Intended for
Dynegy Midwest Generation, LLC

Date
December 28, 2022

Project No.
1940103307

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN

ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN HENNEPIN POWER PLANT ASH POND NO. 2

Project name	**Hennepin Power Plant Ash Pond No. 2**
Project no.	**1940103307**
Recipient	**Dynegy Midwest Generation, LLC**
Document type	**Groundwater Monitoring Plan**
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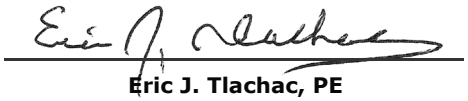
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA

T 414-837-3607
F 414-837-3608
https://ramboll.com

Brian G. Hennings, PG
Senior Managing Hydrogeologist



Eric J. Tlachac, PE
Senior Managing Engineer

Chase J. Christenson, PG
Hydrogeologist

LICENSED PROFESSIONAL CERTIFICATIONS

40 C.F.R. § 257.91(f) Groundwater Monitoring System Certification

In accordance with Title 40 of the Code of Federal Regulations (40 C.F.R.), Part 257, Subpart D, Section (§) 257.91(f) the owner or operator of a coal combustion residuals (CCR) unit must obtain certification from a qualified professional engineer stating that the groundwater monitoring system at the CCR unit has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91. If the groundwater monitoring system includes the minimum number of monitoring wells specified in 40 C.F.R. § 257.91(c)(1), the certification must document the basis supporting use of the minimum number of monitoring wells. Further, in accordance with 40 C.F.R. § 257.91(e)(1), when completing the groundwater monitoring system certification, the qualified professional engineer must be given access to documentation regarding the design, installation, development, and decommissioning of any monitoring wells, piezometers, and other measurement, sampling, and analytical devices.

The groundwater monitoring system designed and constructed for the Hennepin Power Plant (HPP) Ash Pond Number (No.) 2 (AP2) includes more than the minimum number of wells specified in 40 C.F.R. § 257.91(c)(1). The undersigned has been given access to documentation regarding the design, installation, development, and decommissioning of monitoring wells, piezometers and other measurement, sampling, and analytical devices concerning HPP AP2.

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system at HPP AP2 has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: December 28, 2022

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the groundwater monitoring system at HPP AP2 has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Date: December 28, 2022

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TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES (ATTACHED)

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
§	section
ASD	Alternate Source Demonstration
AP2	Ash Pond No. 2, also referred to as Site
AP4	Ash Pond No. 4
bgs	below ground surface
CCA	compliance commitment agreement
CCR	coal combustion residuals
CCWL	Coal Combustion Waste Landfill
CEC	Civil & Environmental Engineers, Inc.
Closure Plan	*Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2*
CMA	Corrective Measures Assessment
CSM	conceptual site model
DMG	Dynegy Midwest Generation, LLC
EAP	East Ash Pond
EAPS	East Ash Pond System
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HBL	health-based level
HCR	Hydrogeologic Site Characterization Report
HPP	Hennepin Power Plant
ID	identification
IEPA	Illinois Environmental Protection Agency
LCL	lower confidence limit
LPL	lower prediction limit
MCL	maximum contaminant level
MW	megawatts
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc.
QAPP	Multi-Site Quality Assurance Project Plan
QA/QC	quality assurance/quality control
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RL	reporting limit
SAP	Multi-Site Sampling and Analysis Plan
SI	surface impoundment
SSL	statistically significant level
SSI	statistically significant increase
TDS	total dissolved solids

UA	Uppermost Aquifer
UPL	upper prediction limit
UTL	upper tolerance limit
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

1.1 Overview

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Monitoring Plan (GMP) on behalf of HPP (**Figure 1-1**), operated by Dynegy Midwest Generation, LLC (DMG) to align the 40 C.F.R. § 257 compliance groundwater monitoring program with the Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 compliance groundwater monitoring program.

This GMP applies specifically to the CCR Unit referred to as AP2 (CCR unit identification [ID] No. 802, Illinois Environmental Protection Agency [IEPA] ID No. W1550100002-04, and National Inventory of Dams [NID] No. IL50663. AP2 is a closed, unlined surface impoundment (SI) that was previously used to manage CCR and non-CCR waste streams at the HPP. The location of AP2 is presented in **Figure 1-2**.

Civil and Environmental Engineers, Inc. (CEC) submitted the *Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2* (Closure Plan) in February 2018 for the remaining inactive portions of AP2 that were previously planned to be capped during phased expansion of the Coal Combustion Waste Landfill (CCWL). An addendum to the Closure Plan, which encompasses AP2 and Ash Pond No. 4 (AP4), was submitted in October 2018 (CEC and O'Brien & Gere Engineers, Inc. [OBG], 2018). IEPA provided comments to the Closure and Post Closure Care Plan in a letter dated May 2, 2019. Responses to comments were provided in a letter from OBG, part of Ramboll dated July 22, 2019. At the request of IEPA, a groundwater model was developed for simulation of episodic and transient flooding in the Illinois River that could potentially reach the base of ash. The requested modeling and evaluation of the effects on boron concentration was completed and provided in the *River Flood Evaluation Report* (Ramboll, 2020a) dated January 15, 2020. IEPA approved the Closure and Post Closure Care Plan for Hennepin AP2 and AP4 on March 5, 2020. A compiled copy of the Closure Plan and addenda was provided to IEPA on March 23, 2020 (Ramboll, 2020b). The Closure Plan included the final GMP (OBG, part of Ramboll, 2019) dated July 22, 2019, which defined groundwater monitoring for AP2 and AP4 following approval of the Closure Plan. Closure construction began in May 2020 and was completed in November 2020.

On April 21, 2021, 35 I.A.C. § 845 became effective, and for CCR units closed prior to the effective date the following section was included (35 I.A.C. § 845.100(i)):

> *If a CCR surface impoundment has completed an Agency-approved closure before April 21, 2021, this Part does not require the owner or operator of the CCR surface impoundment to resubmit to the Agency any closure plan, closure report, or closure certification for that completed closure.*

This GMP includes content requirements specific to 40 C.F.R. § 257.91 (Groundwater Monitoring Systems), 40 C.F.R. § 257.93 (Groundwater Sampling and Analysis Requirements), 40 C.F.R. § 257.94 (Detection Monitoring Program), and 40 C.F.R. § 257.95 (Assessment Monitoring Program) for AP2.

1.2 Site Location and Background

AP2 is located in northcentral Illinois in Putnam County, approximately four miles northeast of the Village of Hennepin, located within the northeast quarter of Section 26, Township 33 North,

Range 2 West (**Figure 1-1**). The HPP is an approximately 504-acre property consisting of 19 parcels, including a retired coal-fired power plant, CCR landfill and SIs, and farmland. The HPP ceased operations in 2019.

The HPP construction history includes construction of Unit 1 in 1953 and Unit 2 in 1959 with capacities of 70 megawatts (MW) and 210 MW, respectively. The plant initially burned high-sulfur Illinois coal and switched to sub-bituminous Powder River Basin coal in 1999 (Science and Technology Management, Inc., 1996).

The three CCR units located adjacent to, or in the vicinity of, each other in the eastern portion of the HPP are referred to as the East Ash Pond System (EAPS). The CCR units associated with the EAPS are situated south and adjacent to the Illinois River. The area is also bounded to the east and south by industrial properties owned by Tri-Con Materials and Washington Mills, respectively (**Figure 1-2**). The HPP provides the western boundary for the CCR units with agricultural land to the southwest. Additionally, a 9-acre parcel between the HPP property and Washington Mills (south of the CCR units) was previously occupied by American Asphalt but they are no longer actively operating this facility, and the property contains several abandoned buildings. The current owner of this parcel is listed as Tri-Con Materials.

Figure 1-2 depicts the location of the CCR units and non-CCR units within the EAPS. The four EAPS CCR units consist of the following:

- CCWL (CCR unit ID No. 801)
- East Ash Pond (EAP; CCR unit ID 803, IEPA ID No. W1550100002-05, and NID No. IL50363)
- Closed (with IEPA approval) AP2
- Closed (with IEPA approval) AP4 (CCR unit ID No. 805 and IEPA ID No. W1550100002-07).

Information regarding the CCWL, EAP, and AP4 CCR units is solely for background information, as this GMP applies specifically to the AP2 CCR unit, which will hereinafter be referred to as the Site.

1.3 Conceptual Site Model

Multiple site investigations have been completed at the HPP to characterize the geology, hydrogeology, and groundwater quality as required by 40 C.F.R. § 257.91 (Groundwater Monitoring Systems). AP2 has been well characterized and detailed in the Hydrogeologic Site Characterization Reports (HCR) for the HPP, including the most recent HCR for the adjacent EAP (Ramboll, 2021) [https://www.luminant.com/ccr/illinois-ccr/?dir=il-ccr%2FHennepin%2F2021], that was included with the Operating Permit application submitted to the IEPA. The HCR was prepared to comply with the requirements specified in 35 I.A.C. § 845.620 and expands upon the Hydrogeologic Monitoring Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017). A conceptual site model (CSM) has been developed and is discussed below.

The Site is characterized by two hydrostratigraphic units:

- **Uppermost Aquifer (UA)**: Includes the unlithified natural geologic materials of the Cahokia Alluvium and Henry Formation extending from the upper saturated zone to the bedrock.
- **Bedrock Confining Unit**: Comprised of shales with thin limestone, sandstone, and coal beds. This bedrock confining unit is encountered at elevations ranging from 399.2 to 410.2 feet North American Vertical Datum of 1988 (NAVD88).

The hydraulic gradient within the UA in the vicinity of the EAPS varies with the elevation of the Illinois River. The direction of groundwater flow is most often toward the river to the north and west, but comparison of groundwater and river elevation data indicate reversals in this flow direction during times of high river elevations. The relative duration of these events is short, which leads to the determination of a predominant groundwater flow direction toward the river to the north and west (**Figures 1-3 and 1-4**).

2. GROUNDWATER MONITORING SYSTEMS

Several monitoring programs are currently being conducted as required by the IEPA and the United States Environmental Protection Agency (USEPA) to evaluate the CCR units associated with the HPP EAPS and the CCWL. The networks have changed over time and many of the wells and parameters overlap as a result of previously approved GMPs and permits which were developed to focus on specific (and separate) units at the EAPS. The monitoring networks for each of the CCR and non-CCR Units at the EAPS include:

- AP2 (subject of this GMP) and AP4
  - 40 C.F.R. § 257 for AP2 (AP4 was classified as capped or otherwise maintained and not subject to 40 C.F.R § 257)
  - IEPA Closure Plan (2019 GMP included in Closure and Post-Closure Care Plan) and
  - 35 I.A.C. § 845
- CCWL
  - Initial Facility Report (IFR) (Section 28)
  - 40 C.F.R. § 257
- EAPS (also includes Leachate Pond, and Polishing Pond)
  - IEPA Water Pollution Control Permit 2019-EO-64097 – Special Condition No. 4
- EAP
  - 40 C.F.R. § 257
  - 35 I.A.C. § 845

Three monitoring programs specific to AP2 and AP4 exist, the Closure Plan monitoring program, the 40 C.F.R. § 257 monitoring program, and the 35 I.A.C. § 845 monitoring program. Groundwater monitoring at AP2 is currently being performed in accordance with Section 1.5 of the approved Closure Plan and 40 C.F.R. § 257. This GMP is being provided to align the 40 C.F.R. § 257 groundwater monitoring network and monitoring program specific to AP2 with 35 I.A.C. § 845. Monitoring networks and programs that apply to other units are not discussed in this GMP. DMG entered into a compliance commitment agreement (CCA) with the IEPA on December 28, 2022. Groundwater monitoring in accordance with the CCA and the proposed 35 I.A.C. § 845 groundwater monitoring plan and sampling methodologies provided in the operating permit application for AP2 and AP4 is scheduled to commence no later than the second quarter of 2023. After AP2 and AP4 have been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit. As specified in the CCA, groundwater sampling requirements that apply to the CCR SI under other existing permit programs will become void upon issuance of an approved operating permit pursuant to 35 I.A.C. § 845. In addition, and in accordance with the CCA, once quarterly groundwater monitoring commences, the groundwater monitoring performed under Section 1.5 of the approved Closure Plan will cease.

2.1 IEPA Closure Plan Monitoring Program

The IEPA Closure Plan monitoring well network consists of seven wells screened in the UA, three background wells (07, 08, and 08D) and four compliance wells (03R, 18S, 18D, and 45S). This same monitoring well network is proposed for groundwater monitoring required by 35 I.A.C. § 845.

The GMP established a monitoring program that meets the requirements of 35 I.A.C. § 620.410 and groundwater samples are collected quarterly and analyzed for the parameters listed in **Table A** below.

Table A. IEPA Closure Plan Groundwater Monitoring Program Parameters

Field Parameters		
pH	Temperature	Turbidity
Dissolved Oxygen	Oxidation/Reduction Potential	Specific Conductance
Inorganics (total)		
Fluoride	Chloride	Sulfate
TDS		
Other (total)		
Radium 226 and 228 combined[1]		
Metals (total)		
Antimony	Cadmium	Lithium
Arsenic	Calcium	Mercury
Barium	Chromium	Molybdenum
Beryllium	Cobalt	Selenium
Boron	Lead	Thallium

[1] Radium 226 and 228 combined sampled semiannually

TDS – total dissolved solids

2.2 35 I.A.C. § 845 Monitoring Program

The 35 I.A.C. § 845 monitoring well network consists of the same seven wells screened in the UA, three background wells (07, 08, and 08D) and four compliance wells (03R, 18S, 18D, and 45S). This same monitoring well network is proposed for groundwater monitoring required by 35 I.A.C. § 845.

Groundwater samples are collected quarterly and analyzed for the laboratory and field parameters from 35 I.A.C. § 845.600 as summarized in **Table B** on the following page.

The groundwater samples collected from the seven wells are used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards listed in 35 I.A.C. § 845.600(a).

Table B. 35 I.A.C. § 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH	Turbidity	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

2.3 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 monitoring well network for AP2 consists of seven groundwater monitoring wells installed nearby or adjacent to AP2 within the unlithified UA including: three background wells (07, 08, and 08D), and four compliance wells (03R, 18S, 18D, and 45S). The well locations are shown on **Figure 2-1**. Monitoring well depths and construction details are listed in **Table 2-1** and summarized in **Table C** below.

Table C. 40 C.F.R. § 257 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type[1]
07	UA	67.5 – 77.5	Background
08	UA	51.5 – 61.5	Background
08D	UA	83.0 – 88.0	Background
03R	UA	42.0 – 52.0	Compliance
18S	UA	40.0 – 50.0	Compliance
18D	UA	71.0 – 76.0	Compliance
45S	UA	35.0 – 45.0	Compliance

[1] Well Type refers to the role of the well in the monitoring network.
bgs = below ground surface

Assessment monitoring in accordance with 40 C.F.R. § 257.95 was initiated on April 9, 2018. Details on the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Multi-Site Sampling and Analysis Plan (SAP) (Ramboll, 2022a).

Groundwater samples are collected semiannually and analyzed for the following laboratory and field parameters from Appendix III and Appendix IV of 40 C.F.R. § 257, summarized in **Table D** on the following page.

Table D. 40 C.F.R. § 257 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH		
Appendix III Parameters (Total, except TDS)			
Boron	Chloride	Sulfate	
Calcium	Fluoride	TDS	
Appendix IV Parameters (Total)			
Antimony	Cadmium	Lithium	Selenium
Arsenic	Chromium	Mercury	Thallium
Barium	Cobalt	Molybdenum	Radium 226 and 228 combined
Beryllium	Lead		

[1]Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity are recorded during sample collection.

Results and analysis of groundwater sampling are reported annually by January 31 of the following year and made available on the CCR public website as required by 40 C.F.R. § 257.

Any future changes to the groundwater monitoring well network as approved by the IEPA under 35 I.A.C. § 845 will also be incorporated into the 40 C.F.R. § 257 network.

2.4 Well Abandonment

No wells are currently proposed for abandonment.

2.5 Groundwater Monitoring System Maintenance Plan

Maintenance procedures provided in the SAP and will be performed as needed to assure that the monitoring wells provide representative groundwater samples (Ramboll, 2022a).

3. GROUNDWATER MONITORING PLAN

The groundwater monitoring plan will monitor and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards included in 40 C.F.R. § 257.94(e) and 40 C.F.R. § 257.95(h). The groundwater monitoring program will include sampling and analysis procedures that are consistent and provide an accurate representation of groundwater quality at the background and downgradient wells as required by 40 C.F.R. § 257.91. As discussed in **Section 2**, three monitoring programs specific to AP2 and AP4 exist, the Closure Plan monitoring program, the 40 C.F.R. § 257 monitoring program, and the 35 I.A.C. § 845 monitoring program. As specified in the CCA, groundwater sampling requirements that apply to the CCR SI under other existing permit programs will become void upon issuance of an approved operating permit pursuant to 35 I.A.C. § 845. In addition, and in accordance with the CCA, once quarterly groundwater monitoring commences, the groundwater monitoring performed under Section 1.5 of the approved Closure Plan will cease.

3.1 Sampling Schedule

Groundwater sampling for the 40 C.F.R. § 257 monitoring well network was initially performed quarterly between 2015 and 2017 to establish baseline groundwater quality. Detection monitoring began in the first quarter of 2017 with semiannual sampling. Assessment monitoring began in the second quarter of 2018. AP2 is currently in assessment monitoring and sampling will continue in 2023 according to the schedule summarized in **Table E** on the following page.

Table E. 40 C.F.R. § 257 Sampling Schedule

Frequency	Duration
Quarterly (groundwater quality)	**Baseline** Began: monitoring began in 2015.
	Ended: monitoring was completed in 2017 to establish baseline groundwater quality for existing landfills and SIs.
At least Semi-annually (groundwater quality)	**Detection Monitoring** Begins: monitoring began no later than October 17, 2017, for existing landfills and SIs, following collection of a minimum of eight independent samples for constituents from Appendix III and Appendix IV from each background and downgradient well. At least semiannual sampling continues for Appendix III constituents throughout the active life of the CCR unit and the post-closure period. For new landfills and SIs, and lateral expansion of existing CCR units, a minimum of eight independent samples from each background well must be collected and analyzed for the constituents in Appendix III and Appendix IV during the first six months of sampling.
	Ends: Following 30-year post-closure care period or statistically significant increase (SSI) determination and unsuccessful Alternate Source Demonstration (ASD) evaluation within 90 days of SSI determination.
	Assessment Monitoring Begins: within 90 days of unsuccessful ASD evaluation for SSIs determined during Detection Monitoring; samples must be collected and analyzed for all constituents listed in Appendix IV. Within 90 days of obtaining the of the initial sample results, and on at least a semiannual basis thereafter, wells must be resampled for Appendix III and for those constituents in Appendix IV that have been detected during sampling.
	Ends: Following demonstration that concentrations of all constituents in Appendices III and IV are below background values for two consecutive sampling events.

Groundwater monitoring for the 40 C.F.R. § 257 well network will continue to follow a schedule in accordance with the requirements of 40 C.F.R. § 257.94 and 40 C.F.R. § 257.95. Upon United States Environmental Protection Agency (USEPA) approval of 35 I.A.C. § 845 as a State CCR Permit Program, the 40 C.F.R. § 257 monitoring will be discontinued and replaced by the 35 I.A.C. § 845 monitoring.

3.2 Groundwater Sample Collection

Groundwater sampling procedures have been developed in the SAP (Ramboll, 2022a) and the collection of groundwater samples is being implemented to meet the requirements of 40 C.F.R. § 257.93. In addition to groundwater well samples, quality assurance samples will be collected as described in the Multi-Site Quality Assurance Project Plan (QAPP) (Ramboll, 2022b).

3.3 Laboratory Analysis

Laboratory analysis will be performed consistent with the specifications of the QAPP. Laboratory methods may be modified based on laboratory equipment availability or procedures, but the Reporting Limit (RL) for all parameters analyzed, regardless of method, will be lower than the

applicable groundwater quality standard. Data reporting requirements and workflow are provided in the Multi-Site Data Management Plan (Ramboll, 2022c).

3.4 Quality Assurance Program

The QAPP includes procedures and techniques for laboratory quality assurance/quality control (QA/QC). Additionally, the SAP includes requirements for field data collection QA/QC.

3.5 Statistical Analysis

A Multi-Site Statistical Analysis Plan (Ramboll, 2022d) has been developed to describe procedures that will be used to establish background conditions and determine SSIs over background concentrations and statistically significant levels (SSLs) over groundwater protection standards (GWPSs) as required by 40 C.F.R. § 257.94 and 257.95. The Multi-Site Statistical Analysis Plan was prepared in accordance with the requirements of 40 C.F.R. § 257.93(f), with reference to the acceptable statistical procedures provided in *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA*,* 2009). The determination of SSIs over background concentrations and SSLs over GWPSs will be completed at least semiannually in accordance with the sampling schedule provided in **Section 3.1**.

3.6 Data Reporting

Data reporting for the 40 C.F.R. § 257 monitoring well network will be consistent with recordkeeping, notification, and internet posting requirements described in 40 C.F.R. § 257.105 through 257.107.

3.7 Compliance with Applicable On-site Groundwater Quality Standards

Compliance with the groundwater quality standards for the detection monitoring program referenced in 40 C.F.R. § 257.94(e) and the assessment monitoring program referenced in 40 C.F.R. § 257.95(h) will be determined as described in the following sections.

3.7.1 SSI Determination in Detection Monitoring

One-sided upper prediction limits (UPL) will be calculated for each Appendix III constituent using the background samples, with the exception of pH, for which both upper and lower prediction limits will be calculated. A tabular summary of UPLs will be provided in the Annual Groundwater Monitoring and Corrective Action Reports. Individual sampling event concentrations for each constituent detected in the downgradient monitoring wells will then be compared to the background UPL. An exceedance of the UPL for any constituent measured at any downgradient well constitutes an SSI. For pH, a measurement above the UPL or below the lower prediction limit (LPL) constitutes an SSI. As required by 40 C.F.R. § 257.93(h)(2), SSI determination will be completed within 90 days of sampling and analysis.

3.7.2 GWPS and SSL Determination in Assessment Monitoring

A GWPS will be established for Appendix IV constituents. The GWPS will be either the USEPA maximum contaminant levels (MCLs) or the health-based levels (HBLs) established in 40 C.F.R. § 257.95(h)(2) for cobalt, lead, lithium, and molybdenum. The exception to this is when the background concentration is greater than the established MCL or HBL. For this exception, background concentrations will be used to define the GWPS. The background will be calculated using a parametric or non-parametric upper tolerance limit (UTL), depending on the data

distribution. A tabular summary of GWPSs will be provided in the Annual Groundwater Monitoring and Corrective Action Reports.

Compliance will be determined by comparing the lower confidence limit (LCL) of the downgradient concentrations to the GWPS. An SSL will be identified when the LCL exceeds the GWPS. The method of calculating the LCL is described in the Multi-Site Statistical Analysis Plan. If there are too few data points to calculate an LCL (a minimum of four data points is required), the most recent data point is compared to the GWPS. If all the downgradient samples for a well constituent pair are non-detect, the most recent RL is compared to the GWPS. Additionally, an SSL will be identified if all previous samples at a downgradient well were not-detect, and the two most recent samples have both detections and GWPS exceedances. SSL determination will be completed within 90 days of sampling and analysis.

3.8 Alternate Source Demonstrations

An ASD may be completed for a unit under the detection monitoring program in 40 C.F.R. § 257.94(e)(2) or assessment monitoring program in 40 C.F.R. § 257.95(g)(3)(ii) to provide lines of evidence that a source other than the monitored unit caused the SSI/SSL or that the SSI/SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The ASD will include information and analysis that supports the conclusions and a certification of accuracy by a qualified professional engineer. ASDs will be completed within 90 days of SSI/SSL determination and be provided in the Annual Groundwater Monitoring and Corrective Action Reports as required by 40 C.F.R. § 257.94(e)(2) and 40 C.F.R. § 257.95(g)(3)(ii).

3.8.1 Detection Monitoring Program

As allowed in 40 C.F.R. § 257.94(e)(2), following the determination of an SSI over background for groundwater constituents listed in Appendix III of 40 C.F.R. § 257, an ASD will be evaluated, and if completed within 90 days of the SSI determination, detection monitoring will continue.

If an ASD has not been successfully completed within 90 days of the SSI determination, Assessment Monitoring in accordance with 40 C.F.R. § 257.95 will be initiated within 90 days and the associated notification will be made to the CCR unit operating record and state director (and/or appropriate tribal authority, if applicable).

3.8.2 Assessment Monitoring Program

As allowed in 40 C.F.R. § 257.95(g)(3)(ii), following the determination of an SSL over the GWPS of constituents listed in Appendix IV of 40 C.F.R. § 257, an ASD will be evaluated and, if completed within 90 days of the SSL determination, assessment monitoring will continue.

If an ASD has not been successfully completed within the 90 days of the SSL determination, a Corrective Measures Assessment (CMA) in accordance with 40 C.F.R. § 257.96 will be initiated and the associated notification will be made to the CCR unit operating record and state director (and/or appropriate tribal authority, if applicable).

3.9 Corrective Action

As described in 40 C.F.R. § 257.96, if the ASD summarized in **Section 3.8** has not been successfully completed, the CMA must be completed within 90 days, unless the owner or

operator demonstrates the need for up to an additional 60 days to complete the CMA due to site-specific conditions of circumstances.

Remedy selection will follow the CMA and be documented in a remedy selection report in accordance 40 C.F.R. § 257.97. A corrective action monitoring plan will be developed to monitor the performance of the selected remedy.

3.10 Annual Report

An Annual Groundwater Monitoring and Corrective Action Report will be completed and placed in the CCR unit operating record by January 31st of the following calendar 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 unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit.
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. In addition to all the monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs.
4. A narrative discussion of any transition between monitoring programs (*e.g.*, the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at an SSI relative to background levels).
5. Other information required to be included in the annual report as specified in 40 C.F.R. §§ 257.90 through 257.98.
6. A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:
    i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in 40 C.F.R. § 257.95.
    ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in 40 C.F.R. § 257.94 or the assessment monitoring program in 40 C.F.R. § 257.95.
    iii) If it was determined that there was an SSI over background for one or more constituents listed in Appendix III of 40 C.F.R. § 257 pursuant to 40 C.F.R. § 257.94(e):
        A. Identify those constituents listed in Appendix III of 40 C.F.R. § 257 and the names of the monitoring wells associated with such an increase.
        B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv) If it was determined that there was an SSL above the groundwater protection standard for one or more constituents listed in Appendix IV of 40 C.F.R. § 257 pursuant to 40 C.F.R. § 257.95(g) include all of the following:

   A. Identify those constituents listed in Appendix IV of 40 C.F.R. § 257 and the names of the monitoring wells associated with such an increase.

   B. Provide the date when the CMA was initiated for the CCR unit.

   C. Provide the date when the public meeting was held for the CMA.

   D. Provide the date when the CMA was completed.

v) Whether a remedy was selected pursuant to 40 C.F.R. § 257.97 during the current annual reporting period, and if so, the date of remedy selection.

vi) Whether remedial activities were initiated or are ongoing pursuant to 40 C.F.R. § 257.98 during the current annual reporting period.

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TABLES

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
HENNEPIN POWER PLANT
ASH POND NO. 2
HENNEPIN, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
03R	C	UA	01/16/2015	481.92	481.92	Top of PVC	479.40	42.00	52.00	437.38	427.38	52.00	427.40	10	2	41.304578	-89.308691
07	B	UA	11/15/1984	518.27	518.27	Top of PVC	515.10	67.50	77.50	447.61	437.61	78.00	437.10	10	2	41.297986	-89.305712
08	B	UA	11/17/1984	501.38	501.38	Top of PVC	498.70	51.50	61.50	447.24	437.24	62.00	436.70	10	2	41.300698	-89.3044
08D	B	UA	04/17/2009	501.34	501.34	Top of PVC	498.80	83.00	88.00	415.79	410.79	90.00	408.80	5	2	41.300799	-89.304522
18S	C	UA	04/14/2009	487.70	487.70	Top of PVC	485.59	40.00	50.00	445.59	435.59	52.00	433.60	10	2	41.304939	-89.3071
18D	C	UA	04/14/2009	487.60	487.60	Top of PVC	485.51	71.00	76.00	414.51	409.51	78.00	407.50	5	2	41.30492	-89.307093
45S	C	UA	06/29/2015	467.48	467.48	Top of PVC	465.70	35.00	45.00	430.70	420.70	45.00	420.70	10	2	41.303751	-89.310195

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
Type refers to the role of the well in the monitoring network: background (B), compliance (C), or water level measurements only (WLO)
WLO wells are temporary pending implementation of impoundment closure per an approved Construction Permit application
BGS = below ground surface
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
UA = Uppermost Aquifer

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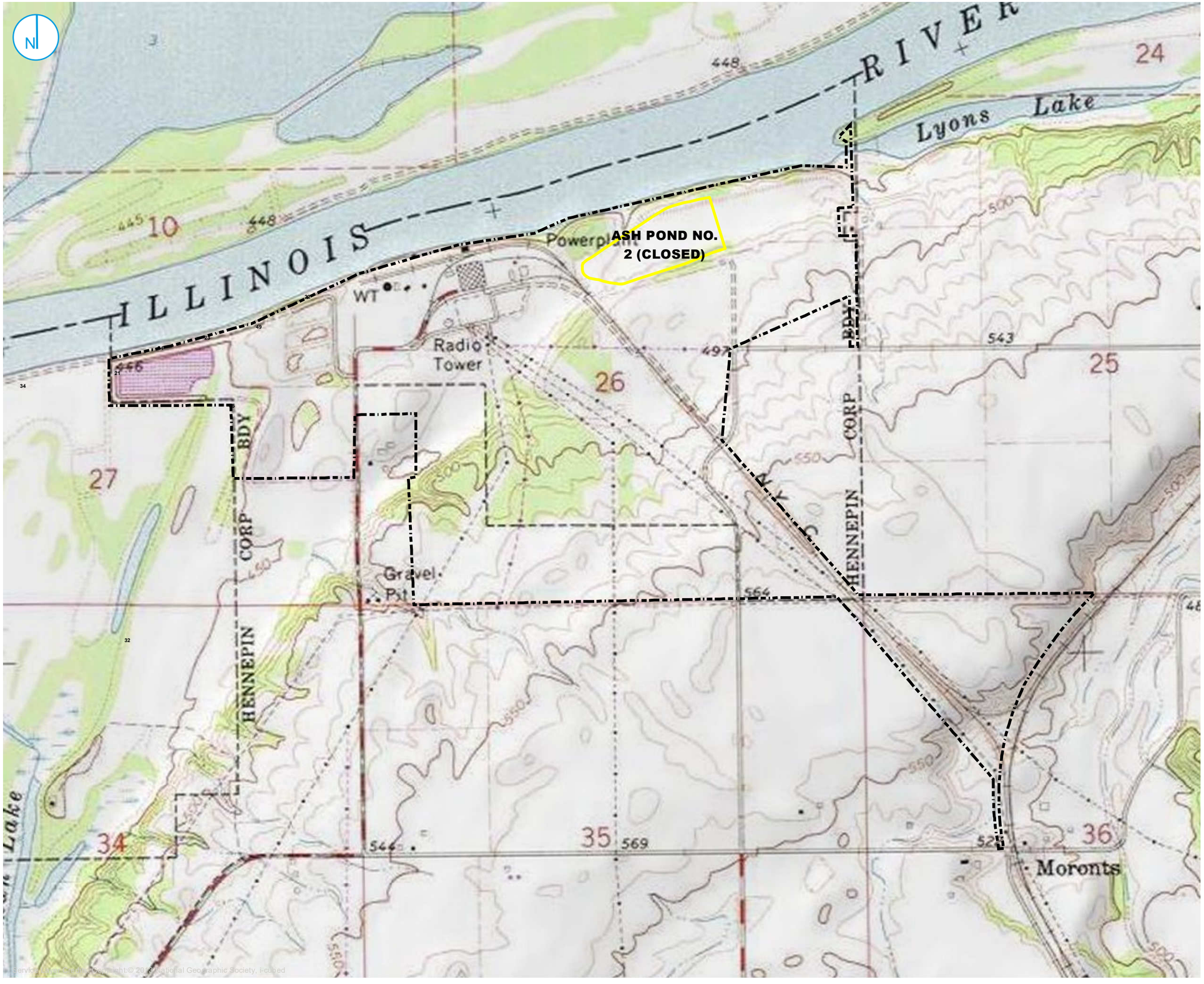
FIGURES



40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 500 1,000 Feet

SITE LOCATION MAP

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\22285\MXD\GMP\HennepinAP2_802\Figure 1-1. Site Location Map.mxd

PROJECT: 169000XXXX | DATED: 1/13/2023 | DESIGNER: galanmc

40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)

SITE FEATURE

LIMITS OF FINAL COVER

PROPERTY BOUNDARY

0 175 350
Feet

SITE MAP

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO.2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

- BACKGROUND WELL
- COMPLIANCE WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

NOTE:
ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.

0 175 350
Feet

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP FEBRUARY 24-26, 2021

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\22285\MXD\GMP\Hennepin\AP2_802\Figure 1-3. Pot Map 20210224_26.mxd

PROJECT: 169000XXXX | DATED: 1/13/2023 | DESIGNER: galammc

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- BACKGROUND WELL
- COMPLIANCE WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

NOTE:
ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.

0 175 350
Feet

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP APRIL 7, 2021

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\2212285\MXD\GMP\HennepinAP2_802\Figure 1-4. Pot Map 20210407.mxd

PROJECT: 169000XXXX | DATED: 1/13/2023 | DESIGNER: galammc

COMPLIANCE MONITORING WELL

BACKGROUND MONITORING WELL

STAFF GAGE, RIVER

40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)

SITE FEATURE

LIMITS OF FINAL COVER

PROPERTY BOUNDARY

0 200 400 Feet

40 C.F.R. § 257 GROUNDWATER MONITORING WELL NETWORK

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO.2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\GMP\HennepinAP2_802Figure 2-1. Part 257 GW Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 3/1/2023 | DESIGNER: galarnmc