

Intended for  
**Kincaid Generation, LLC**

Date  
**December 28, 2022**

Project No.  
**1940103307**

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

**ASH POND  
KINCAID POWER PLANT  
KINCAID, ILLINOIS**

## 40 C.F.R. § 257 GROUNDWATER MONITORING PLAN KINCAID POWER PLANT ASH POND

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Project No. **1940103307**  
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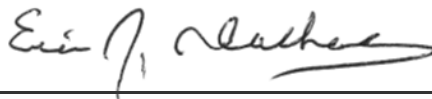
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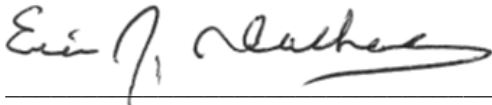
## LICENSED PROFESSIONAL CERTIFICATIONS

### 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 Kincaid Power Plant (KPP) Ash Pond (AP) 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 the KPP AP.

*I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system at the KPP AP 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 the KPP AP 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 (ATTACHED)**

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## 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
BCU	bedrock confining unit
bgs	below ground surface
CCA	compliance commitment agreement
CCR	coal combustion residuals
CMA	Corrective Measures Assessment
CSM	conceptual site model
AP	Ash Pond, also referred to as Site
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HBL	health-based level
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
KPP	Kincaid Power Plant
LCL	lower confidence limit
LCU	Lower Confining Unit
LPL	lower prediction limit
MCL	maximum contaminant level
NA	not applicable
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
NRT/OBG	Natural Resource Technology, an OBG Company
PMP	potential migration pathway
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
SSI	statistically significant increase
SSL	statistically significant level
TDS	total dissolved solids
UA	Uppermost Aquifer
UPL	upper prediction limit
USCU	Upper Semi-Confining Unit
UTL	upper tolerance limit
USEPA	United States Environmental Protection Agency
WLO	water level only

## 1. INTRODUCTION

### 1.1 Overview

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Monitoring Plan (GMP) on behalf of KPP, operated by Kincaid Generation, LLC 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 the AP (CCR unit identification [ID] Number [No.] 141, Illinois Environmental Protection Agency [IEPA] ID No. W0218140002-01, and National Inventory of Dams [NID] No. IL50706). The AP is a 172-acre unlined CCR surface impoundment used to manage CCR and non-CCR waste streams at the KPP. 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 the AP at KPP.

### 1.2 Site Location and Background

The KPP is located in the southwest quarter of Section 1, and the northeast quarter of Section 12, Township 13 North, Range 4 West, along West Route 104 Christian County, Illinois and approximately four miles west of the Village of Kincaid (see **Figure 1-1**). The KPP operates as a coal-fired power plant and consists of one CCR unit, the AP, with a total storage capacity of approximately 3,560 acre-feet.

The AP is located between two lobes of Sangchris Lake, which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River (**Figure 1-2**). Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of Kincaid Ash Pond and is connected to the eastern lobe of Sangchris Lake.

Construction of the AP began in 1964 and was commissioned for use in 1967. The AP primarily contains bottom ash and boiler slag, and other minor materials including water and wastewater treatment solids, excavation spoils, and dredge spoils. Discharge for the AP is located at the southeast corner of the unit.

### 1.3 Conceptual Site Model

Multiple site investigations have been completed at the KPP to characterize the geology, hydrogeology, and groundwater quality as required by 40 C.F.R. § 257.91 (Groundwater Monitoring Systems). The AP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (HCR) (Ramboll, 2021) [<https://www.luminant.com/ccr/illinois/?dir=Illinois%2FKincaid%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.

In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU):** Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses within the USCU with higher permeability within the USCU have a higher probability of contaminant transport and these materials are referred to as the potential migration pathways (PMPs).
- **Uppermost Aquifer (UA):** Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet North American Vertical Datum of 1988 (NAVD88). The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit). Includes the lithologic layers identified as the Vandalia Till.
- **Bedrock (BCU):** This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and underlies the entire AP.

In the vicinity of the AP, groundwater generally flows north and northwest through the USCU toward the western lobe of Sangchris Lake. There also appears to be a component of groundwater flow to the south and east toward the discharge flume that flows to the eastern lobe of Sangchris Lake (**Figures 1-3 and 1-4**), as evidenced by groundwater elevations on the southern side of the AP. These two components of groundwater flow suggest a groundwater divide beneath the AP.



## 2. GROUNDWATER MONITORING SYSTEMS

### 2.1 Existing Monitoring Well Network and Analysis

Three monitoring programs specific to the AP exist, the 35 I.A.C. § 620.410(a) monitoring program, the 40 C.F.R. § 257 monitoring program, and the 35 I.A.C. § 845 monitoring program. This GMP is being provided to expand the 40 C.F.R. § 257 groundwater monitoring network and monitoring program specific to the KPP AP to align with the monitoring network established for 35 I.A.C. § 845. Kincaid Generation, LLC entered into a compliance commitment agreement (CCA) with 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 the AP is scheduled to commence no later than the second quarter of 2023. After the AP has 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.

#### 2.1.1 35 I.A.C. § 620 Monitoring Program

The current IEPA-required groundwater monitoring program associated with the AP consists of 12 groundwater monitoring wells used to monitor the UA, including four background monitoring wells (MW-1, MW-2, MW 9, and MW-10) and eight compliance monitoring wells (MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-11, and MW-12) in accordance with the GMP (Kincaid Generation, LLC, 2017). The boring logs, well construction forms, and other related monitoring well forms for the well network are included in Appendix C of the HCR (Ramboll, 2021). The well locations are shown on **Figure 2-1**.

Groundwater samples are collected, analyzed, and reported semiannually for the parameters listed in 35 I.A.C. § 620.410 (Groundwater Quality Standards for Class I: Potable Resource Groundwater) with the exception of perchlorate, which is not required under the IEPA monitoring program GMP. The parameters analyzed for the IEPA Monitoring Program are listed in **Table A** below:

**Table A. 35 I.A.C. § 620 Groundwater Monitoring Program Parameters**

<b>Field Parameters</b>			
Groundwater Elevation	pH	Specific conductivity	Temperature
<b>General Chemistry Parameters</b>			
Chloride (total)	Fluoride (total)	Nitrate (total)	Total Dissolved Solids (TDS)
Cyanide (total)	Nitrite (total)	Sulfate(total)	
<b>Metals (total)</b>			
Antimony	Cadmium	Lead	Silver
Arsenic	Chromium	Manganese	Thallium
Barium	Cobalt	Mercury	Vanadium
Beryllium	Copper	Nickel	Zinc
Boron	Iron	Selenium	Radium 226 and 228 combined

### 2.1.2 Existing 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 well network for the AP consists of eight monitoring wells installed nearby or adjacent to the AP within the unlithified UA. The 40 C.F.R. § 257 well network consists of two background monitoring wells (MW-1 and MW-2) and six compliance monitoring wells (MW-5, MW-6, MW-7, MW-8, MW-11, and MW-12). The boring logs, well construction forms, and other related monitoring well forms are available in the Operating Records as required by 40 C.F.R. § 257.91 for each monitored CCR Unit or CCR Multi-Unit, and are included in Appendix C of the HCR (Ramboll, 2021). The well locations are shown on **Figure 2-1**.

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 field and laboratory parameters from Appendix III and Appendix IV of 40 C.F.R. § 257, summarized in **Table B** below.

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

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

<sup>1</sup> 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.

### 2.1.3 35 I.A.C. § 845 Well Installation and Monitoring

In 2021, 19 additional monitoring wells (MW-7S, MW-8S, MW-12S, MW-12D, MW-20S, MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, and MW-31S) were installed along the perimeter of the AP to assess the vertical and horizontal lithology, stratigraphy, chemical properties, and physical properties of geologic layers to a minimum of 100 feet below ground surface (bgs) as specified in 35 I.A.C. § 845.620(b).

Prospective 35 I.A.C. § 845 monitoring wells were sampled for eight rounds from February to August 2021 and the results were assessed for selection of the AP 35 I.A.C. § 845 monitoring well network. Groundwater samples were collected and analyzed for 35 I.A.C. § 845.600 parameters as summarized in **Table C** on the following page.

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

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

<sup>1</sup> Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

Data and results from the 35 I.A.C. § 845 background monitoring were included in the water quality discussion included in the HCR (Ramboll, 2021). The data collected from background locations during the 35 I.A.C. § 845 monitoring were used to evaluate and calculate background concentrations for the AP.

## 2.2 Expansion of Existing 40 C.F.R. § 257 Monitoring Well Network

The existing 40 C.F.R. § 257 network is being expanded to include five monitoring wells screened in the USCU (wells MW-7S<sup>1</sup>, MW-8S, MW-20S<sup>1</sup>, MW-27<sup>1</sup>, and MW-31S), 16 monitoring wells screened in the UA (wells MW-01, MW-02, MW-03, MW-05, MW-06, MW-07, MW-08, MW-11, MW-12, MW-20, MW-23, MW-28, MW-30, MW-31, MW-32, and PZ-4C), and two water level only surface water staff gages (XSG-01 and SG-02). The proposed network is summarized in **Table D** on the following page and displayed on **Figure 2-1**. Twenty-one wells (two background and 19 compliance) will be used to monitor groundwater concentrations within the hydrostratigraphic units.

The groundwater samples collected from the 21 wells will be used to monitor and evaluate groundwater quality and 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 proposed monitoring wells will yield groundwater samples that accurately represent the quality of background groundwater that has not been affected by leakage from the AP, as well as downgradient groundwater at the waste boundary of the AP (as required in 40 C.F.R. § 257.91(a)(1) and (2)). Monitoring well depths and construction details are listed in **Table 2-1** and summarized in **Table D** on the following page.

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.

<sup>1</sup> Wells MW-7S, MW-20S, and MW-27 are screened in the upper semi-confining unit that have been identified to monitor the PMP.

**Table D. Expanded 40 C.F.R. § 257 Monitoring Well Network**

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type <sup>3</sup>
<b>MW-1</b>	UA	15.0 - 25.0	Background
<b>MW-2</b>	UA	10.0 - 20.0	Background
<b>MW-3</b>	UA	14.0 - 24.0	Compliance
<b>MW-5</b>	UA	30.0 - 40.0	Compliance
<b>MW-6</b>	UA	10.0 - 20.0	Compliance
<b>MW-7</b>	UA	10.0 - 20.0	Compliance
<b>MW-7S*</b>	USCU	6.0 - 11.0	Compliance
<b>MW-8</b>	UA	12.0 - 22.0	Compliance
<b>MW-8S</b>	USCU	4.0 - 7.0	Compliance
<b>MW-11</b>	UA	11.0 - 21.0	Compliance
<b>MW-12</b>	UA	15.0 - 25.0	Compliance
<b>MW-20</b>	UA	14.0 - 24.0	Compliance
<b>MW-20S*</b>	USCU	4.0 - 10.0	Compliance
<b>MW-23</b>	UA	23.0 - 28.0	Compliance
<b>MW-27*</b>	USCU	10.0 - 15.0	Compliance
<b>MW-28</b>	UA	12.0 - 22.0	Compliance
<b>MW-30</b>	UA	35.0 - 40.0	Compliance
<b>MW-31</b>	UA	35.0 - 40.0	Compliance
<b>MW-31S</b>	USCU	25.0 - 30.0	Compliance
<b>MW-32</b>	UA	32.0 - 37.0	Compliance
<b>PZ4C</b>	UA	15.5 - 20.5	Compliance
<b>XSG-01<sup>1,2</sup></b>	Ash/CCR	NA	WLO
<b>SG-02<sup>1,2</sup></b>	UA	NA	WLO

<sup>1</sup> Surface water level measuring points.

<sup>2</sup> Location is temporary pending implementation of impoundment closure per an approved Construction Permit Application.

<sup>3</sup> Well type refers to the role of the well in the monitoring network.

\* Well in the USCU that has been identified to monitor the PMP.

NA = Not Applicable

WLO = water level only

## 2.3 Well Abandonment

No wells are currently proposed for abandonment.

## **2.4 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 GMP 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 that 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 the AP exist, the IEPA 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.

#### 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. The AP 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**

<b>Frequency</b>	<b>Duration</b>
Quarterly (groundwater quality)	<p><b>Baseline</b></p> <p>Began: monitoring began in 2015.</p> <p>Ended: monitoring was completed in 2017 to establish baseline groundwater quality for existing landfills and SIs</p>
At least Semi-annually (groundwater quality)	<p><b>Detection Monitoring</b></p> <p>Began: 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.</p> <p>At least semiannual sampling continues for Appendix III constituents throughout the active life of the CCR unit and the post-closure period.</p> <p>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.</p> <p>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.</p> <p><b>Assessment Monitoring</b></p> <p>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.</p> <p>Ends: Following demonstration that concentrations of all constituents in Appendices III and IV are below background values for two consecutive sampling events.</p>

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 the *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 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 31<sup>st</sup> 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.

## 4. REFERENCES

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## **TABLES**

**TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS**

GROUNDWATER MONITORING PLAN  
 KINCAID POWER PLANT  
 ASH POND  
 KINCAID, 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)
MW-1	B	UA	04/20/2010	604.71	604.71	Top of PVC	602.60	15.00	25.00	587.60	577.60	25.00	568.10	10	2	39.592051	-89.490283
MW-2	B	UA	04/21/2010	601.10	601.10	Top of PVC	598.88	10.00	20.00	588.90	578.90	20.00	541.40	10	2	39.590698	-89.488916
MW-3	C	UA	04/15/2010	601.46	601.46	Top of PVC	599.24	14.00	24.00	585.20	575.20	24.00	552.70	10	2	39.594458	-89.487173
MW-5	C	UA	04/22/2010	619.44	619.44	Top of PVC	617.77	30.00	40.00	587.80	577.80	40.00	541.80	10	2	39.601296	-89.490402
MW-6	C	UA	04/16/2010	600.46	600.46	Top of PVC	598.44	10.00	20.00	588.40	578.40	20.00	572.90	10	2	39.598638	-89.498944
MW-7	C	UA	04/16/2010	597.75	597.75	Top of PVC	596.00	10.00	20.00	586.00	576.00	20.00	569.50	10	2	39.597637	-89.498959
MW-7S	C	USCU	02/02/2021	597.64	597.64	Top of PVC	595.59	6.00	11.00	589.59	584.59	11.00	580.59	5	2	39.59766	-89.498978
MW-8	C	UA	04/13/2010	603.14	603.14	Top of PVC	601.14	12.00	22.00	589.10	579.10	22.00	563.10	10	2	39.594399	-89.496829
MW-8S	C	USCU	02/02/2021	603.30	603.30	Top of PVC	600.57	4.00	7.00	596.57	593.57	7.00	580.57	3	2	39.594381	-89.496822
MW-11	C	UA	06/17/2015	601.81	601.81	Top of PVC	599.27	11.00	21.00	588.30	578.30	21.00	578.30	10	2	39.593104	-89.491115
MW-12	C	UA	07/23/2015	591.40	591.40	Top of PVC	589.04	15.00	25.00	573.90	563.90	25.00	563.90	10	2	39.600208	-89.496381
MW-20	C	UA	01/26/2021	600.77	600.77	Top of PVC	598.52	14.00	24.00	584.52	574.52	24.00	547.52	10	2	39.598653	-89.48728
MW-20S	C	USCU	01/26/2021	600.64	600.64	Top of PVC	598.43	4.00	10.00	594.43	588.43	10.00	588.43	6	2	39.598665	-89.487279
MW-23	C	UA	02/02/2021	610.32	610.32	Top of PVC	608.05	23.00	28.00	585.05	580.05	28.00	558.05	5	2	39.593293	-89.489352
MW-27	C	USCU	02/02/2021	600.05	600.05	Top of PVC	597.35	10.00	15.00	587.35	582.35	15.00	577.35	5	2	39.596694	-89.497927
MW-28	C	UA	02/02/2021	601.40	601.40	Top of PVC	598.33	12.00	22.00	586.33	576.33	22.00	573.33	10	2	39.599258	-89.497962
MW-30	C	UA	02/03/2021	618.47	618.47	Top of PVC	616.00	35.00	40.00	581.00	576.00	40.00	571.00	5	2	39.601262	-89.493996
MW-31	C	UA	02/03/2021	617.34	617.34	Top of PVC	615.02	35.00	40.00	580.02	575.02	40.00	565.02	5	2	39.601301	-89.491702
MW-31S	C	USCU	02/03/2021	617.54	617.54	Top of PVC	615.13	25.00	30.00	590.13	585.13	30.00	585.13	5	2	39.601303	-89.491681
MW-32	C	UA	02/03/2021	619.49	619.49	Top of PVC	617.20	32.00	37.00	585.20	580.20	37.00	577.20	5	2	39.601279	-89.488643
PZ-4C	C	UA	03/30/2016	600.57	600.57	Top of PVC	597.89	15.50	20.50	582.39	577.39	20.50	577.39	5	2	39.596398	-89.487207
XSG-01	WLO	CCR	--	--	608.43	Staff gauge	--	--	--	--	--	--	--	--	--	39.593401	-89.48768
SG-02	WLO	SW	--	--	564.80	Staff gauge	--	--	--	--	--	--	--	--	--	39.593106	-89.498155

**TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS**

GROUNDWATER MONITORING PLAN  
 KINCAID POWER PLANT  
 ASH POND  
 KINCAID, 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)
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**Notes:**

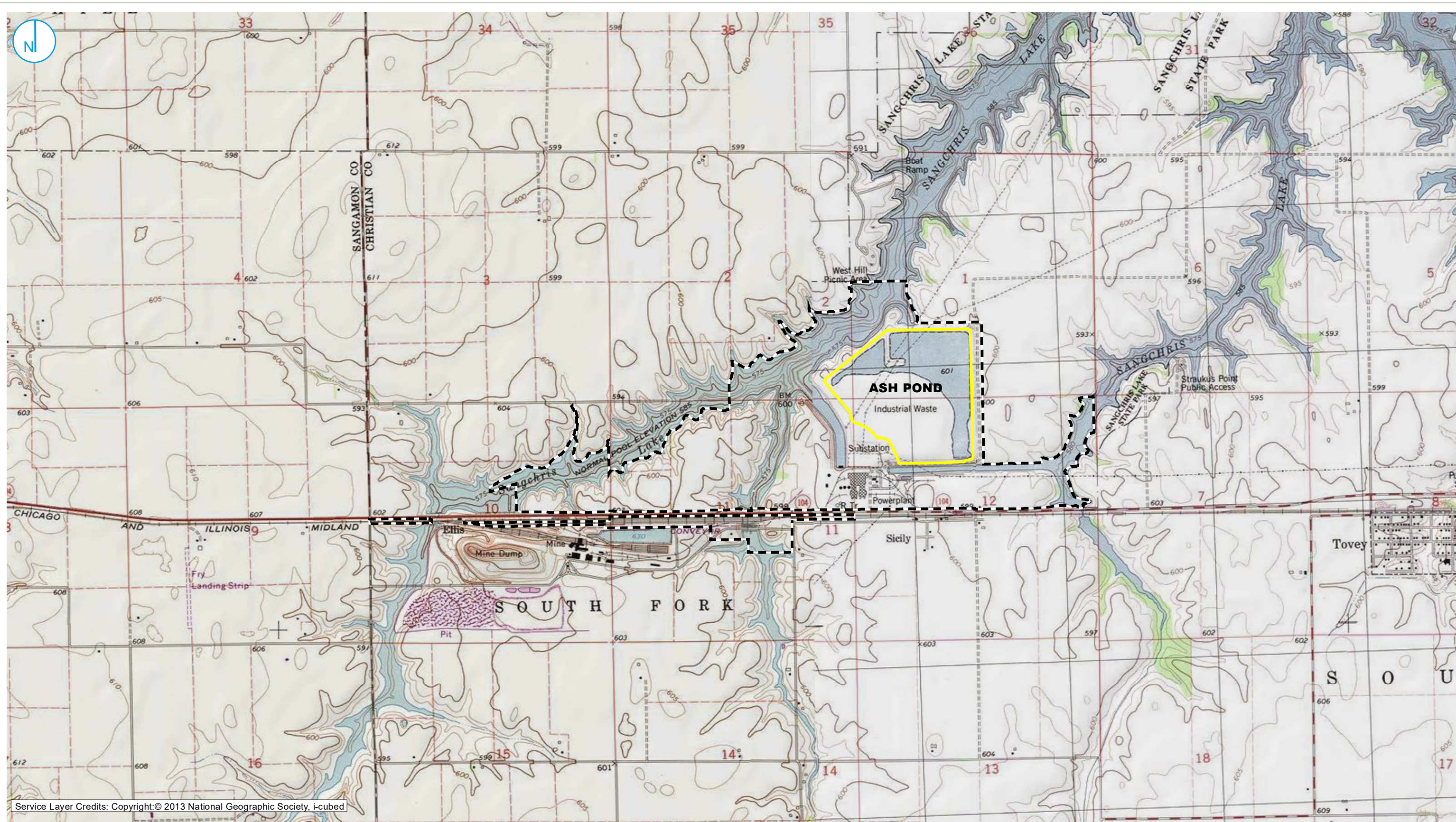
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A  
 Type refers to the role of the well in the monitoring network: background (B), compliance (C), or water level measurements only (WLO)  
 WLO wells are temporary pending implementation of impoundment closure per an approved Construction Permit application  
 -- = data not available  
 BGS = below ground surface  
 CCR = Coal Combustion Residual  
 ft = foot or feet  
 HSU = Hydrostratigraphic Unit  
 PVC = polyvinyl chloride  
 SW = surface water  
 UA = uppermost aquifer  
 USCU = upper semi-confining unit

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## FIGURES



PROJECT: 169000X.XXX | DATED: 8/5/2021 | DESIGNER: galarmc  
Y:\Mapping\Projects\222286\MXD\B45\_Operating\_Permit\Kincaid\GMP\Figure 1-1\_Site Location Map.mxd



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

### SITE LOCATION MAP

### FIGURE 1-1

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN  
**ASH POND**  
KINCAID POWER PLANT  
KINCAID, ILLINOIS

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







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

0 250 500  
Feet

**SITE MAP**

**FIGURE 1-2**

**40 C.F.R. § 257 GROUNDWATER MONITORING PLAN**  
**ASH POND**  
 KINCAID POWER PLANT  
 KINCAID, ILLINOIS

RAMBOLL AMERICAS  
 ENGINEERING SOLUTIONS, INC.





PROJECT: 169000XXXX | DATED: 10/1/2021 | DESIGNER: STOLZSD  
 Y:\Mapping\Projects\222285\MXD\845\_Operating\_Permit\Kincaid\GMP\Figure 1-3\_GWE\_Contours\_20210223.mxd



ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.  
 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
- STAFF GAGE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY



**UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP  
 FEBRUARY 23, 2021**

**40 C.F.R. § 257 GROUNDWATER MONITORING PLAN  
 ASH POND  
 KINCAID POWER PLANT  
 KINCAID, ILLINOIS**

**FIGURE 1-3**

RAMBOLL AMERICAS  
 ENGINEERING SOLUTIONS, INC.





Y:\Mapping\Projects\222285\MXD\845\_Operating\_Permit\Kincaid\GMP\Figure 1-4\_GWE\_Contours\_20210405.mxd

PROJECT: 169000XXXX | DATED: 10/1/2021 | DESIGNER: STOLZSD



ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.  
 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
- STAFF GAGE
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- 40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY



**UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP  
 APRIL 5, 2021**

**40 C.F.R. § 257 GROUNDWATER MONITORING PLAN  
 ASH POND  
 KINCAID POWER PLANT  
 KINCAID, ILLINOIS**

**FIGURE 1-4**

RAMBOLL AMERICAS  
 ENGINEERING SOLUTIONS, INC.





PROJECT: 16900XXXXX | DATED: 1/19/2023 | DESIGNER: galammc  
Y:\Mapping\Projects\222285\MXD\KINCAID\Figure 2-1\_Expanded Part 257 GW Monitoring Well Network.mxd



- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- STAFF GAGE, CCR UNIT
- 40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY



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

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN  
ASH POND  
KINCAID POWER PLANT  
KINCAID, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.

