceedances of the GWPS in 35 I.A.C. § 845.600 and the names of the monitoring wells associated with the exceedance.
    v. Provide the date when the assessment of corrective measures was initiated for the CCR SI.

vi. Provide the date when the assessment of corrective measures was completed for the CCR SI.

vii. Specify whether a remedy was selected under 35 I.A.C. § 845.670 during the current annual reporting period, and if so, the date of remedy selection.

viii. Specify whether remedial activities were initiated or are ongoing under 35 I.A.C. § 845.780 during the current annual reporting period.

An operating permit application for the NEAP was submitted by DMG to IEPA by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d), and is pending approval. Therefore, the Part 845 groundwater monitoring program has not yet been initiated. This report summarizes the data collected for the NEAP as it was presented in the operating permit application, and includes the following:

- A map showing the CCR SI and all proposed background (or upgradient) and downgradient monitoring wells, including their identification numbers, that are part of the proposed groundwater monitoring program for the CCR SI presented in the GMP included in the operating permit application (Ramboll, 2021a).
- Identification of monitoring wells that were installed during 2021 to fulfill the requirements of 35 I.A.C. § 845.620(b).
- Representative potentiometric surface maps from the independent sampling events conducted in 2021 to meet the requirements of 35 I.A.C. § 845.650(b)(1)(A), as presented in the HCR included in the operating permit application (Ramboll, 2021b).
- A summary from the independent sampling events completed in 2021, including the number of groundwater samples that were collected for analysis for each proposed background and downgradient well and the dates the samples were collected.
- The proposed GWPS as presented in the GMP.
- A summary of the History of Potential Exceedances included in the operating permit application (Ramboll, 2021c), as required by 35 I.A.C. § 845.230(d), summarizing groundwater concentrations from 2015 to 2021 that exceeded the proposed GWPS.
  - These are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A of the GMP), which is pending IEPA approval.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

The Part 845 groundwater monitoring program will commence the quarter following IEPA approval and issuance of the operating permit for the NEAP.

3. KEY ACTIONS COMPLETED IN 2021

Work was completed in 2021 to meet the requirements of Part 845 and details were provided in the operating permit application submitted to IEPA. The boring logs and well construction forms are included in the HCR provided with the operating permit application (Ramboll, 2021b).

The proposed Part 845 monitoring well network is presented in **Figure 1** and summarized below in **Table A**. The proposed Part 845 monitoring well network also includes wells previously installed for other programs.

Table A. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type [1]
10	UCU	46.6 - 56.6	Background
16B	UU	7 - 12	Compliance
16A	BCU	21.8 - 41.8	Compliance
22	BCU	80 - 100	Background
35S	UU	3.5 - 8.5	Compliance
35D	BCU	35 - 45	Compliance
70S	UU	10 - 20	Compliance
70D	BCU	41 - 51	Compliance
71S	UU	5.5 - 10.5	Compliance
71D	BCU	30 - 40	Compliance
NED [2,3]	CCR	5.3 – 15.0	WLO

[1] Well type refers to the role of the well in the monitoring network.
[2] Well is to be for water level data collection only on an as-needed basis. This well is an interim well that is expected to be removed during remedial construction following IEPA approval of the construction permit application.
[3] Location is temporary pending implementation of impoundment closure per an approved construction permit application.
BCU = bedrock confining unit
bgs = below ground surface
CCR = coal combustion residuals
UCU = upper confining unit
UU = upper unit
WLO = water level only

Proposed Part 845 monitoring wells were sampled for eight rounds of independent groundwater samples from March to August 2021 and the results were analyzed for the parameters listed in 35 I.A.C. § 845.600. A summary of the samples collected from background and compliance monitoring wells for determination of the history of potential exceedances is included in **Table B** below. All groundwater elevation data and analytical results obtained in 2021 are presented in the HCR (Ramboll, 2021b). Groundwater elevation contour maps representative of the independent sampling events are presented in **Figures 2 through 4**.

Table B. Summary of Groundwater Samples Collected

Sampling Dates	Parameters Collected	Monitoring Wells Sampled [1]
April 1, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, 71S, and 71D
April 20 - 21, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, 71S, and 71D
May 10 - 12, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, and 71S
June 3, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, and 71S
June 17, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, 71S, and 71D
July 8, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, and 71S
July 27, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, and 71S
August 17, 2021	Metals [2], mercury, inorganic parameters [3], radium 226 and 228, field parameters [4]	10, 16A, 22, 35D, 70S, 70D, 71S, and 71D

[1] In general, one sample was collected per monitoring well per event.
[2] Metals include antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, and thallium.
[3] Inorganic parameters include fluoride, chloride, sulfate, and total dissolved solids (TDS).
[4] Field parameters include pH, dissolved oxygen, temperature, oxidation/reduction potential, specific conductance, and turbidity.

Evaluation of background groundwater quality is presented in the GMP and the proposed GWPSs are included in **Appendix A.** Compliance with Part 845 will be determined after the first round of groundwater sampling following IEPA's issuance of the operating permit for the NEAP.

Groundwater concentrations from 2015 to 2021 were presented in the HCR and evaluated in the presentation of the History of Potential Exceedances included in the operating permit application. Groundwater concentrations that exceeded the proposed GWPS are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan, which is pending IEPA approval. Tables summarizing how potential historical exceedances were determined and the potential exceedances themselves are provided in **Appendix B**.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

The first round of groundwater sampling for compliance with the Part 845 groundwater monitoring program will commence the quarter following IEPA approval and issuance of the operating permit for the NEAP, and in accordance with the GMP.

5. KEY ACTIVITIES PLANNED FOR 2022

The following key activities are planned for 2022:

- Groundwater sampling and reporting for compliance will be initiated the quarter following issuance of the operating permit at all monitoring wells in the approved monitoring well network as presented in the GMP and required by 35 I.A.C. § 845.610(b)(3), including:
  - Monthly groundwater elevations.
  - Quarterly groundwater sampling.

6. REFERENCES

Illinois Environmental Protection Agency (IEPA), 2021. *In the Matter of: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 Illinois Administration Code 845, Addendum*. April 15, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021a. *Groundwater Monitoring Plan. Vermilion Power Plant, New East Ash Pond, Oakwood, Illinois*. Dynegy Midwest Generation, LLC. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. *Hydrogeologic Site Characterization Report. Vermilion Power Plant, New East Ash Pond, Oakwood, Illinois*. Dynegy Midwest Generation, LLC. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021c. *History of Potential Exceedances. Vermilion Power Plant, New East Ash Pond, Oakwood, Illinois*. Dynegy Midwest Generation, LLC. October 25, 2021.

FIGURES

COMPLIANCE WELL
BACKGROUND WELL
SOURCE SAMPLE LOCATION
MONITORING WELL TO BE ABANDONED
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

0 150 300
Feet

PROPOSED PART 845 GROUNDWATER MONITORING WELL NETWORK

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
NEW EAST ASH POND
VERMILION POWER PLANT
OAKWOOD, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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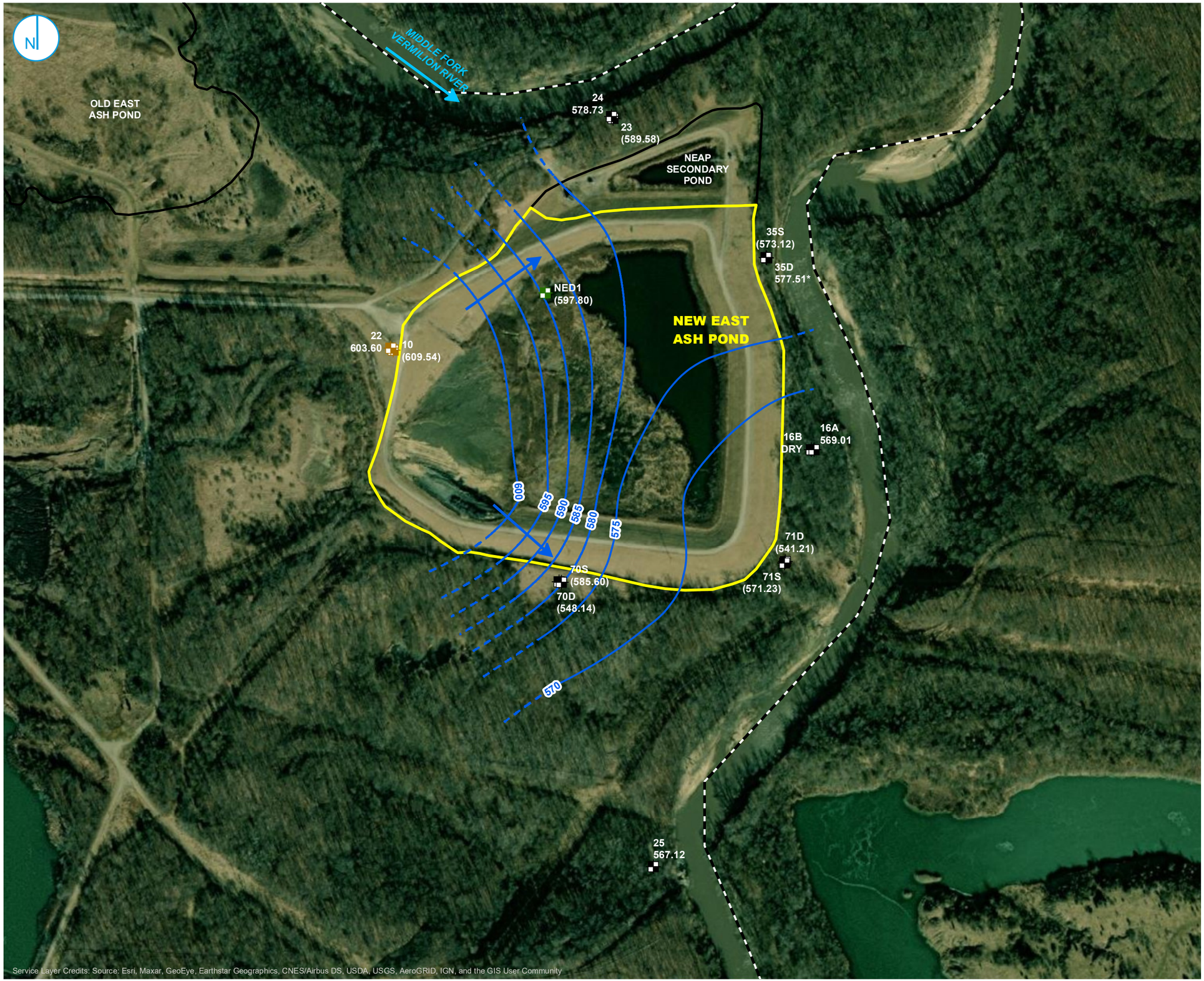
Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Vermilion\NEAP\GMP\Figure 2-1_Proposed 845 GW Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 10/8/2021 | DESIGNER: HOTCALD



Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- BACKGROUND WELL
- MONITORING WELL
- SOURCE SAMPLE LOCATION
- GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- PART 845 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- PROPERTY BOUNDARY

NOTES:

1. ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988
4. * ELEVATION COLLECTED AS PART OF NPDES PERMIT NO. IL0004057 MONITORING ON MARCH 29, 2021..

0 150 300
Feet

POTENTIOMETRIC SURFACE MAP MARCH 29, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT REPORT
NEW EAST ASH POND
VERMILION POWER PLANT
OAKWOOD, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS
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Y:\Mapping\Projects\220228\MXD\845_Operating_Permit\Vermilion\NEAP\Figure 3-2_GWE Contours Event 1_20210329.mxd

PROJECT: 1690000XXXX | DATED: 10/7/2021 | DESIGNER: STOLZSD

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

NOTES:

1. ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988..

0 150 300
Feet

POTENTIOMETRIC SURFACE MAP
APRIL 12, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
NEW EAST ASH POND
VERMILION POWER PLANT
OAKWOOD, ILLINOIS

FIGURE 3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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Y:\Mapping\Projects\222285\MXD\845_Operating_Permit\Vermilion\NEAP\Figure 3-3_GWE Contours Event 2_20210412.mxd

PROJECT: 1690000XXXX | DATED: 10/7/2021 | DESIGNER: STOLZSD

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

NOTES:

1. ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988..

0 200 400 Feet

POTENTIOMETRIC SURFACE MAP
MAY 10, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
NEW EAST ASH POND
VERMILION POWER PLANT
OAKWOOD, ILLINOIS

FIGURE 4

RAMBOLL AMERICAS
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Y:\Mapping\Projects\222285\MXD\845_Operating_Permit\Vermilion\NEAP\Figure 3-4_GWE Contours Event 3_20210510.mxd

PROJECT: 169000XXXX | DATED: 10/7/2021 | DESIGNER: STOLZSD

APPENDICES

APPENDIX A
TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS

TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS
GROUNDWATER MONITORING PLAN
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.005	0.006	0.006	mg/L
Arsenic, total	0.001	0.010	0.010	mg/L
Barium, total	0.082	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	0.43	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	20.4	200	200	mg/L
Chromium, total	0.004	0.1	0.1	mg/L
Cobalt, total	0.09	0.006	0.09	mg/L
Fluoride, total	0.43	4.0	4.0	mg/L
Lead, total	0.001	0.0075	0.0075	mg/L
Lithium, total	0.03	0.04	0.04	mg/L
Mercury, total	0.0002	0.002	0.002	mg/L
Molybdenum, total	0.004	0.1	0.1	mg/L
pH (field)	7.8 / 6.3	9.0 / 6.5	9.0 / 6.3	SU
Radium 226 and 228 combined	7	5	7	pCi/L
Selenium, total	0.001	0.05	0.05	mg/L
Sulfate, total	338	400	400	mg/L
Thallium, total	0.002	0.002	0.002	mg/L
Total Dissolved Solids	1080	1200	1200	mg/L

Notes:
For pH, the values presented are the upper / lower limits
Groundwater protection standards for calcium and turbidity do not apply per 35 I.A.C. § 845.600(b)
mg/L = milligrams per liter
SU = standard units
pCi/L = picocuries per liter

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APPENDIX B
HISTORY OF POTENTIAL EXCEEDANCES

HISTORY OF POTENTIAL EXCEEDANCES

This presentation of the History of Potential Exceedances, and any corrective action taken to remediate groundwater, is provided to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.230(d)(2)(M) for the Vermilion Power Plant New East Ash Pond, Illinois Environmental Protection Agency (IEPA) ID No. W1838000002-04.

Note

Groundwater concentrations from 2015 to 2021 presented in the Hydrogeologic Site Characterization Report (HCR) Table 4-1, and evaluated and summarized in the following tables, are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to Groundwater Monitoring Plan [GMP]), which has not been reviewed or approved by the IEPA at the time of submittal of the 35 I.A.C. § 845 Operating Permit application.

Alternate sources for potential exceedances as allowed by 35 I.A.C. § 845.650(e) have not yet been evaluated. These will be evaluated and presented in future submittals to IEPA as appropriate.

Table 1 summarizes how the potential exceedances were determined. Table 2 is a summary of all potential exceedances.

Background Concentrations

Background monitoring wells identified in the GMP include 10 and 22.

For monitoring wells, either newly constructed in 2021 or existing wells, background concentrations calculated from the eight sampling events required by 35 I.A.C. § 845.650(b)(1)(A), to be collected within 180 days from April 21, 2021, were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as GWPSs. Compliance well statistical calculations from that same time period were compared to the GWPSs to determine potential exceedances.

Corrective Action

No corrective actions have been taken to remediate the groundwater.

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
16A	BCU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.006	0.005	0.006	Standard
16A	BCU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.000921	0.010	0.001	0.01	Standard
16A	BCU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.24	2.0	0.082	2	Standard
16A	BCU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
16A	BCU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.67	2.0	0.43	2	Standard
16A	BCU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
16A	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	142	200	20	200	Standard
16A	BCU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0015	0.10	0.004	0.1	Standard
16A	BCU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.090	0.090	0.006	Background
16A	BCU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.69	4.0	0.43	4	Standard
16A	BCU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.0075	0.001	0.0075	Standard
16A	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	0.031	0.040	0.030	0.04	Standard
16A	BCU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
16A	BCU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0015	0.10	0.004	0.1	Standard
16A	BCU	845	pH (field)	SU	03/29/2021 - 08/17/2021	CI around mean	7.3	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
16A	BCU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	0.27	7.0	7.0	5	Background
16A	BCU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
16A	BCU	845	Sulfate, total	mg/L	03/29/2021 - 08/17/2021	CI around mean	11	400	338	400	Standard
16A	BCU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
16A	BCU	845	Total Dissolved Solids	mg/L	03/29/2021 - 08/17/2021	CI around mean	624	1200	1080	1200	Standard
35D	BCU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.000748	0.006	0.005	0.006	Standard
35D	BCU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.00135	0.010	0.001	0.01	Standard
35D	BCU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.021	2.0	0.082	2	Standard
35D	BCU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
35D	BCU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	1.5	2.0	0.43	2	Standard
35D	BCU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
35D	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	227	200	20	200	Standard
35D	BCU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.000931	0.10	0.004	0.1	Standard
35D	BCU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	Future median	0.0014	0.090	0.090	0.006	Background
35D	BCU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.68	4.0	0.43	4	Standard
35D	BCU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.000807	0.0075	0.001	0.0075	Standard
35D	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.100	0.040	0.030	0.04	Standard
35D	BCU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
35D	BCU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.016	0.10	0.004	0.1	Standard
35D	BCU	845	pH (field)	SU	03/29/2021 - 08/17/2021	CI around mean	7.1	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
35D	BCU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	0.22	7.0	7.0	5	Background
35D	BCU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
35D	BCU	845	Sulfate, total	mg/L	03/29/2021 - 08/17/2021	CB around linear reg	701	400	338	400	Standard
35D	BCU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
35D	BCU	845	Total Dissolved Solids	mg/L	03/29/2021 - 08/17/2021	CB around linear reg	1650	1200	1080	1200	Standard
70S	UU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.006	0.005	0.006	Standard
70S	UU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.010	0.001	0.01	Standard
70S	UU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.016	2.0	0.082	2	Standard
70S	UU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
70S	UU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.32	2.0	0.43	2	Standard
70S	UU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
70S	UU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	9.0	200	20	200	Standard
70S	UU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0015	0.10	0.004	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
70S	UU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.090	0.090	0.006	Background
70S	UU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	0.15	4.0	0.43	4	Standard
70S	UU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.0075	0.001	0.0075	Standard
70S	UU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.011	0.040	0.030	0.04	Standard
70S	UU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
70S	UU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	CB around T-S line	0.00497	0.10	0.004	0.1	Standard
70S	UU	845	pH (field)	SU	04/01/2021 - 08/17/2021	CI around mean	6.8	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
70S	UU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	-0.135	7.0	7.0	5	Background
70S	UU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
70S	UU	845	Sulfate, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	586	400	338	400	Standard
70S	UU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
70S	UU	845	Total Dissolved Solids	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	980	1200	1080	1200	Standard
70D	BCU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.000914	0.006	0.005	0.006	Standard
70D	BCU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-0.000156	0.010	0.001	0.01	Standard
70D	BCU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.49	2.0	0.082	2	Standard
70D	BCU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.004	0.001	0.004	Standard
70D	BCU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.98	2.0	0.43	2	Standard
70D	BCU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
70D	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	591	200	20	200	Standard
70D	BCU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-0.00234	0.10	0.004	0.1	Standard
70D	BCU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	Future median	0.0036	0.090	0.090	0.006	Background
70D	BCU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	0.21	4.0	0.43	4	Standard
70D	BCU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-0.00344	0.0075	0.001	0.0075	Standard
70D	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.063	0.040	0.030	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
70D	BCU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
70D	BCU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	-0.0231	0.10	0.004	0.1	Standard
70D	BCU	845	pH (field)	SU	04/01/2021 - 08/17/2021	CI around mean	6.8	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
70D	BCU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	1.1	7.0	7.0	5	Background
70D	BCU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.050	0.001	0.05	Standard
70D	BCU	845	Sulfate, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	48	400	338	400	Standard
70D	BCU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
70D	BCU	845	Total Dissolved Solids	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	1730	1200	1080	1200	Standard
71S	UU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.006	0.005	0.006	Standard
71S	UU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.00286	0.010	0.001	0.01	Standard
71S	UU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.042	2.0	0.082	2	Standard
71S	UU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
71S	UU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.18	2.0	0.43	2	Standard
71S	UU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.005	0.001	0.005	Standard
71S	UU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CI around median	2.0	200	20	200	Standard
71S	UU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.0012	0.10	0.004	0.1	Standard
71S	UU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	Future median	0.0013	0.090	0.090	0.006	Background
71S	UU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.17	4.0	0.43	4	Standard
71S	UU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.0075	0.001	0.0075	Standard
71S	UU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.00452	0.040	0.030	0.04	Standard
71S	UU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
71S	UU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.00224	0.10	0.004	0.1	Standard
71S	UU	845	pH (field)	SU	04/01/2021 - 08/17/2021	CI around mean	6.7	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
71S	UU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	0.19	7.0	7.0	5	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
71S	UU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0.001	0.050	0.001	0.05	Standard
71S	UU	845	Sulfate, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	55	400	338	400	Standard
71S	UU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.00133	0.002	0.002	0.002	Standard
71S	UU	845	Total Dissolved Solids	mg/L	04/01/2021 - 08/17/2021	CI around mean	476	1200	1080	1200	Standard
71D	BCU	845	Antimony, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.000757	0.006	0.005	0.006	Standard
71D	BCU	845	Arsenic, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.000138	0.010	0.001	0.01	Standard
71D	BCU	845	Barium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-0.132	2.0	0.082	2	Standard
71D	BCU	845	Beryllium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0	0.004	0.001	0.004	Standard
71D	BCU	845	Boron, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.31	2.0	0.43	2	Standard
71D	BCU	845	Cadmium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
71D	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-47.8	200	20	200	Standard
71D	BCU	845	Chromium, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.000232	0.10	0.004	0.1	Standard
71D	BCU	845	Cobalt, total	mg/L	04/01/2021 - 08/17/2021	Future median	0.0022	0.090	0.090	0.006	Background
71D	BCU	845	Fluoride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.41	4.0	0.43	4	Standard
71D	BCU	845	Lead, total	mg/L	04/01/2021 - 08/17/2021	CI around geomean	0.000104	0.0075	0.001	0.0075	Standard
71D	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	-0.0144	0.040	0.030	0.04	Standard
71D	BCU	845	Mercury, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
71D	BCU	845	Molybdenum, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.00361	0.10	0.004	0.1	Standard
71D	BCU	845	pH (field)	SU	04/01/2021 - 08/17/2021	Most recent sample	7.0	6.3/9.0	6.3/7.8	6.5/9	Background/Standard
71D	BCU	845	Radium 226 + radium 228, total	pCi/L	04/01/2021 - 08/17/2021	CI around mean	-2.76	7.0	7.0	5	Background
71D	BCU	845	Selenium, total	mg/L	04/01/2021 - 08/17/2021	CI around median	0	0.050	0.001	0.05	Standard
71D	BCU	845	Sulfate, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	23	400	338	400	Standard
71D	BCU	845	Thallium, total	mg/L	04/01/2021 - 08/17/2021	All ND - Last	0.002	0.002	0.002	0.002	Standard
71D	BCU	845	Total Dissolved Solids	mg/L	04/01/2021 - 08/17/2021	CI around mean	259	1200	1080	1200	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Notes:
Potential exceedance of GWPS
HSU = hydrostratigraphic unit:
  BCU = Bedrock Confining Unit
  UU = Upper Unit
Program = regulatory program data were collected under:
  257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
  845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
pCi/L = picoCuries per liter
SU = standard units
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
Statistical Calculation = method used to calculate the statistical result:
  All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown
  CB around linear reg = Confidence band around linear regression
  CB around T-S line = Confidence band around Thiel-Sen line
  CI around geomean = Confidence interval around the geometric mean
  CI around mean = Confidence interval around the mean
  CI around median = Confidence interval around the median
  Future median = Median of the three most recent samples
  Most recent sample = Result for the most recently collected sample used due to insufficient data
Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range
For pH, the values presented are the lower / upper limits
GWPS = Groundwater Protection Standard
GWPS Source:
  Standard = standard specified in 35 I.A.C. § 845.600(a)(1)
  Background = background concentration (see cover page for additional information)

TABLE 2. SUMMARY OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
VERMILION POWER PLANT
NEW EAST ASH POND
OAKWOOD, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
35D	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	227	200	20	200	Standard
35D	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.100	0.040	0.030	0.04	Standard
35D	BCU	845	Sulfate, total	mg/L	03/29/2021 - 08/17/2021	CB around linear reg	701	400	338	400	Standard
35D	BCU	845	Total Dissolved Solids	mg/L	03/29/2021 - 08/17/2021	CB around linear reg	1650	1200	1080	1200	Standard
70S	UU	845	Sulfate, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	586	400	338	400	Standard
70D	BCU	845	Chloride, total	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	591	200	20	200	Standard
70D	BCU	845	Lithium, total	mg/L	04/01/2021 - 08/17/2021	CI around mean	0.063	0.040	0.030	0.04	Standard
70D	BCU	845	Total Dissolved Solids	mg/L	04/01/2021 - 08/17/2021	CB around linear reg	1730	1200	1080	1200	Standard

Notes:
HSU = hydrostratigraphic unit:
  BCU = Bedrock Confining Unit
  UU = Upper Unit
Program = regulatory program data were collected under:
  257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
  845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
pCi/L = picoCuries per liter
SU = standard units
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
Statistical Calculation = method used to calculate the statistical result:
  CB around linear reg = Confidence band around linear regression
  CI around mean = Confidence interval around the mean
Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range
For pH, the values presented are the lower / upper limits
GWPS = Groundwater Protection Standard
GWPS Source:
  Standard = standard specified in 35 I.A.C. § 845.600(a)(1)
  Background = background concentration (see cover page for additional information)