Cynthia Vodopivec
Kincaid Generation, LLC
Luminant
6555 Sierra Dr.
Irving, TX 75039

September 29, 2020

Sent via email

Mr. Andrew R. Wheeler, EPA Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Mail Code 5304-P
Washington, DC 20460

Re: Kincaid Power Station Alternative Closure Demonstration

Dear Administrator Wheeler:

Kincaid Generation, LLC (Kincaid Generation) hereby submits this request to the U.S. Environmental Protection Agency (EPA) for approval of a site-specific alternative deadline to initiate closure pursuant to 40 C.F.R. § 257.103(f)(2) for the Ash Pond located at the Kincaid Power Station near Kincaid, Illinois. Kincaid Generation is requesting an extension pursuant to 40 C.F.R. § 257.103(f)(2) so that the Ash Pond may continue to receive CCR and non-CCR wastestreams after April 11, 2021, and complete closure no later than October 17, 2028.

Enclosed is a demonstration prepared by Burns & McDonnell that addresses all of the criteria in 40 C.F.R. § 257.103(f)(2)(i)-(iv) and contains the documentation required by 40 C.F.R. § 257.103(f)(2)(v). As allowed by the agency, in lieu of hard copies of these documents, electronic files were submitted to Kirsten Hillyer, Frank Behan, and Richard Huggins via email. If you have any questions regarding this submittal, please contact Phil Morris at 618-343-7794 or phil.morris@vistracorp.com.

Sincerely,

Cynthia Vodopivec
VP - Environmental Health & Safety

Enclosure

cc: Kirsten Hillyer
Frank Behan
Richard Huggins

CCR Surface Impoundment Demonstration for a Site-Specific Alternative to Initiation of Closure Deadline

Kincaid Generation, LLC

Kincaid Power Station
Project No. 122702

Revision 0
9/28/2020

CCR Surface Impoundment Demonstration for a Site-Specific Alternative to Initiation of Closure Deadline

prepared for

Kincaid Generation, LLC
Kincaid Power Station
Kincaid, Illinois

Project No. 122702

Revision 0
9/28/2020

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

INDEX AND CERTIFICATION

Kincaid Generation, LLC
CCR Surface Impoundment
Demonstration for a Site-Specific Alternative to Initiation of Closure Deadline
Project No. 122702

Report Index

Certification

I hereby certify, as a Professional Engineer in the state of Illinois, that the information in this document as noted in the above Report Index was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Kincaid Generation, LLC or others without specific verification or adaptation by the Engineer.

LICENSED PROFESSIONAL ENGINEER
EDWARD T. TOHILL
062-056915
STATE OF ILLINOIS

Edward T. Tohill
09/28/20
LIC. EXPIRES 11/30/21

Edward T. Tohill

Edward T. Tohill, P.E., (Illinois License No. 062-056915)

Date: 09/28/20

TABLE OF CONTENTS

Page No.

LIST OF TABLES

Page No.

LIST OF ABBREVIATIONS

Abbreviation	**Term/Phrase/Name**
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
ELG Rule	Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category
EPA	Environmental Protection Agency
Kincaid	Kincaid Power Station
Kincaid Generation	Kincaid Generation, LLC
RCRA	Resource Conservation and Recovery Act
SWPPP	Stormwater Pollution Prevention Plan

1.0 EXECUTIVE SUMMARY

Kincaid Generation, LLC (Kincaid Generation) submits this request to the U.S. Environmental Protection Agency (EPA) for approval of a site-specific alternative deadline to initiate closure pursuant to 40 C.F.R. § 257.103(f)(2) —"Permanent Cessation of a Coal-Fired Boiler(s) by a Date Certain"— for the Ash Pond located at the Kincaid Power Station (Kincaid) in Illinois. The Ash Pond is a 172-acre CCR surface impoundment used to manage CCR and non-CCR wastestreams at Kincaid. As discussed herein, the boilers at the station will retire and the impoundment will complete closure no later than October 17, 2028. Therefore, Kincaid Generation is requesting an extension pursuant to 40 C.F.R. § 257.103(f)(2) so that the Ash Pond may continue to receive CCR and non-CCR waste streams after April 11, 2021, and complete closure no later than October 17, 2028.

2.0 INTRODUCTION

Kincaid is a 1,108-megawatt coal-fueled electric generating station near Kincaid, Illinois, that utilizes the 172-acre Ash Pond to manage sluiced bottom ash, economizer ash, air heater ash, and non-CCR wastewaters with a majority of the water recycled back through the system. The Ash Pond was constructed in 1964-1965 and put into service in 1967. The various non-CCR wastewaters routed to the Ash Pond originate from the West Area Runoff Basin, which collects flows from coal pile runoff, tunnel ground water sump, slag tank cooling water, intake pump house sump, ammonia storage tank sump, building low volume wastewater, condensate storage area and overflows, station basement sumps, and other stormwater sources. The Ash Pond also receives boiler wash water during maintenance outage events. A site plan is provided in Appendix A, and the plant water balance diagram is included in Appendix B. Note that the Ash Pond is referred to as the Bottom Ash Sluice Water Recycle Pond on the water balance diagram.

On April 17, 2015, the Environmental Protection Agency (EPA) issued the federal Coal Combustion Residual (CCR) Rule, 40 C.F.R. Part 257, Subpart D, to regulate the disposal of CCR materials generated at coal-fueled units. The rule is being administered under Subtitle D of the Resource Conservation and Recovery Act (RCRA, 42 U.S.C. § 6901 et seq.). On August 28, 2020, the EPA Administrator issued revisions to the CCR Rule that require all unlined surface impoundments to initiate closure by April 11, 2021, unless an alternative deadline is requested and approved. 40 C.F.R. § 257.101(a)(1) (85 Fed. Reg. 53,516 (Aug. 28, 2020)). Specifically, owners and operators of a CCR surface impoundment may continue to receive CCR and non-CCR wastestreams if the facility will cease operation of the coal-fired boiler(s) and complete closure of the impoundments within certain specified timeframes. 40 C.F.R. § 257.103(f)(2). To qualify for an alternative closure deadline under § 257.103(f)(2), a facility must meet the following four criteria:

1. **§ 257.103(f)(2)(i)** – No alternative disposal capacity is available on-site or off-site. An increase in costs or the inconvenience of existing capacity is not sufficient to support qualification.
2. **§ 257.103(f)(2)(ii) -** Potential risks to human health and the environment from the continued operation of the CCR surface impoundment have been adequately mitigated;
3. **§ 257.103(f)(2)(iii) -** The facility is in compliance with the CCR rule, including the requirement to conduct any necessary corrective action; and
4. **§ 257.103(f)(2)(iv) -** The coal-fired boilers must cease operation and closure of the impoundment must be completed within the following timeframes:

a. For a CCR surface impoundment that is 40 acres or smaller, the coal-fired boiler(s) must cease operation and the CCR surface impoundment must complete closure no later than October 17, 2023.
b. For a CCR surface impoundment that is larger than 40 acres, the coal-fired boiler(s) must cease operation, and the CCR surface impoundment must complete closure no later than October 17, 2028.

Section 257.103(f)(2)(v) sets out the documentation that must be provided to EPA to demonstrate that the four criteria set out above have been met. Therefore, this demonstration is organized based on the documentation requirements of §§ 257.103(f)(2)(v)(A) – (D).

3.0 DOCUMENTATION OF NO ALTERNATIVE DISPOSAL CAPACITY

To demonstrate that the criteria in § 257.103(f)(2)(i) has been met, the following provides documentation that no alternative disposal capacity is currently available on-site or off-site for each CCR and non-CCR wastestream that Kincaid Generation seeks to continue placing into the Ash Pond after April 11, 2021. Consistent with the regulations, neither an increase in costs nor the inconvenience of existing capacity was used to support qualification under this criteria. Instead, as EPA explained in the preamble to the proposed Part A revisions, "it would be illogical to require [] facilities [ceasing power generation] to construct new capacity to manage CCR and non-CCR wastestreams." 84 Fed. Reg. 65,941, 65,956 (Dec. 2, 2019). EPA again reiterated in the preamble to the final revisions that "[i]n contrast to the provision under § 257.103(f)(1), the owner or operator does not need to develop alternative capacity because of the impending closure of the coal fired boiler. Since the coal-fired boiler will shortly cease power generation, it would be illogical to require these facilities to construct new capacity to manage CCR and non-CCR wastestreams." 85 Fed. Reg. at 53,547. Thus, new construction or the development of new alternative disposal capacity was not considered a viable option for any wastestream discussed below.

3.1 Site-Layout and Wastewater Processes

As shown in Figure 1 (see Appendix A), Kincaid is located between Illinois Highway 104, the Ash Pond, and Sangchris Lake. The Ash Pond receives both the CCR sluice flows and a portion of the non-CCR wastewater flows onsite. The plant process flows are shown in Appendix B. The remaining impoundments onsite (East Area Runoff Basins, West Area Runoff Basin, the Equalization Basins, and the Standby Pond) are not authorized to receive the CCR sluice flows and are not large enough to independently treat the total volume of the plant process water flows. The existing wastewater treatment plant is sized to treat chemical and non-chemical metal cleaning waste flows (during outages) as well as water treatment plant area runoff, condensate polisher backwash, water treatment plant floor drains, water treatment plant filler backwash, DSI building washdown, and a slip stream of the ash sluice water recycle system as needed to maintain water level and quality. The existing wastewater treatment plant also treats the East Area runoff Basin Effluent discharges which consist of boiler sample drains (i.e. main building drains), east station area stormwater runoff, ash sluice recycle water strainer backwash, mercury monitoring system condensate (to condensate pit sump), main oil water separator (main and auxiliary transformer area runoff, turbine oil pit drains, turbine room floor drains, boiler fan area floor drains), oil/water separator no. 1 (turbine room pump, D.C. heater drains condensate pit sump), and auxiliary boiler blowdown. This wastewater system is not large enough to treat the sluice flows, coal pile runoff, stormwater, and other miscellaneous low volume wastewaters onsite that currently are treated in the Ash Pond.

3.2 CCR Wastestreams

Kincaid Generation evaluated each CCR wastestream placed in the Ash Pond at Kincaid. For the reasons discussed below in Table 3-1, each of the following CCR wastestreams must continue to be placed in the Ash Pond due to lack of alternative capacity both on and off-site.

Table 3-1: Kincaid CCR Wastestreams

CCR Wastestreams	Alternative Disposal Capacity Currently Available? YES/NO	Details
Bottom Ash Sluice	NO	There is no potential alternative for on or off-site disposal of these wet-generated CCR wastestreams.
Economizer Ash Sluice	NO	
Air Heater Ash Sluice	NO	

For the bottom ash, economizer ash and air heater ash sluice flows, there is no currently available onsite infrastructure to support dry handling of the ash or elimination of these wastestreams. As stated previously, since Kincaid Generation has elected to pursue the option to permanently cease the use of the coal fired boilers by a date certain, developing alternative disposal capacity is “illogical,” to use EPA’s words, and also counterproductive to the work to retire the boilers and close the impoundments. As long as Kincaid Generation continues to wet handle the bottom ash, economizer ash and air heater ash material, there are no other onsite CCR impoundments available to receive and treat these flows and it is not feasible to dispose of the wet-handled material offsite. The remaining impoundments onsite (West Area Runoff Basin, Equalization Basins 1 & 2, the Standby Pond and East Area Runoff Basins 1 & 2) are not authorized to receive the CCR sluice flows. As EPA explained in the preamble of the 2015 rule, it is not possible for sites that sluice CCR material to an impoundment to eliminate the impoundment and dispose of the material offsite. *See* 80 Fed. Reg. 21,301, 21,423 (Apr. 17, 2015) (“[W]hile it is possible to transport dry ash off-site to [an] alternate disposal facility that is simply not feasible for wet-generated CCR. Nor can facilities immediately convert to dry handling systems.”). As a result, the conditions at Kincaid satisfy the demonstration requirement in § 257.103(f)(2)(i). Consequently, in order to continue to operate and generate electricity, Kincaid must continue to use the Ash Pond to manage the CCR wastestreams previously discussed.

3.3 Non-CCR Wastestreams

Kincaid Generation evaluated each non-CCR wastestream placed in the Ash Pond at Kincaid. These streams are collected in the West Area Runoff Basin and a portion is pumped to the Ash Pond for additional treatment (TSS removal) before being routed to junction box downstream of the existing wastewater treatment plant for discharge (the remaining portion is pumped to the waste water treatment plant). The total flow from the West Area Runoff Basin to the Ash Pond averages 1 million gallons per day up to 4.1 million gallons per day maximum. This flow rate, and the high surges from storm events, requires continued use of the Ash Pond for equalization of the existing wastewater treatment system. For the reasons discussed below in Table 3-2, each of the following non-CCR wastestreams must continue to be placed in the Ash Pond due to lack of alternative capacity both on and off-site**.**

Table 3-2: Kincaid Non-CCR Wastestreams

Non-CCR Wastestreams	Alternative Disposal Capacity Currently Available? YES/NO	Details
Coal Pile Runoff	NO	Additional piping would need to be installed to reroute West Area Runoff Basin overflow to a new equalization basin or effluent tank with discharge to either the wastewater treatment plant or a new or existing permitted outfall. Some of these flows contain high levels of TSS that would overwhelm the current wastewater treatment system if the Ash Pond were removed from service.
Tunnel Ground Water Sump	NO	
Slag Tank Cooling Water	NO	
Intake Pump House Sump	NO	
Ammonia Storage Tank Sump	NO	
Building & Equipment Low Volume Wastewater	NO	
Condensate Storage Area and Overflows	NO	
Station Basement	NO	

As noted in Table 3-2, there is potential to discharge a portion of these non-CCR flows to other locations; however, this would require construction / operating permits; NPDES permit modifications, installation of new piping, and installation of potentially a new treatment system including non-CCR ponds, clarifiers, and/or storage tank(s). As stated previously, since Kincaid Generation has elected to pursue the option to permanently cease the use of the coal fired boilers by a certain date, developing alternative disposal capacity is "illogical," to use EPA's words, and also counterproductive to the work to retire the boilers and close the impoundments. There is currently no available infrastructure at the plant to support reroute of these flows. For the reasons discussed above, each of the following non-CCR wastestreams must continue to be placed in the Ash Pond due to lack of alternative capacity both on and off-site. Consequently, in order to continue to operate and generate electricity, Kincaid must continue to use the Ash Pond to manage the non-CCR wastestreams discussed above.

4.0 RISK MITIGATION PLAN

To demonstrate that the criteria in § 257.103(f)(2)(ii) has been met, Kincaid Generation has prepared and attached a Risk Mitigation Plan for the Kincaid Ash Pond (see Attachment 1).

5.0 DOCUMENTATION AND CERTIFICATION OF COMPLIANCE

In the Part A rule preamble, EPA reiterates that compliance with the CCR rule is a prerequisite to qualifying for an alternative closure extension, as it "provides some guarantee that the risks at the facility are properly managed and adequately mitigated." 85 Fed. Reg. at 53,543. EPA further stated that it "must be able to affirmatively conclude that facility meets this criterion prior to any continued operation." 85 Fed. Reg. at 53,543. Accordingly, EPA "will review a facility's current compliance with the requirements governing groundwater monitoring systems." 85 Fed. Reg. at 53,543. In addition, EPA will also "require and examine a facility's corrective action documentation, structural stability documents and other pertinent compliance information." 85 Fed. Reg. at 53,543. Therefore, EPA is requiring a certification of compliance and specific compliance documentation be submitted as part of the demonstration. 40 C.F.R. § 257.103(f)(2)(v)(C).

To demonstrate that the criteria in § 257.103(f)(2)(iii) has been met, Kincaid Generation is submitting the following information as required by § 257.103(f)(2)(v)(C):

5.1 Owner's Certification of Compliance - § 257.103(f)(2)(v)(C)(1)

I hereby certify that, based on my inquiry of those persons who are immediately responsible for compliance with environmental regulations for the Ash Pond at Kincaid, the facility is in compliance with all of the requirements contained in 40 C.F.R. Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments. The Kincaid CCR compliance website is up-to-date and contains all the necessary documentation and notification postings.

On behalf of Kincaid Generation:

Cynthia Vodopivec
VP - Environmental Health & Safety
September 28, 2020

5.2 Visual representation of hydrogeologic information - § 257.103(f)(2)(v)(C)(2)

Consistent with the requirements of § 257.103(f)(2)(v)(C)(2)(i) – (iii), Kincaid Generation has attached the following items to this demonstration:

- Map(s) of groundwater monitoring well locations in relation to the CCR unit (Attachment 2)
- Well construction diagrams and drilling logs for all groundwater monitoring wells (Attachment 3)
- Maps that characterize the direction of groundwater flow accounting for seasonal variations (Attachment 4)

5.3 Groundwater monitoring results - § 257.103(f)(2)(v)(C)(3)

Tables summarizing constituent concentrations at each groundwater monitoring well through the first 2020 semi-annual monitoring period are included as Attachment 5.

5.4 Description of site hydrogeology including stratigraphic cross-sections - § 257.103(f)(2)(v)(C)(4)

A description of the site hydrogeology and stratigraphic cross-sections of the site are included as Attachment 6.

5.5 Corrective measures assessment - § 257.103(f)(2)(v)(C)(5)

Background sampling began in late 2015 and continued for eight consecutive quarters. The first semiannual detection monitoring samples were collected in November 2017. The first assessment monitoring samples were collected in May 2018. The results, through the 2020 monitoring period, indicate that the Kincaid Ash Pond is currently in assessment monitoring, with no exceedances of the Appendix IV parameters. Accordingly, an assessment of corrective measures is not currently required at the site. Kincaid will continue to conduct groundwater monitoring in accordance with all state and federal requirements.

5.6 Remedy selection progress report - § 257.103(f)(2)(v)(C)(6)

As noted above, an assessment of corrective measures and the resulting selection of remedy are not currently required for the Ash Pond.

5.7 Structural stability assessment - § 257.103(f)(2)(v)(C)(7)

Pursuant to § 257.73(d), the initial structural stability assessment for the Ash Pond was prepared in October 2016 and is included as Attachment 7.

5.8 Safety factor assessment - § 257.103(f)(2)(v)(C)(8)

Pursuant to § 257.73(e), the initial safety factor assessment for the Ash Pond was prepared in October 2016 and is included as Attachment 8.

6.0 DOCUMENTATION OF CLOSURE COMPLETION TIMEFRAME

To demonstrate that the criteria in § 257.103(f)(2)(iv) has been met, "the owner or operator must submit the closure plan required by § 257.102(b) and a narrative that specifies and justifies the date by which they intend to cease receipt of waste into the unit in order to meet the closure deadlines." An addendum to the closure plan for the Ash Pond is included as Attachment 9.

In order for a CCR surface impoundment over 40 acres to continue to receive CCR and non-CCR wastestreams after the initial April 11, 2021 deadline, the coal-fired boiler(s) at the facility must cease operation and the CCR surface impoundment must complete closure no later than October 17, 2028. As discussed below, Kincaid will begin construction of the Ash Pond closure by April 17, 2025, and cease placing wastestreams into the Ash Pond on July 17, 2027, in order for closure to be completed by this deadline.

Table 6-1 is included below to summarize the major tasks and estimated durations associated with closing the Ash Pond in place. These durations are consistent with the durations experienced in the closure of over 500 acres of other CCR impoundments already completed by Kincaid Generation and its affiliates to date. The design, permitting, and procurement efforts will take place while the unit is still in operation. The first major construction effort will be to modify the pond operations by relocating the influent lines, minimizing the pond water levels, and isolating flow to a smaller portion of the current 111-acre impoundment that can be closed during the last two construction seasons. Kincaid Generation expects that the impoundment operating area will be reduced to approximately 40-50 acres during this effort. This reduction in footprint may require the addition of chemical feeds to provide adequate treatment with the reduction in residence time; however, it will simultaneously allow for continued operation of the plant to maintain generating capacity for the MISO markets and minimize the risk to the environment both by minimizing the potential for any impacts to groundwater and by opening up a significant portion of the remaining impoundment to allow for dewatering, grading, and closure.

Table 6-1 provides estimates for the durations required to close a portion of the pond footprint after the date noted to begin closure construction (Phase 1), as well as the current estimates for the closure of the active area (Phase 2, remaining 40-50 acres). In order to dewater the closure area, Kincaid Generation will likely release pond water through the existing Outfall E01 and employ pumps as necessary, and potentially an engineered dewatering system such as wellpoints to aid in stabilizing the material. As the water level is lowered and the material is stabilized, the contractor will work across the pond re-grading the existing CCR material to achieve positive drainage. As grading is completed in certain areas, the contractor may begin placing the final cover system which will consist of an 18-inch infiltration layer and 6-inch erosion layer in accordance with the requirements of the CCR Rule (or an alternative cover system that meets these minimum standards). The Phase 1 cover installation schedule will overlap with the Phase 1 grading schedule and is expected to finish approximately two months after the grading effort is completed. Once cover is placed, the area will be seeded and stabilized. The seeding and stabilization schedule will overlap with the cover installation schedule and finish one month after the cover system is placed. Closure is essentially completed once the erosion control layer is placed, so the final month of this activity will provide additional float to the schedule.

Table 6-1: Kincaid Ash Pond Closure Schedule

Action	Estimated Timeline (Months)
Spec, bid, and Award Engineering Services for CCR Impoundment Closure	3
Finalize CCR unit closure plan and seek IEPA approval for CCR unit closure	12
Obtain environmental permits (based on IEPA approval of closure plan): • State Waste Pollution Control Construction/Operating Permit • NPDES Industrial Wastewater Permit Modification • General NPDES Permit for Storm Water Discharges from Construction Site Activities and Storm Water Pollution Prevention Plan (SWPPP) • Proposed 35 Ill. Admin Code 845 operating permit application is due NLT September 2021. Construction permit application is anticipated to be due NLT July 2022.	21
Spec, bid, and Award Construction Services for CCR Impoundment Closure	3
Begin Construction of Closure Date	April 17, 2025
Minimize Active Area of Impoundment/Dewater Phase 1 Area	6
Regrade CCR Material in Phase 1 Area	18
Install Cover System – Phase 1 Area*	13

Action	Estimated Timeline (Months)
Establish Vegetation – Phase 1 Area**	2
Cease Placement of Waste	July 17, 2027
Dewater Impoundment – Phase 2 Area	3
Regrade CCR Material – Phase 2 Area	6
Install Cover System– Phase 2 Area	5
Establish Vegetation, Perform Site Restoration Activities, Complete Closure, and Initiate Post-Closure Care**	2
Total Estimated Time to Complete Closure	81 months
Date by Which Closure Must be Complete	October 17, 2028

* Activity expected to overlap with grading operations, finishing 2 months after grading is completed.

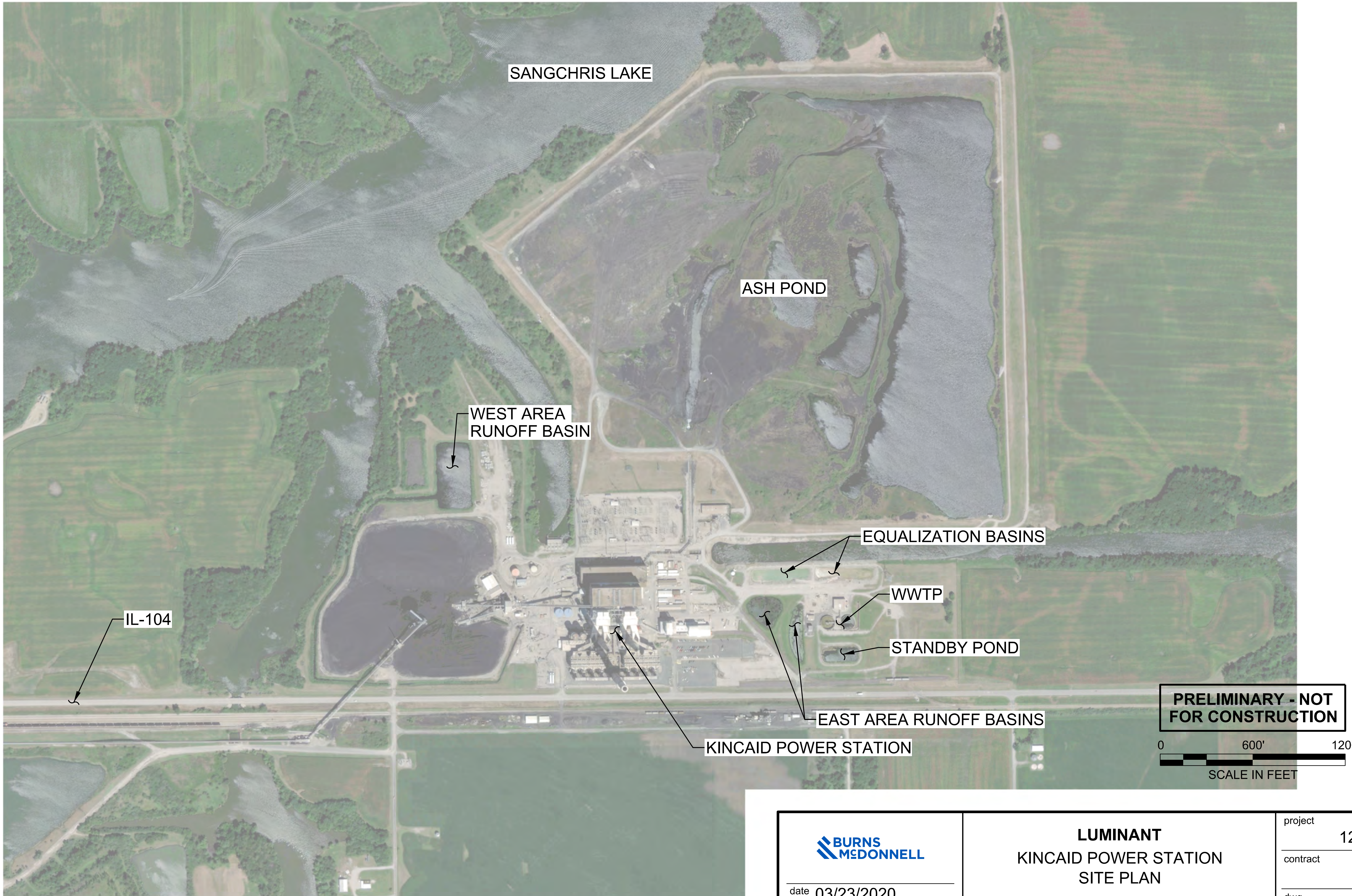
** Activity expected to overlap with cover system installation, finishing 1 month after cover installation is completed.

7.0 CONCLUSION

Based upon the information included in and attached to this demonstration, Kincaid Generation has demonstrated that the requirements of 40 C.F.R. § 257.103(f)(2) are satisfied for the 172-acre Ash Pond at Kincaid. This CCR surface impoundment is needed to continue to manage the CCR and non-CCR wastestreams identified in Section 3.2 and 3.3 above, is larger than 40 acres, and the boilers at the station will cease coal-fired operation and the Ash Pond will be closed by the October 17, 2028 deadline. Therefore, this CCR unit qualifies for the site-specific alternative deadline for the initiation of closure authorized by 40 C.F.R. § 257.103(f)(2).

Therefore, it is requested that EPA approve Kincaid Generation's demonstration and authorize the Ash Pond at Kincaid to continue to receive CCR and non-CCR wastestreams notwithstanding the deadline in § 257.101(a)(1) and to grant the alternative deadline of October 17, 2028, by which to complete closure of the impoundment.

APPENDIX A – SITE PLAN



BURNS McDONNELL

date 03/23/2020

designed A. MYERS

LUMINANT

KINCAID POWER STATION

SITE PLAN

project 122702

contract -

dwg **FIGURE 1** -

9/25/2020 \\bmcd\dfs\Clients\ENR\VistraEnergy\122702_ALTuseDisposal\Design\Civil\Dwgs\Sketches\Kincaid_Figure1.dgn

APPENDIX B – WATER BALANCE DIAGRAM

ATTACHMENT IV: KINCAID POWER PLANT: WASTE WATER FLOW DIAGRAM

(A) Includes:

Main and Auxiliary Transformer Areas
Turbine Oil Pit Drains
Turbine Room Floor Drains
Boiler Fan Area Floor Drains

(B) Includes:

Turbine Room Sump
D.C. Heater Drains
Condensate Polisher Backwash (Alternate Route)
Water Treatment Plant Drains (Alternate Route)
Water Treatment Plant Filter Backwash
(Alternate Route)
Condensate Pit Sump

(C) Includes:

Condensate Polisher Backwash
Water Treatment Plant Floor Drains
Water Treatment Plant filter Backwash

(D) Includes:

Non-Chemical Metal Cleaning Includes:
Precipitator cleaning
Boiler Fireside Cleaning
Economizer Cleaning
Air Heater cleaning
Boiler Waterside Cleaning
Condenser Tube Cleaning
Misc. Non-Chemical Metal Cleaning Waste

Chemical Metal Cleaning Includes
Boiler Tube cleaning
Condenser Tube cleaning
Misc. Chemical Metal cleaning

Notes:

1. Flows shown as: Average [Maximum]
2. Flow units = Million Gallons per Day
3. Main flows shown are considered daily average flows. Flows shown i represent daily maximum flows.
4. Dashed lines represent intermittent discharge
5. Average flows based on representative average from most recent 3
6. Maximum flows is design maximum calculated as follows:
   a. House service water estimated as 3 pumps, Each with a capacity of 35 MGD
   b. Condenser cooling water estimated as 4 pumps. Each with a capacity of 258 MGD
   c. Sewage treatment plant based on two 70 gpm forwarding pump
   d. Demineralizer regenerant waste based on 3 regenerations per day at 0.146 million gallons per regeneration
   e. Ash sluice water recycle emergency overflow based on discharge pipe dimensions
   f. Waste water treatment plant derived from 12" Parshall discharge flume flow vs. water depth curve
7. Ash sluice water recycle emergency overflow has not discharged sinc Average and maximum flows reported on May & June 2006 DMR's w MGD.
8. The following flows were added to the water balance based on the in the NPDES Permit:
   a. Boiler drains
   b. Total cooling water outflow into Lake Sangchris
   c. Flow from East Area Runoff Basin to wastewater treatment
   d. Flow from West Area Runoff Basin to Bottom Ash Sluice Water Recycle Pond.
   e. Flow from Equalization Basin 1 to wastewater treatment
   f. Total flow from East Area Runoff Basin and Equalization Basin 1 into wastewater treatment system
   g. Flow from Equalization Basin 2 to wastewater treatment syste
   h. Flows from wastewater treatment to Junction Box
   i. Flow from Outfall B01
   j. Flow from Condenser Cooling Water
9. The following flows were added based on the diagram provided duri
   a. Sewage Treatment Plant
   b. Demineralizer Regenerant Waste
10. The maximum flow from the West Area Runoff Basins based on infor Harza Manual for pumps ARWP-1 and ARWP-2, which are 2000 gpm

ATTACHMENT 1 – RISK MITIGATION PLAN

RISK MITIGATION PLAN - 40 C.F.R. § 257.103(f)(2)(v)(B)

INTRODUCTION

To demonstrate that the criteria in §40 C.F.R. 257.103(f)(2)(ii) has been met, Kincaid Generation, L.L.C. ("Kincaid Generation") has prepared this Risk Mitigation Plan for the Ash Pond located in at the Kincaid Power Station ("Kincaid") near Kincaid, Illinois.

- EPA is requiring a risk mitigation plan to "address the potential risk of continued operation of the CCR surface impoundment while the facility moves towards closure of their coal-fired boiler(s), to be consistent with the court's holding in *USWAG* that RCRA requires EPA to set minimum criteria for sanitary landfills that prevent harm to either human health or the environment." 85 Fed. Reg. at 53,516, 53,548 (Aug. 28, 2020).

As required by § 257.103(f)(2)(v)(B), the Risk Mitigation Plan must describe the "measures that will be taken to expedite any required corrective action," and contain the three following elements:

- First, "a discussion of any physical or chemical measures a facility can take to limit any future releases to groundwater during operation." § 257.103(f)(2)(v)(B)(1). In promulgating this requirement, EPA explained that this "might include stabilization of waste prior to disposition in the impoundment or adjusting the pH of the impoundment waters to minimize solubility of contaminants [and that] [t]his discussion should take into account the potential impacts of these measures on Appendix IV constituents." 85 Fed. Reg. at 53,548.

- Second, "a discussion of the surface impoundment's groundwater monitoring data and any found exceedances; the delineation of the plume (if necessary based on the groundwater monitoring data); identification of any nearby receptors that might be exposed to current or future groundwater contamination; and how such exposures could be promptly mitigated." § 257.103(f)(2)(v)(B)(2).

- Third, "a plan to expedite and maintain the containment of any contaminant plume that is either present or identified during continued operation of the unit." § 257.103(f)(2)(v)(B)(3). In promulgating this final requirement, EPA explained that "the purpose of this plan is to demonstrate that a plume can be fully contained and to define how this could be accomplished in the most accelerated timeframe feasible to prevent further spread and eliminate any potential for exposures." 85 Fed. Reg. at 53,549. In addition, EPA stated that "this plan will be based on relevant site data, which may include groundwater chemistry, the variability of local hydrogeology, groundwater elevation and flow rates, and the presence of any surface water features that would influence rate and direction of contamination movement. For example, based on the rate and direction of groundwater flow and potential for diffusion of the plume, this plan could identify the design and spacing of extraction wells necessary to prevent further downgradient migration of contaminated groundwater." 85 Fed. Reg. at 53,549.

Consistent with these requirements and guidance, Kincaid Generation plans to continue to mitigate the risks to human health and the environment from the Kincaid Ash Pond as detailed in this Risk Mitigation Plan.

1 OPERATIONAL MEASURES TO LIMIT FUTURE RELEASES TO GROUNDWATER – 40 C.F.R. § 257.101(F)(2)(V)(B)(1)

The Kincaid Ash Pond is a 172-acre CCR surface impoundment. Consistent with the requirements of the CCR rule, compliance documents on Kincaid's CCR public website reflect the characterization of the Ash Pond as a single unit for purposes of groundwater monitoring and closure activities

The Kincaid CCR surface impoundment receives CCR transport waters from bottom ash, economizer ash and air heater ash plus non-CCR process waters onsite. This is a recirculation system with emergency overflow discharging to Sangchris Lake via Outfall E01 in accordance with NPDES Permit No. IL0002241.

At the Kincaid Ash Pond, none of the Appendix IV parameter have reported SSLs, or SSLs above their respective Ground Water Protection Standards (GWPSs) as sampled and analyzed per the facility's groundwater monitoring program for the CCR surface impoundment. Therefore, Kincaid's current physical treatment operation adequately limits potential risks to human health and the environment during operation. Kincaid will continue this treatment process for the CCR surface impoundment until such time as closure is required per 40 CFR 257. The facility's current physical treatment process is discussed below.

1.1 CURRENT OPERATION OF PHYSICAL TREATMENT

Fly ash is captured dry and sent offsite for disposal or beneficial reuse. Therefore, current operations do not add fly ash transport waters to the CCR Impoundment.

As part of normal operations, bottom ash is transported through the sluice lines into the recycle CCR surface impoundment where it is dewatered and transported offsite for beneficial reuse from the impoundment regularly. As needed, a portion of the bottom ash transport waters are pulled from the recycle system and treated prior to discharge through Outfall E01 by adjusting the pH to form insoluble precipitates and then if necessary, a polymer is added. The polymer chains act to attract these precipitates, forming larger groups which eventually develop sufficient density to settle, leaving behind a clear liquid. Pulling the water from the recycle system for treatment reduces the constituent concentration in the recycle CCR impoundment which in turn reduces leaching to groundwater.

The CCR surface impoundment is also a wastewater treatment settling system which allows the solids to settle.

Therefore, since fly ash transport water is not conveyed to the impoundment and bottom ash solids are removed from the impoundment, the current operation of the Kincaid CCR impoundment limits future releases to groundwater during operation, and consequently no potential safety impacts or exposure to human health or environmental receptors are expected to result.

If Appendix IV releases are discovered per the facility's groundwater monitoring program, Kincaid Generating will test, evaluate, and implement a chemical treatment method (i.e. pH adjustment, coagulation, precipitation, or other method as determined) for the Kincaid CCR Impoundment to limit potential risks to human health and the environment during operation.

2 GROUNDWATER IMPACTS, RECEPTORS, AND POTENTIAL EXPOSURE MITIGATION - 40 C.F.R. § 257.101(F)(2)(V)(B)(2)

The Kincaid Ash Pond, with a footprint of approximately 172 acres (Figure 1), currently remains in assessment monitoring. There have been no statistically significant levels (SSLs) of Appendix IV parameter concentrations since assessment monitoring was established on May 9, 2018 in accordance with 40 CFR § 257.95. The most recent summary of groundwater monitoring activities is provided in the "2019 Annual Groundwater Monitoring and Corrective Action Report, Kincaid Ash Pond, Kincaid Power Station" (Ramboll, 2020) [see Attachment 1]. A summary of the assessment monitoring program is provided in Table 1. Since there have been no SSLs or GWPS exceedances to date, no plume delineation maps have been necessary.

Receptors

Should a release to groundwater for one or more Appendix IV parameters occur in the future, the two primary risks to human health and the environment are via groundwater exposure and surface water exposure. Groundwater exposure would be via ingestion or dermal contact, both of which are likely an incomplete exposure pathway for CCR-related constituents originating from the Kincaid Ash Pond. Impacted groundwater potentially migrating to nearby surface water bodies – specifically Sangchris Lake bordering the north, west and southwest of the western half of the impoundment – could be an exposure pathway but does not pose a risk for the reasons discussed below.

There are no industrial, commercial or domestic use water wells in a downgradient or cross-gradient groundwater flow direction relative to the Kincaid Ash Pond that are at risk of impacts from a release. Most wells in the area are located on the opposite side of Sangchris Lake from the plant, which is likely a significant hydrogeologic divide to groundwater flow. In addition, there are no surface water intakes within a one-mile radius of the Kincaid property line.

Ambient groundwater flow in the Uppermost Aquifer beneath the Kincaid Ash Pond is generally west towards Sangchris Lake, although there appears to be radial flow from the ash pond during portions of the year. Groundwater elevations are primarily controlled by the water level in Sangchris Lake. Under high lake level events or flooding, flow direction may be reversed (i.e. groundwater flows in an easterly direction) near the lake for limited durations (refer to the description of hydrogeology attached to the alternative closure demonstration letter).

Horizontal hydraulic gradient at the northwestern portion of the ash pond, as determined near well MW-12 in November 2016 and February 2017, was approximately 0.02 and 0.01 ft/ft, respectively. Groundwater flow velocity was 0.07 and 0.03 feet per day (ft/day) as determined by the interpolated groundwater elevation contours in November 2016 and February 2017, respectively (refer to the description of hydrogeology attached to the alternative closure demonstration letter).

Exposure Mitigation

Mitigation of future potential exposures to groundwater contamination from continued operation of the Kincaid Ash Pond is discussed in detail in the following section.

3 CONTAMINANT PLUME CONTAINMENT: OPTIONS EVALUATION AND PLAN- 40 C.F.R. § 257.101(F)(2)(V)(B)(3)

Appropriate corrective measure(s) to address future potential impacted groundwater associated with the Kincaid Ash Pond are based on impacts to the Uppermost Aquifer. The Uppermost Aquifer consists of heterogeneous sand, silty sand, and sandy clay with thicknesses generally ranging from less than one foot to five feet and a median horizontal hydraulic conductivity of 2×10^{-4} centimeters per second (cm/s). The Uppermost Aquifer is overlain by a semi-confining clay and silt. The top of the Uppermost Aquifer generally lies 15 to 20 feet below ground surface (bgs), with 8 of the 9 monitoring wells around the impoundment screened at depths ranging from 10 to 25 feet bgs and one well screened at 30 to 40 feet bgs. The Uppermost Aquifer is underlain by a lower confining unit composed of a clay till with a thickness ranging from 36 to 57 feet and a vertical permeability of 5×10^{-8} cm/s. Underlying the till is limestone and shale bedrock of the Pennsylvanian Bond Formation. (refer to the description of hydrogeology attached to the alternative closure demonstration letter).

Since there has been no release of Appendix IV parameters to groundwater above GWPS(s), which would trigger a Corrective Measures Assessment (CMA) under 40 C.F.R. § 257.96 based on specific parameter concentrations and contaminant plume dimensions, several options are evaluated to address potential future plume containments. The evaluation criteria for assessing remedial options are the following: performance; reliability; ease of implementation; potential impacts of the remedies (safety, cross-media, and control of exposure to residual contamination); time required to begin and complete the remedy; and, institutional requirements that may substantially affect implementation of the remedy(s), such as permitting, environmental or public health requirements.

Although future potential source control measures (e.g. closure in place, closure by removal to on-site or off-site landfill, in-situ solidification/stabilization) to mitigate groundwater impacts are typically considered as part of a CMA process upon closure of the Kincaid Ash Pond, the shorter-term options considered for mitigating groundwater impacts relative to a potential future release of one or more Appendix IV parameters at Kincaid are as follows:

- Monitored Natural Attenuation (MNA)
- Groundwater Cutoff Wall
- In-Situ Chemical Treatment
- Permeable Reactive Barrier
- Groundwater Extraction

These same groundwater remedial corrective measures will be evaluated for all Appendix IV constituents that present a future risk to human health or the environment.

<u>Monitored Natural Attenuation (MNA)</u>
Upon notification of a release of one or more Appendix IV constituent(s) to groundwater, MNA will be evaluated with site-specific characterization data and geochemical analysis as a long term remedial option, combined with source control measures, through application of the USEPA's tiered approach to MNA (USEPA 1999, 2007 and 2015):

1. Demonstrate that the area of groundwater impacts is not expanding.

2. Determine the mechanisms and rates of attenuation.

3. Determine that the capacity of the aquifer is sufficient to attenuate the mass of constituents in groundwater and that the immobilized constituents are stable and will not remobilize.
4. Design a performance monitoring program based on the mechanisms of attenuation and establish contingency remedies (tailored to site-specific conditions) should MNA not perform adequately.

MNA is not regarded as a short-term remedial option for contaminant plume containment, but as a potential long-term option following implementation of shorter term control measures.

Groundwater Extraction

This corrective measure includes installation of a series of groundwater pumping wells or trenches to control and extract impacted groundwater. Groundwater extraction captures and contains impacted groundwater and can limit plume expansion and/or off-site migration. Construction of a groundwater extraction system typically includes, but is not limited to, the following primary project components:

- Designing and constructing a groundwater extraction system consisting of a series of extraction wells or trenches located around the perimeter of the contaminant plume and operating at a rate to allow capture of CCR impacted groundwater.
- Designing a system to manage extracted groundwater, which may include modification to the existing NPDES permit, including treatment prior to discharge, if necessary.
- Ongoing inspection and maintenance of the groundwater extraction system.

Installation of a groundwater extraction system, whether wells or trenches, can be expedited with the assumption that there is a good conceptual site model (CSM) of the hydrogeological system around the CCR unit, groundwater flow and transport model, and aquifer test if a well system is the best option for intercepting the groundwater contaminant plume. Upon notification of an SSL exceedance of a GWPS for one or more Appendix IV parameters, an aquifer test will be conducted, and groundwater model developed for designing a groundwater extraction system for optimization of contaminant plume capture.

A schematic of a typical groundwater extraction well is shown on Figure 2. Based on site specific hydrogeology and future potential plume width and depth, a groundwater extraction system will typically consist of one to three extraction wells with pitless adapter's manifolded together with HDPE conveyance pipe to a common tank or lined collection vault prior to treatment at the on-site wastewater treatment plant and discharge via the NPDES permitted outfall.

Groundwater Cutoff Wall

Vertical cutoff walls are used to control and/or isolate impacted groundwater. Low permeability cutoff walls can be used to prevent horizontal off-site migration of potentially impacted groundwater. Cutoff walls act as barriers to migration of impacted groundwater and can isolate soils that have been impacted by CCR to prevent contact with unimpacted groundwater. Cutoff walls are often used in conjunction with an interior pumping system to establish a reverse gradient within the cutoff wall. The reverse gradient maintains an inward flow through the wall, keeping it from acting as a groundwater dam and controlling potential end-around or breakout flow of contaminated groundwater.

A commonly used cutoff wall construction technology is the slurry trench method, which consists of excavating a trench and backfilling it with a soil-bentonite mixture, often created with the soils excavated from the trench. The trench is temporarily supported with bentonite slurry that is pumped into the trench as it is excavated. Excavation for cutoff walls is conducted with conventional hydraulic excavators, hydraulic excavators equipped with specialized booms to extend their reach (*i.e.*, long-stick excavators), or chisels and clamshells, depending upon the depth of the trench and the material to be excavated. For a cutoff wall to be technically feasible, there must be a low-permeability lower confining layer into which the barrier can be keyed, and it must be at a technically feasible depth.

Permeable Reactive Barrier

Chemical treatment via a Permeable Reactive Barrier (PRB) is defined as an emplacement of reactive materials in the subsurface designed to intercept a contaminant plume, provide a flow path through the reactive media, and transform or otherwise render the contaminant(s) into environmentally acceptable forms to attain remediation concentration goals downgradient of the barrier (EPRI, 2006).

As groundwater passes through the PRB under natural gradients, dissolved constituents in the groundwater react with the media and are transformed or immobilized. A variety of media have been used or proposed for use in PRBs. Zero-valent iron has been shown to effectively immobilize CCR constituents, including arsenic, chromium, cobalt, molybdenum, selenium and sulfate. Zero-valent iron has not been proven effective for boron, antimony, or lithium (EPRI, 2006).

System configurations include continuous PRBs, in which the reactive media extends across the entire path of the contaminant plume; and funnel-and-gate systems, where barrier walls are installed to control groundwater flow through a permeable gate containing the reactive media. Continuous PRBs intersect the entire contaminant plume and do not materially impact the groundwater flow system. Design may or may not include keying the PRB into a low-permeability unit at depth. Funnel-and-gate systems utilize a system of barriers to groundwater flow (funnels) to direct the contaminant plume through the reactive gate. The barriers, typically some form of cutoff wall, are keyed into a low-permeability unit at depth to prevent short circuiting of the plume. Funnel-and-gate design must consider the residence time to allow chemical reactions to occur. Directing the contaminant plume through the reactive gate can significantly increase the flow velocity, thus reducing residence time.

Design of PRB systems requires rigorous site investigation to characterize the site hydrogeology and to delineate the contaminant plume. A thorough understanding of the geochemical and redox characteristics of the plume is critical to assess the feasibility of the process and select appropriate reactive media. Laboratory studies, including batch studies and column studies using samples of site groundwater, are needed to determine the effectiveness of the selected reactive media at the site (EPRI, 2006).

This is a potential viable option for groundwater corrective measures, to be evaluated further, but is not a short-term solution that can be implemented expeditiously.

In-Situ Chemical Treatment

In-situ chemical treatment for inorganics are being tested and applied with increasing frequency. In-situ chemical treatment includes the targeted injection of reactive media into the subsurface to mitigate groundwater impacts. Inorganic contaminants are typically remediated through immobilization by reduction or oxidation followed by precipitation or adsorption (EPRI, 2006). Chemical reactants that have been applied or are in development for application in treating inorganic contaminants include ferrous sulfate, nanoscale zero-valent iron, organo-phosphorus nutrient mixture (PrecipiPHOS™) and sodium dithionite (EPRI, 2006). Zero-valent iron has been shown to effectively immobilize cobalt and molybdenum. Implementation of in-situ chemical treatment requires detailed technical analysis of field hydrogeological and geochemical conditions along with laboratory studies.

This is a potential viable option for groundwater corrective measures, to be evaluated further, but is not a short-term solution that can be implemented expeditiously.

3.1 Containment Plan

Based on the options evaluated for containment of a future potential groundwater contaminant plume originating from the Kincaid Ash Pond for one or more Appendix IV constituents exceeding their GWPS(s), the most viable short-term option of those evaluated is a groundwater extraction well or recovery trench system, which would allow for capture of impacted groundwater and prevention of further plume migration towards the principal potential receptor, which has been identified as Sangchris Lake.

In circumstances where there is not an immediate concern of endangerment to human health or the environment, other longer-term corrective measures may be more viable. The principal method under consideration for controlling potential future Appendix IV constituent releases is MNA. MNA is a potentially viable corrective measure that will be further evaluated for use at the Kincaid Ash Pond.

Depending on the location, depth, and plume geometry of any future potential Appendix IV exceedances of GWPSs, the specific constituent(s) with exceedances, and distance from potential receptors, the other groundwater corrective measures discussed as part of the corrective options evaluation – groundwater cutoff wall, permeable reactive barrier, and in-situ chemical treatment – are all secondary remedial alternatives available for consideration following the current primary options of groundwater extraction for short-term application and MNA for long-term application.

4 REFERENCES

Electric Power Research Institute (EPRI), 2006. Groundwater Remediation of Inorganic Constituents at Coal Combustion Product Management Sites, Overview of Technologies, Focusing on Permeable Reactive Barriers. Electric Power Research Institute, Palo Alto, California. Final Report 1012584, October 2006.

Ramboll, 2020. 2019 Annual Groundwater Monitoring and Corrective Action Report, Kincaid Ash Pond, Kincaid Power Station. January 31, 2020.

USEPA, 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. Directive No. 9200.U-17P. Washington, D.C.: EPA, Office of Solid Waste and Emergency Response.

USEPA, 2007. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 1 – Technical Basis for Assessment. EPA/600/R-07/139. National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio. October 2007.

USEPA, 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. Directive No. 9283.1-36. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. August 2015.

TABLES

Table 1 - Assessment Monitoring Program Summary, Kincaid Ash Pond

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s) Appendix IV	SSL(s) Determination Date	ASD Completion Date	CMA Completion / Status
May 31 - June 1, 2018	July 26, 2018	Appendix III Appendix IV	NA	NA	NA	NA
August 28, 2018	October 18, 2018	Appendix III Appendix IV Detected[1]	None	January 7, 2019	NA	NA
February 14-15, 2019	April 15, 2019	Appendix III Appendix IV	None	July 15, 2019	NA	NA
August 20-21, 2019	October 15, 2019	Appendix III Appendix IV Detected[1]	None	January 13, 2020	NA	NA
February 11, 2020	April 15, 2020	Appendix III Appendix IV Detected	None	July 14, 2020	NA	NA

[O: RAB 9/11/20; C: EJT 9/15/20]

Notes:

CMA = Corrective Measures Assessment

NA = Not Applicable

1. Groundwater sample analysis was limited to Appendix IV parameters detected in previous events in accordance with 40 C.F.R. Part 257.95(d)(1).

FIGURES

DRAWN BY/DATE:
TDC 12/1/15
REVIEWED BY/DATE:
YAD 12/1/15
APPROVED BY/DATE:
SJC 09/14/17

SITE AND WELL LOCATION MAP
KINCAID ASH POND
UNIT ID: 141

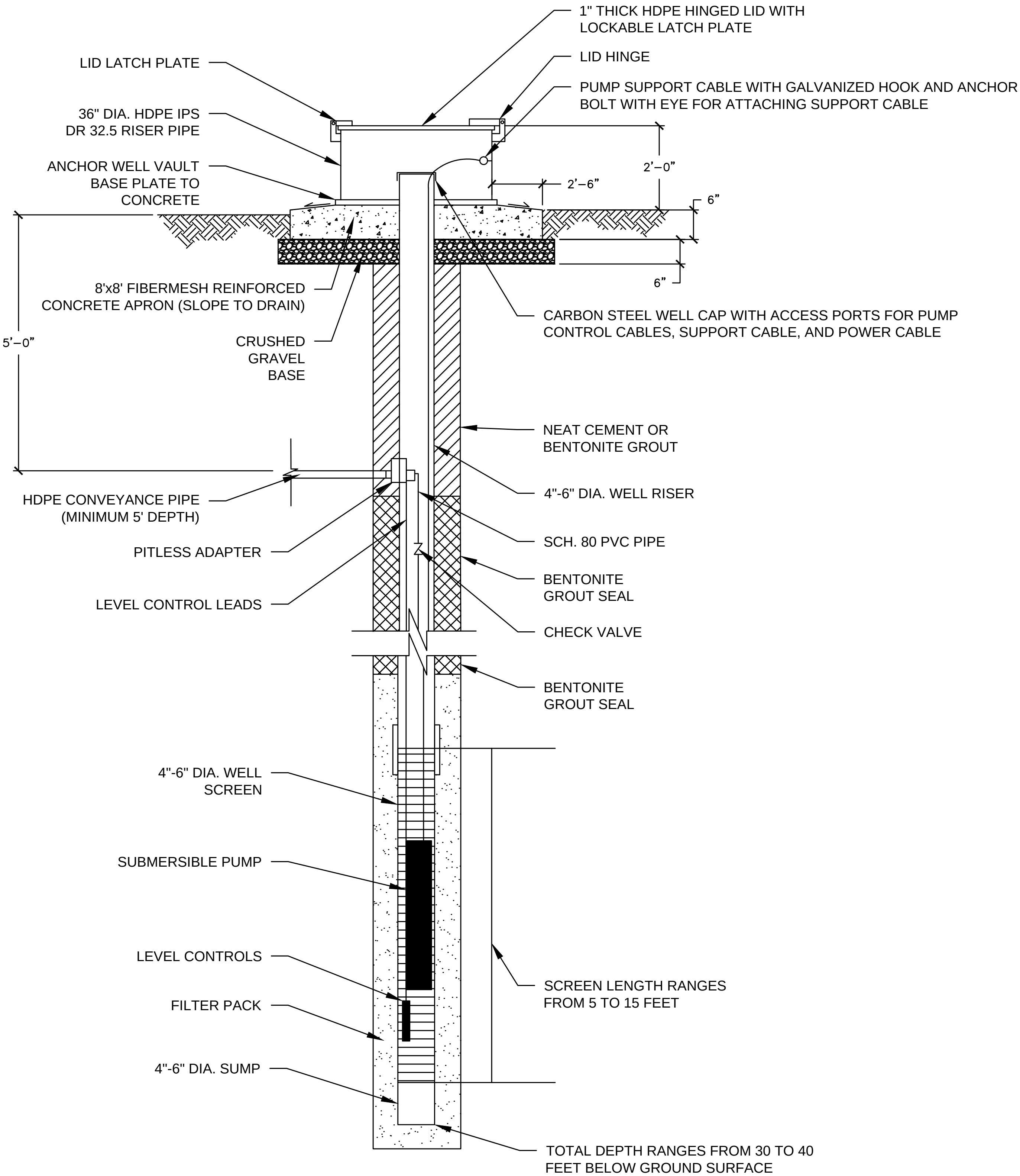
SAMPLING AND ANALYSIS PLAN
DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285/3.3

FIGURE NO: 1

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\22\2285_Kincaid\MXD\SAP\Figure 1_Site and Well Location Map - Kincaid.mxd Author: tcushman; Date/Time: 12/1/2015, 2:36:29 PM



\\ramboll.sharepoint.com@SSL\DavWWWRoot\sites\vistra\Shared Documents\-CCR GW\Drawings\CAD\Gradient Control Well.dwg

PROJECT: RAMBOLL PROJECT NUMBER DATED: 9/10/2020 5:12 PM DESIGNER: ENGELHSA

NOTES

1. NOT TO SCALE

TYPICAL HYDRAULIC GRADIENT CONTROL WELL DETAIL

FIGURE 2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

KINCAID GENERATING L.L.C

KINCAID ASH POND

KINCAID, ILLINOIS

RAMBOLL

ATTACHMENT 1

Prepared for

Kincaid Generation, L.L.C.

Document type

2019 Annual Groundwater Monitoring and Corrective Action Report

Date

January 31, 2020

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

KINCAID ASH POND, KINCAID POWER STATION

Bright ideas. Sustainable change.

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
KINCAID ASH POND, KINCAID POWER STATION

Project name	**Kincaid Power Station**
Project no.	**72758**
Recipient	**Kincaid Generation, L.L.C.**
Document type	**Annual Groundwater Monitoring and Corrective Action Report**
Version	**FINAL**
Date	**January 31, 2020**
Prepared by	**Kristen L. Theesfeld**
Checked by	**Jacob J. Walczak**
Approved by	**Eric J. Tlachac**
Description	**Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

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CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

AP	Ash Pond
CCR	Coal Combustion Residuals
GWPS	Groundwater Protection Standard
SAP	Sampling and Analysis Plan
SSL	Statistically Significant Level

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.90(e) for Kincaid Ash Pond (AP) located at Kincaid Power Station near Kincaid, Illinois.

Groundwater is being monitored at Kincaid AP in accordance with the Assessment Monitoring Program requirements specified in 40 C.F.R. § 257.95.

No changes were made to the monitoring system in 2019 (no wells were installed or decommissioned).

No Statistically Significant Levels (SSLs) of 40 C.F.R. Part 257 Appendix IV parameters were determined in 2019 and Kincaid AP remains in the Assessment Monitoring Program.

1. INTRODUCTION

This report has been prepared by Ramboll on behalf of Kincaid Generation, L.L.C., to provide the information required by 40 C.F.R.§ 257.90(e) for Kincaid AP located at Kincaid Power Station near Kincaid, Illinois.

In accordance with 40 C.F.R. § 257.90(e), the owner or operator of a Coal Combustion Residuals (CCR) unit must prepare an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year that documents the status of the Groundwater Monitoring and Corrective Action Program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects 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 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 §§ 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 a Statistically Significant Increase relative to background levels).
5. Other information required to be included in the Annual Report as specified in §§ 257.90 through 257.98.

This report provides the required information for Kincaid AP for calendar year 2019.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the Monitoring Program status in calendar year 2019, and Kincaid AP remains in the Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95.

3. KEY ACTIONS COMPLETED IN 2019

The Assessment Monitoring Program is summarized in Table A. The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells is presented in Figure 1. No changes were made to the monitoring system in 2019 (no wells were installed or decommissioned). In general, one groundwater sample was collected from each background and downgradient well during each monitoring event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (SAP) (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2019 are presented in Tables 1 and 2. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSLs of Appendix IV parameters over Groundwater Protection Standards (GWPSs).

Statistical background values are provided in Table 3 and GWPSs in Table 4.

Analytical results for the May and August 2018 sampling events were provided in the 2018 Annual Groundwater Monitoring and Corrective Action Report.

Table A – 2018-2019 Assessment Monitoring Program Summary

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s)	SSL(s) Determination Date
May 31 - June 1, 2018	July 26, 2018	Appendix III Appendix IV	NA	NA
August 28, 2018	October 18, 2018	Appendix III Appendix IV Detected [1]	None	January 7, 2019
February 14-15, 2019	April 15, 2019	Appendix III Appendix IV	None	July 15, 2019
August 20-21, 2019	October 15, 2019	Appendix III Appendix IV Detected [1]	NA	TBD

Notes:

NA: Not Applicable
TBD: To Be Determined
1. Groundwater sample analysis was limited to Appendix IV parameters detected in previous events in accordance with 40 C.F.R. § 257.95(d)(1).

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2019. Groundwater samples were collected and analyzed in accordance with the SAP (NRT/OBG, 2017a), and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2020

The following key activities are planned for 2020:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2020.
- Complete evaluation of analytical data from the downgradient wells, using GWPSs to determine whether an SSL of Appendix IV parameters has occurred.
- If an SSL is identified, potential alternate sources (i.e., a source other than the CCR unit caused the SSL or that that SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated.
  - If an alternate source is demonstrated to be the cause of the SSL, a written demonstration will be completed within 90 days of SSL determination and included in the 2020 Annual Groundwater Monitoring and Corrective Action Report.
  - If an alternate source(s) is not identified to be the cause of the SSL, the applicable requirements of 40 C.F.R. §§ 257.94 through 257.98 (e.g., assessment of corrective measures) as may apply in 2020 will be met, including associated recordkeeping/notifications required by 40 C.F.R. §§ 257.105 through 257.108.

6. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a. Sampling and Analysis Plan, Kincaid Ash Pond, Kincaid Power Station, Kincaid, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a, Statistical Analysis Plan, Kincaid Power Station, Kincaid Generation, L.L.C., October 17, 2017.

TABLES

TABLE 1.
2019 ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
KINCAID POWER STATION
UNIT ID 141 - KINCAID ASH POND
KINCAID, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Well Identification Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date & Time Sampled	Depth to Groundwater (ft)[1]	Groundwater Elevation (ft NAVD88)	40 C.F.R. Part 257 Appendix III						
						Boron, total (mg/L) 6020A[2]	Calcium, total (mg/L) 6020A[2]	Chloride, total (mg/L) 9251[2]	Fluoride, total (mg/L) 9214[2]	pH (field) (S.U.) SM 4500 H+B[2]	Sulfate, total (mg/L) 9036[2]	Total Dissolved Solids (mg/L) SM 2540C[2]
Background / Upgradient Monitoring Wells												
MW-1	39.592051	-89.490283	2/14/2019 11:15	14.33	590.38	0.243	66.0	10	0.17	6.7	92	312
			8/21/2019 9:28	15.27	589.44	0.290	60.2	10	0.18	6.3	80	334
MW-2	39.590698	-89.488916	2/14/2019 10:27	5.16	595.94	0.0701	104	18	0.55	7.4	136	442
			8/20/2019 11:32	7.16	593.94	0.0667	94.2	16	0.48	7.1	119	488
Downgradient Monitoring Wells												
MW-5	39.601296	-89.490402	2/14/2019 12:35	25.15	594.29	0.530	147	42	0.16	7.0	12	650
			8/21/2019 10:28	26.50	592.94	0.547	150	41	0.18	6.6	<10	646
MW-6	39.598638	-89.498944	2/15/2019 10:39	6.25	594.21	0.649	101	<5	0.19	6.7	106	464
			8/21/2019 10:58	10.32	590.14	1.32	113	<5	0.19	6.4	153	550
MW-7	39.597637	-89.498959	2/15/2019 11:14	2.59	595.16	0.114	170	<5	0.22	7.2	193	726
			8/21/2019 11:22	6.57	591.18	0.395	133	<5	0.25	6.7	150	654
MW-8	39.594399	-89.496829	2/14/2019 13:16	6.42	596.72	1.02	175	21	0.23	6.9	332	946
			8/21/2019 11:47	8.46	594.68	1.10	166	19	0.21	6.5	258	864
MW-11	39.593104	-89.491115	2/14/2019 11:41	11.41	590.40	1.69	131	38	0.52	7.1	103	616
			8/21/2019 10:02	11.55	590.26	1.85	125	30	0.49	6.7	88	628
MW-12	39.600200	-89.496380	2/14/2019 14:50	5.87	585.57	3.06	224	32	0.19	6.9	393	1130
			8/20/2019 10:02	6.64	584.80	4.42	219	29	0.18	6.4	371	1160

[O: RAB 12/23/19, C: KLT 12/24/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
ft = foot/feet
mg/L = milligrams per liter
NAVD88 = North American Vertical Datum of 1988
S.U. = Standard Units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Increases (SSIs) over background.
[1]All depths to groundwater were measured on the first day of the sampling event.
[2]4-digit numbers represent SW-846 analytical methods.

TABLE 2.
2019 ANALYTICAL RESULTS - APPENDIX IV PARAMETERS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
KINCAID POWER STATION
UNIT ID 141 - KINCAID ASH POND
KINCAID, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Well Identification Number	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date & Time Sampled	40 C.F.R. Part 257 Appendix IV														
				Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Cadmium, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	Radium 226/228, Combined (pCi/L)	Selenium, total (mg/L)	Thallium, total (mg/L)
				6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	6020A[1]	7470A[1]	6020A[1]	903/904[1]	6020A[1]	6020A[1]
Background / Upgradient Monitoring Wells																		
MW-1	39.592051	-89.490283	2/14/2019 11:15	<0.0010	<0.0010	0.0498	<0.0010	<0.0010	<0.0015	<0.0010	0.17	<0.0010	0.0019	<0.00020	<0.0015	0.92	<0.0010	<0.0020
			8/21/2019 9:28[2]	NA	<0.0010	0.0489	NA	NA	<0.0015	<0.0010	0.18	<0.0010	<0.0030	NA	<0.0015	0.68	<0.0010	NA
MW-2	39.590698	-89.488916	2/14/2019 10:27	<0.0010	0.0015	0.116	<0.0010	<0.0010	<0.0015	<0.0010	0.55	<0.0010	0.0070	<0.00020	0.0058	0.24	<0.0010	<0.0020
			8/20/2019 11:32[2]	NA	0.0010	0.107	NA	NA	<0.0015	<0.0010	0.48	<0.0010	0.0051	NA	0.0046	0.94	<0.0010	NA
Downgradient Monitoring Wells																		
MW-5	39.601296	-89.490402	2/14/2019 12:35	<0.0010	<0.0010	0.156	<0.0010	<0.0010	<0.0015	<0.0010	0.16	<0.0010	0.0029	<0.00020	<0.0015	0.04	<0.0010	<0.0020
			8/21/2019 10:28[2]	NA	<0.0010	0.150	NA	NA	<0.0015	<0.0010	0.18	<0.0010	<0.0030	NA	<0.0015	1.15	<0.0010	NA
MW-6	39.598638	-89.498944	2/15/2019 10:39	<0.0010	<0.0010	0.0366	<0.0010	<0.0010	<0.0015	<0.0010	0.19	<0.0010	<0.0015	<0.00020	<0.0015	0.37	<0.0010	<0.0020
			8/21/2019 10:58[2]	NA	<0.0010	0.0395	NA	NA	<0.0015	<0.0010	0.19	<0.0010	<0.0030	NA	<0.0015	0.75	<0.0010	NA
MW-7	39.597637	-89.498959	2/15/2019 11:14	<0.0010	<0.0010	0.0681	<0.0010	<0.0010	<0.0015	<0.0010	0.22	<0.0010	0.0044	<0.00020	0.0023	0.38	<0.0010	<0.0020
			8/21/2019 11:22[2]	NA	0.0017	0.0634	NA	NA	<0.0015	0.0011	0.25	<0.0010	0.0048	NA	0.0033	0.41	<0.0010	NA
MW-8	39.594399	-89.496829	2/14/2019 13:16	<0.0010	<0.0010	0.0267	<0.0010	<0.0010	<0.0015	<0.0010	0.23	<0.0010	0.0032	<0.00020	<0.0015	0.20	<0.0010	<0.0020
			8/21/2019 11:47[2]	NA	<0.0010	0.0330	NA	NA	<0.0015	0.0014	0.21	<0.0010	<0.0030	NA	<0.0015	0.34	<0.0010	NA
MW-11	39.593104	-89.491115	2/14/2019 11:41	<0.0010	0.0081	0.138	<0.0010	<0.0010	<0.0015	0.0011	0.52	<0.0010	0.0025	<0.00020	0.0025	0.81	<0.0010	<0.0020
			8/21/2019 10:02[2]	NA	0.0012	0.129	NA	NA	<0.0015	<0.0010	0.49	<0.0010	<0.0030	NA	0.0024	0.70	0.0027	NA
MW-12	39.600200	-89.496380	2/14/2019 14:50	<0.0010	<0.0010	0.0892	<0.0010	<0.0010	<0.0015	<0.0010	0.19	<0.0010	0.0095	<0.00020	<0.0015	0.40	<0.0010	<0.0020
			8/20/2019 10:02[2]	NA	<0.0010	0.0655	NA	NA	<0.0015	<0.0010	0.18	<0.0010	0.0087	NA	<0.0015	1.02	<0.0010	NA

[O: RAB 12/23/19, C: KLT 12/24/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
NA = Not Analyzed
pCi/L = picoCuries per liter
< = concentration is less than concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Levels (SSLs) over Groundwater Protection Standards.
[1] 4-digit numbers represent SW-846 analytical methods and 3-digit numbers represent Clean Water Act analytical methods.
[2] Only the parameters detected during the previous sampling events were analyzed during this sampling event, in accordance with 40 C.F.R. § 257.95(d)(1).

TABLE 3.
STATISTICAL BACKGROUND VALUES
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
KINCAID POWER STATION
UNIT ID 141 - KINCAID ASH POND
KINCAID, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Statistical Background Value (UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.27
Calcium (mg/L)	105
Chloride (mg/L)	17
Fluoride (mg/L)	0.47
pH (S.U.)	6.3 / 7.7
Sulfate (mg/L)	178
Total Dissolved Solids (mg/L)	666

[O: RAB 12/23/19, C: KLT 12/24/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
S.U. = Standard Units
UPL = Upper Prediction Limit

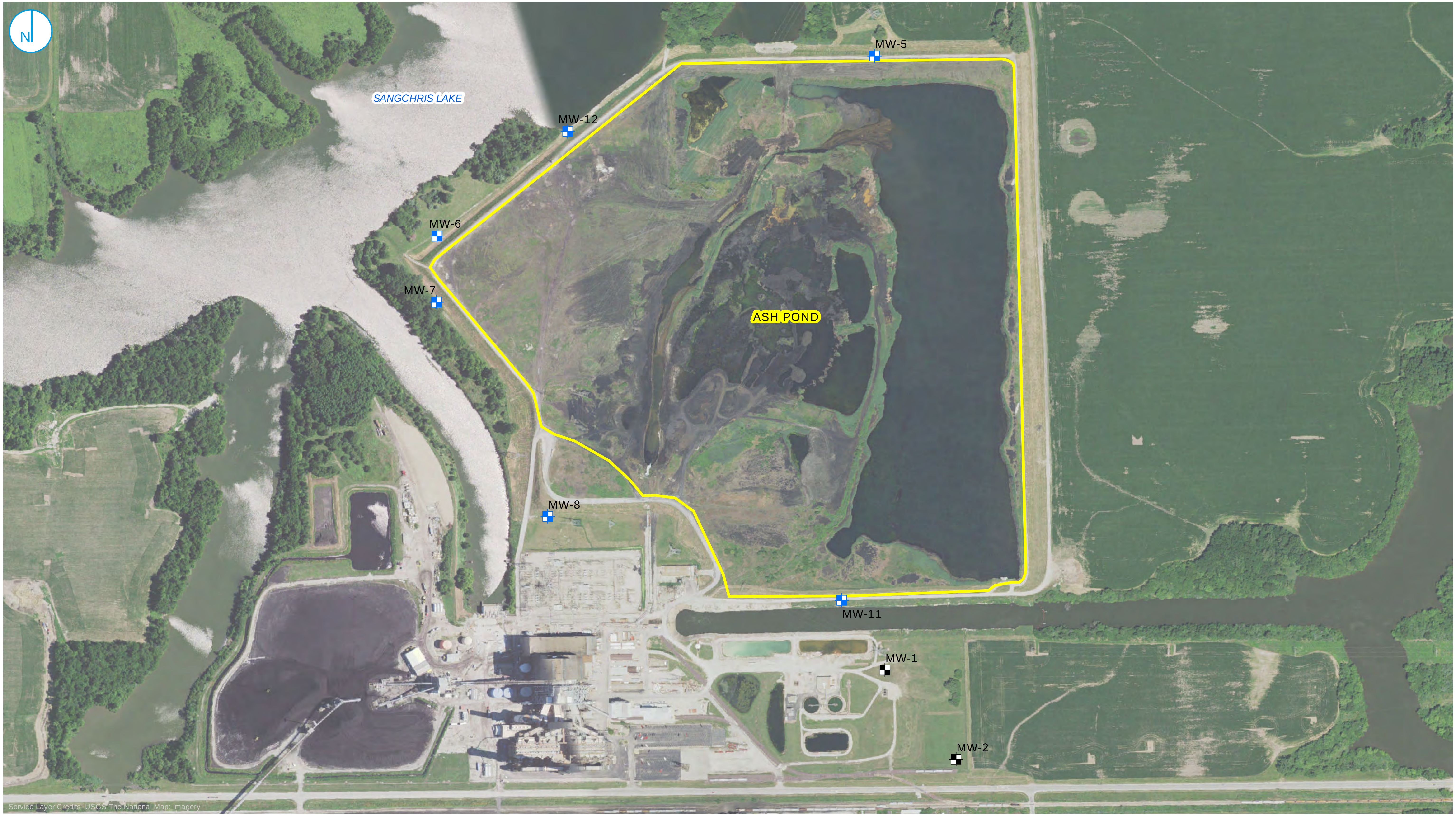
TABLE 4.
GROUNDWATER PROTECTION STANDARDS
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
KINCAID POWER STATION
UNIT ID 141 - KINCAID ASH POND
KINCAID, ILLINOIS
ASSESSMENT MONITORING PROGRAM

Parameter	Groundwater Protection Standard[1]
40 C.F.R. Part 257 Appendix IV	
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.010
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.10
Cobalt (mg/L)	0.006
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.040
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.10
Radium 226+228 (pCi/L)	5
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002

[O: RAB 12/23/19, C: KLT 12/24/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
pCi/L = picoCuries per liter
[1]Groundwater Protection Standard is the higher of the Maximum Contaminant Level / Health-Based Level or background.

FIGURES



DOWNGRADIENT MONITORING WELL LOCATION

BACKGROUND MONITORING WELL LOCATION

CCR MONITORED UNIT

0 250 500 Feet

MONITORING WELL LOCATION MAP
KINCAID ASH POND
UNIT ID:141

2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

FIGURE 1

O'BRIEN & GERE ENGINEERS, INC.
A RAMBOLL COMPANY

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\2019_AnnualGWM_CAR\Figure 1_GWS_WellLoc_Kincaid.mxd

PROJECT: 169000XXXX | DATED: 1/14/2020 | DESIGNER: GALARNMC

ATTACHMENT 2 – MAP OF GROUNDWATER MONITORING WELL LOCATIONS

DRAWN BY/DATE:
TDC 12/1/15
REVIEWED BY/DATE:
YAD 12/1/15
APPROVED BY/DATE:
SJC 09/14/17

SITE AND WELL LOCATION MAP
KINCAID ASH POND
UNIT ID: 141

SAMPLING AND ANALYSIS PLAN
DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285/3.3

FIGURE NO: 1

NATURAL RESOURCE TECHNOLOGY

Y:\Mapping\Projects\22\2285_Kincaid\MXD\SAP\Figure 1_Site and Well Location Map - Kincaid.mxd Author: tcushman; Date/Time: 12/1/2015, 2:36:29 PM

ATTACHMENT 3 – WELL CONSTRUCTION DIAGRAMS AND DRILLING LOGS

Civil & Environmental Consultants, Inc.

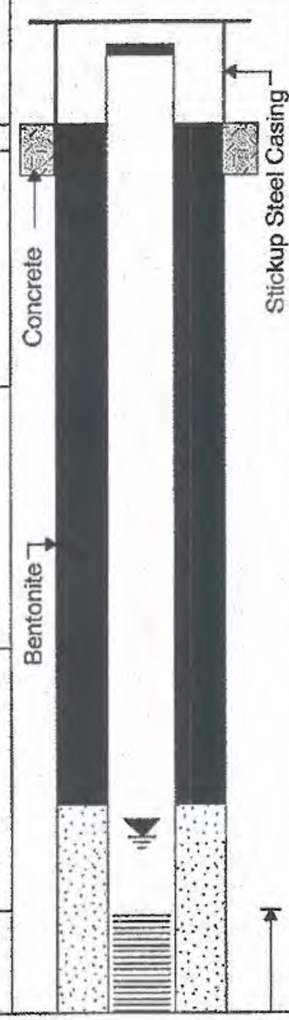
Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois		Borehole/Well ID: MW-1
		Casing Elevation: 605.12
		Ground Elevation: NA
Project No.: 100-399		Groundwater Ele.: 591.52

Date Started: 4/19/2010 Completed: 4/20/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 15-25' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)
					-2			
					0	Ground Surface		0.0
1	1.2	4-6-6	0.0	SS		Topsoil		-0.5
					2	FILL Brown SILTY CLAY, trace gravel, stiff, dry		
					4			-5.0
2	0.8	4-4-5	0.0	SS	6	Brownish grey CLAYEY SILT, moist, medium stiff, slightly plastic		
					8			
3	0.0	2-1-3	NA	SS	10	No Recovery		-10.0
					12			
					14			-15.0
4	0.8	2-2-2	0.0	SS	16	Orangish tan SILTY CLAY, soft, plastic, moist		

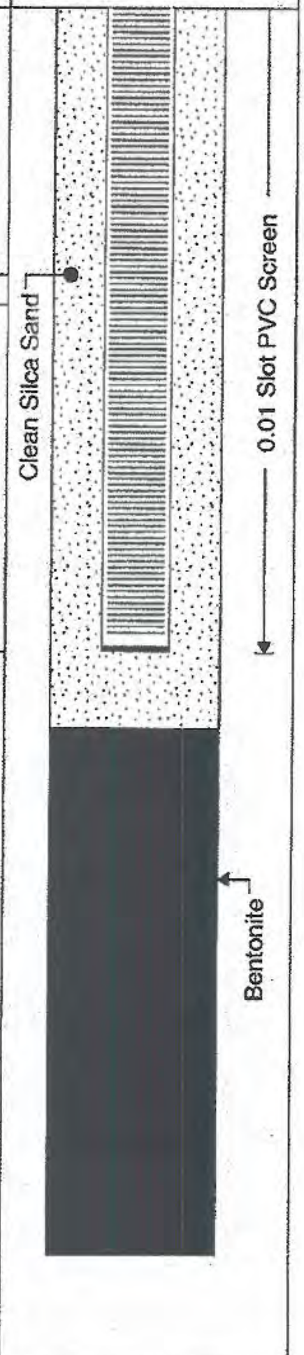
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-1

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					18		-20.0
5	1.5	12-30-50/5	0.0	SS	20	Brown SILTY SAND, some chert fragments, wet	-20.4
					22, 24	GLACIAL TILL Brown SANDY SILT, very stiff, moist	-25.0
6	1.4	24-34-50/5	0.0	SS	26, 28	Grey SILTY CLAY, some gravel, very stiff, moist(-)	-30.0
7	1.4	22-25-50/5	0.0	SS	30	Grey SILTY SAND, coarse grained, wet	-30.4
					32	Grey SILTY CLAY, some sand and gravel, very stiff, moist(-)	-33.0
8	1.3	24-45-50/3	0.0	SS	34	Grey SILTY CLAY, some gravel, hard, dry to moist(-) Auger refusal @ 33'	-34.5

Well Diagram



Civil & Environmental Consultants, Inc.

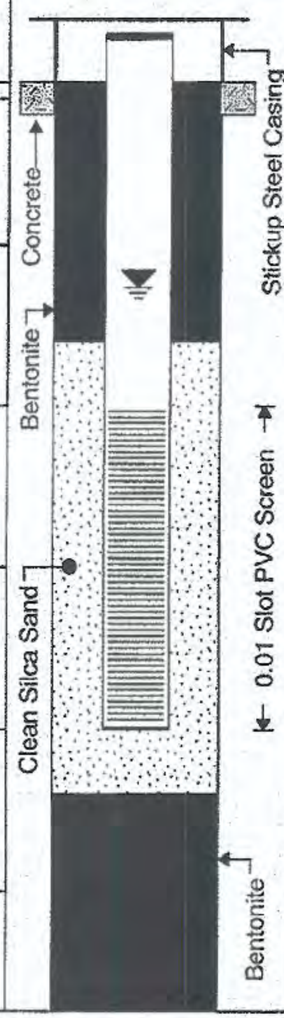
Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-2
	Casing Elevation: 601.44
	Ground Elevation: NA
Project No.: 100-399	Groundwater Ele.: 595.14

Date Started: 4/20/2010 Completed: 4/21/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 10-20' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					-2		
					0	Ground Surface	0.0
1	0.9	4-4-4	0.0	SS	0–5	Topsoil Brown SILTY CLAY, medium stiff, moist(-)	-5.0
2	0.8	2-2-2	0.0	SS	5–10	Brownish grey SILTY CLAY, soft, slightly plastic, moist	-10.0
3	1.3	2-2-2	0.0	SS	10–15	Dark grey SILTY CLAY, trace sand and gravel, medium stiff, plastic, moist	-15.0
4	1.5	1-2-6	0.0	SS	15–20	Greyish brown SANDY SILT, trace gravel, soft, slightly plastic, wet	-20.0
5	1.3	22-50/5	0.0	SS	20–25	GLACIAL TILL Grey SILTY CLAY, trace sand and gravel, hard, dry	-25.0
6	1.0	14-50/5	0.0	SS	25–28	Grey SILTY CLAY, some sand and gravel, very hard, dry to moist	

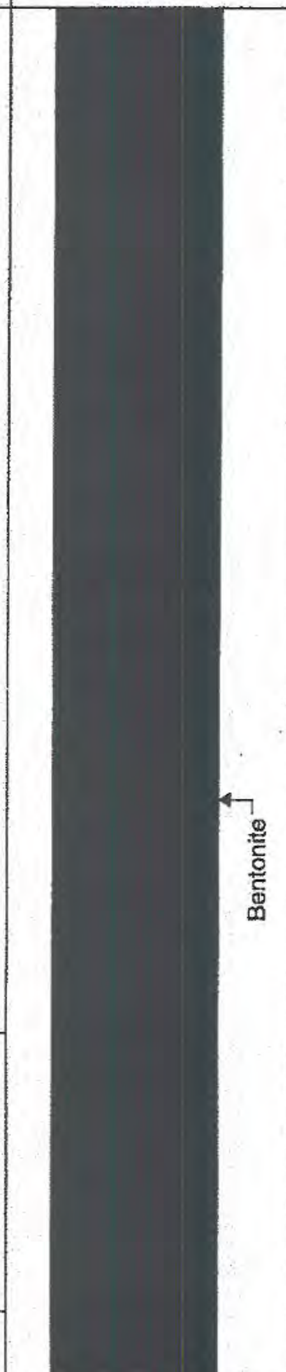
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-2

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)
7	1.4	26-43-50/5.5	0.0	SS	30	Sand(-)		
					32			
					34			
8	1.3	26-41-50/4	0.0	SS	36			
					38			
9	0.8	30-50/4	0.0	SS	40	Started air-rotary drilling		
					42			
					44			
					46			
					48			-50.0
10	1.5	21-26-31	NA	SS	50	Grey SILTY CLAY, some pebbles, very stiff, moist		
					52			
					54			-56.0
11	1.5	11-23-25	NA	SS	56	BEDROCK Grey SHALE, weathered		-57.5
					58			

Well Diagram



Civil & Environmental Consultants, Inc.

Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-5
	Casing Elevation: 619.91
	Ground Elevation: NA
Project No.: 100-399	Groundwater Ele.: 594.83

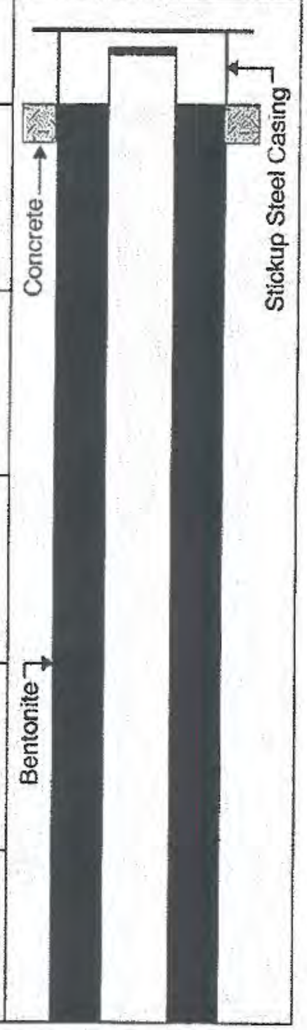
Date Started: 4/21/2010 Completed: 4/22/2010
Drilling Company: Roberts Environmental Drilling, Inc.
Driller:
CEC Representative: Corey Strain
Drilling Method: HSA
Bore Hole: 4.25" Core Size: 2"
Well Installed: ☑
Screened Interval: 30-40' bgs

Sample Information:
No analytical analysis was performed.

Comments/Problems:

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					0	Ground Surface	0.0
					0	FILL Brown SILTY CLAY, some gravel	
1	1.3	4-6-10	0.0	SS	5	Grey brown SILTY CLAY, some sand and gravel, very stiff, moist	-5.0
2	1.5	3-5-7	0.0	SS	10	Greenish grey SILTY CLAY, trace gravel, very stiff, moist	-10.0
3	1.3	2-3-5	0.0	SS	15	Dark grey to black CLAYEY SILT, soft, moist	-15.0
4	1.4	4-5-7	0.0	SS	20	Grey brown SILTY CLAY, medium stiff, moist	-20.0

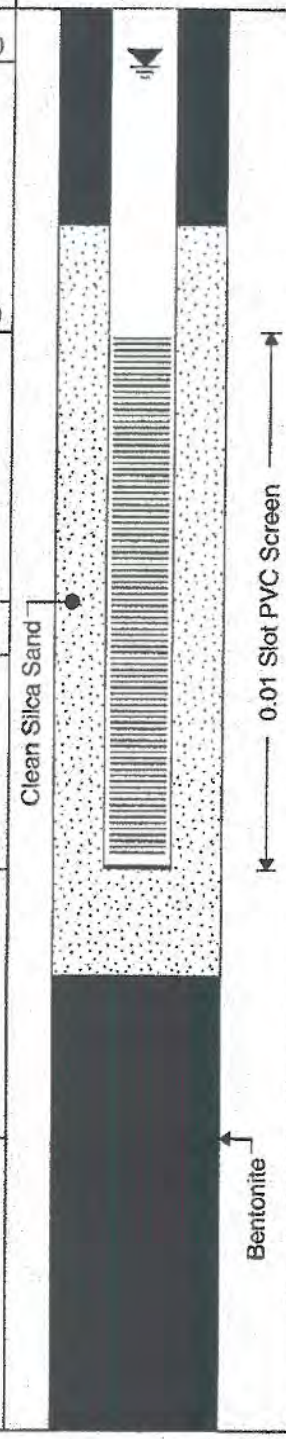
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-5

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
							-25.0
5	1.5	3-3-4	0.0	SS	26, 28	Light to dark grey CLAYEY SILT, soft, moist	
							-30.0
6	1.0	3-2-2	0.0	SS	30, 32, 34	Brownish grey SILTY CLAY, plastic, medium stiff, moist	
							-35.0
7	1.5	2-4-5	0.0	SS		Orangish tan CLAYEY SILT, medium stiff, moist, native	
							-36.0
					36, 38	Orangish brown SILTY SAND, wet	
							-40.0
8	1.3	23-41-50/5	0.0	SS	40, 42, 44	GLACIAL TILL Light grey SILTY CLAY, some gravel, hard, moist(-)	
							-45.0
9	0.7	45-50/2	0.0	SS	46, 48, 50	Grey SILTY CLAY, some sand and gravel, hard, moist(-)	

Well Diagram



Civil & Environmental Consultants, Inc.	Project Name:	Borehole/Well ID: MW-5
	Project No.: 100-399	

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)	Well Diagram
					52–54			-55.0	
10		50/2.5	0.0	SS	56	Dark grey SANDY SILT, trace gravel, stiff, moist			Bentonite
					58–64			-65.0	
11	1.3	16-30-36	0.0	SS	66	Dark greyish green SANDY SILT, trace gravel, stiff, moist			
					68–74			-75.0	
12	0.4	30-42-3	0.0	SS	76	BEDROCK SHALE, weathered		-76.0	

Civil & Environmental Consultants, Inc.

Chicago Cincinnati Columbus Export Detroit
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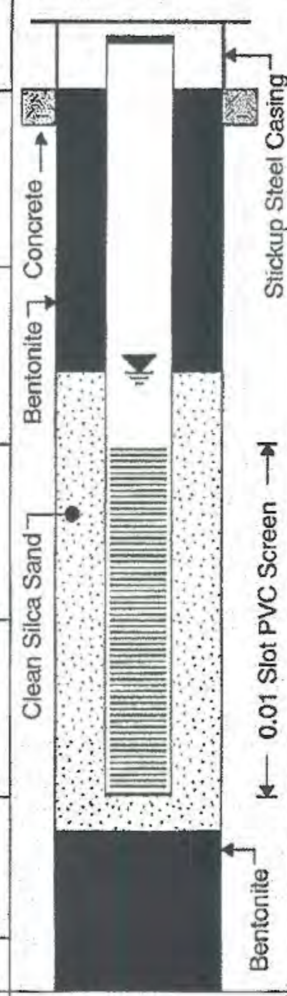
Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-6	
	Casing Elevation: 600.83	
	Ground Elevation: NA	
Project No.: 100-399	Groundwater Ele.: 592.85	

Date Started: 4/16/2010	Completed: 4/16/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.		
Driller:		
CEC Representative: Corey Strain		
Drilling Method: HSA		Comments/Problems:
Bore Hole: 4.25"	Core Size: 2"	
Well Installed: ☑		
Screened Interval: 10-20' bgs		

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)
					-2	Ground Surface		0.0
1	1.3	2-4-4	0.0	SS	0	Dark brown CLAYEY SILT, some organics, slightly plastic, medium stiff, moist		-5.0
2	1.3	2-1-2	0.0	SS	5	Tan brown CLAYEY SILT, trace organics, slightly plastic, soft, moist		-10.0
3	1.5	2-3-4	0.0	SS	10	Brown SANDY SILT, some clay, trace gravel, medium stiff, moist to wet		-15.0
4	1.3	3-1-1	0.0	SS	15	Orangish brown SILTY SAND, coarse grained, trace gravel, soft, wet		-20.0
5	0.8	30-50/5.5	0.0	SS	20	GLACIAL TILL Grey SILTY CLAY, trace gravel, medium stiff, moist		-24.0
6	1.3	20-36-50/5.5	0.0	SS	24	Grey SILTY CLAY, trace gravel, very stiff, dry		-25.5

Well Diagram



Civil & Environmental Consultants, Inc.

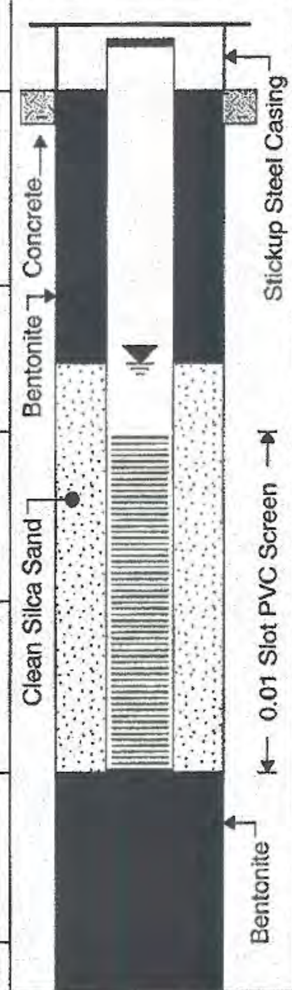
Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-7
	Casing Elevation: 598.02
	Ground Elevation: NA
Project No.: 100-399	Groundwater Ele.: 589.32

Date Started: 4/16/2010 Completed: 4/16/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" / Core Size: 2"	
Well Installed: ☑	
Screened Interval: 10-20' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					-2		
					0	Ground Surface	0.0
1	1.5	3-4-3	0.0	SS	0–6	Brown CLAYEY SILT, trace sand and gravel, medium stiff, moist	-5.7
2	1.5	3-2-4	0.0	SS	6–10	Dark grey CLAYEY SILT, trace gravel, some organics, slightly plastic, moist	-10.0
3	1.4	2-3-4	0.0	SS	10–15	Brown grey SILTY CLAY, trace gravel, plastic, medium stiff, mottled, moist	-15.0
4	1.5	1-1-2	0.0	SS	15–20	Orangish brown SANDY SILT, trace gravel, soft, wet	-20.0
5	1.5	10-25-35	0.0	SS	20–25	GLACIAL TILL Grey SILTY CLAY, trace gravel, non-plastic, moist(-)	-25.0
6	1.5	20-35-45	0.0	SS	25–26.5	Grey SILTY CLAY, trace sand and gravel, stiff, non-plastic, dry	-26.5

Well Diagram



Civil & Environmental Consultants, Inc.

Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

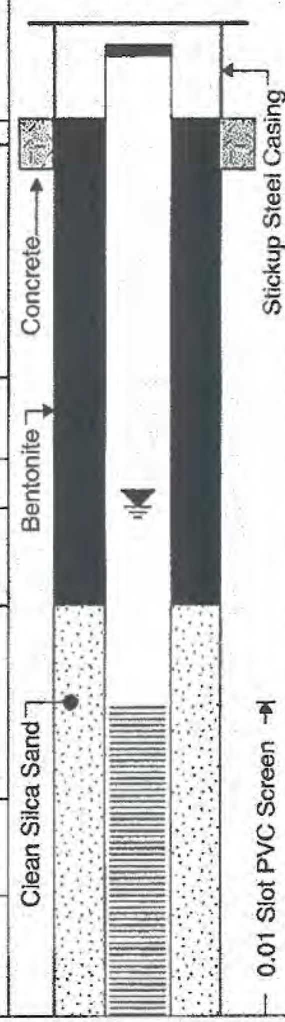
Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-8	
	Casing Elevation: 603.54	
	Ground Elevation: NA	
Project No.: 100-399	Groundwater Ele.: 595.55	

Date Started: 4/13/2010 Completed: 4/13/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 12-22' bgs.	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type
1	1.0	2-4-8	0.4	SS
2	1.0	2-3-4	0.0	SS
3	1.5	3-3-5	0.0	SS
4	1.4	3-3-2	0.0	SS
5	1.5	2-2-3	0.0	SS
6	1.8	4-1-1	0.0	SS
7	1.7	1-2-2	0.0	SS
8	1.5	1-1-3	0.0	SS

Depth (feet)	Material Description and Comments	Elevation (feet, msl)
0	Ground Surface	0.0
0	Topsoil	
	Brown SILTY CLAY, trace sand, medium stiff, moist, no odor	-5.3
	Grey brown SILTY CLAY, trace gravel, moist	-7.0
	Grey SILTY CLAY, medium stiff, moist	-8.0
	Orangish brown SILTY CLAY, trace sand, moist to wet	-10.0
10	Orangish tan CLAYEY SILT, trace sand, slightly plastic, medium stiff, wet	-14.0
14	Tan CLAYEY SILT, trace sand, slightly plastic, soft, moist to wet	-16.0
16	Orangish tan SILTY CLAY, trace sand, slightly plastic, medium stiff, wet	

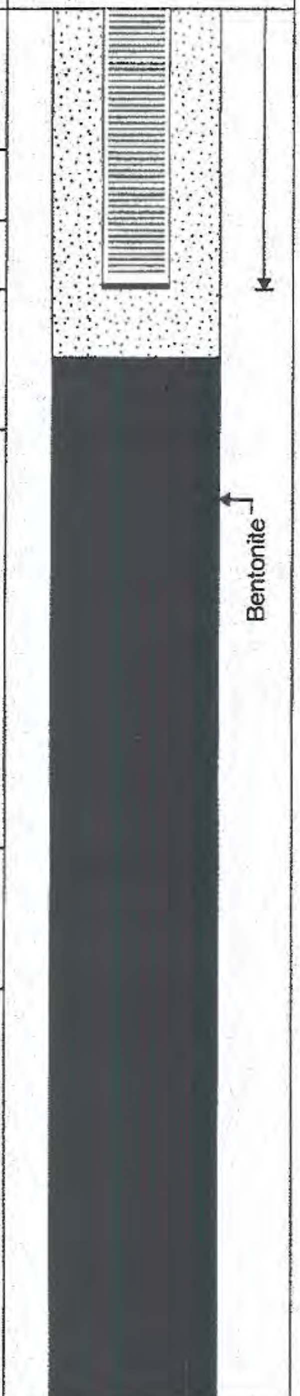
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-8

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
9	1.9	1-1-2	0.0	SS		Thin sand lens	-20.0
10	1.4	1-2-6	0.0	SS	20	Orangish brown SILTY SAND, soft, wet	-21.0
						Brown grey SILTY CLAY, medium stiff, moist	-22.0
11	1.3	10-50	0.0	SS	22	GLACIAL TILL Grey SILTY CLAY, trace sand and gravel, moist	-24.0
12	1.9	21-25-48	0.0	SS	24	Grey SILTY CLAY, trace gravel, dry	
13	1.0	30-50/5	0.0	SS	26		
14	0.9	25-50/5	0.0	SS	28	Thin sand lens, wet	-30.0
15	0.9	27-50/3	0.0	SS	30	Grey SILTY SAND, dense, moist to wet	-32.0
16	0.9	41-50/5	0.0	SS	32	Grey SILTY CLAY, trace sand and gravel, stiff, dry to moist	
17	0.9	40-50/5	0.0	SS	34		
18	0.8	40-50	0.0	SS	36		-38.0
					38		

Well Diagram



SOIL BORING LOG INFORMATION

Natural Resource Technology

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-11

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade	6/17/2015	6/17/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-11	Feet (NAVD88)	599.27 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒

State Plane 1,066,371.19 N, 2,486,955.55 E E/Ⓦ

1/4 of 1/4 of Section , T N, R

Lat 39° 35' 35.176"

Long -89° 29' 28.013"

Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	Illinois	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 21.5	5 6 6 6	0	0 - 0.2' **SILTY CLAY** CL/ML, very dark gray (10YR 3/1), 5-50% roots, trace gravel, wet.	CL/ML								
			1	0.2 - 3' **CLAYEY SILT** ML/CL, dark brown (10YR 3/3), yellowish brown (10YR 5/6) mottling, trace gravel, dry. 1.5' dark yellowish brown (10YR 4/6).	ML/CL								
2 SS	24 24	8 8 11 17	2	2' trace coarse sand to fine gravel, color grades to yellowish brown (10YR 4/6).									
			3	3 - 4' **SILT:** ML, black (10YR 2/1), 5-15% clay, cohesive, nonplastic, moist.	ML								
3 SS	24 21	3 5 8 7	4	4 - 6' **CLAYEY SILT** ML/CL, very dark brown (10YR 2/2), cohesive, low plasticity. 4.5' grading to silty clay, color grades to light olive brown (2.5Y 5/3) with olive yellow (2.5Y 6/6) mottling, cohesive, medium to high plasticity. 5.5' color grades to very dark brown (10YR 2/2), cohesive, low plasticity.	ML/CL								
4 ST	24 12		6	6 - 8' Shelby Tube Sample.									ST4: 24" push.
5 SS	24 24	2 2 5 7	8	8 - 15.3' **SILTY CLAY** CL/ML, light olive brown (2.5Y 5/3), olive yellow (2.5Y 6/6) and very dark brown (10YR 2/2) mottling, cohesive, medium plasticity, moist. 9.3' very dark grayish brown (2.5Y 3/2).	CL/ML								
6 SS	24 23.5	2 3 5 7	10	10' low to medium plasticity, moist.									
			12										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-11

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 21	1 2 3 5	13	8 - 15.3' **SILTY CLAY** CL/ML, light olive brown (2.5Y 5/3), olive yellow (2.5Y 6/6) and very dark brown (10YR 2/2) mottling, cohesive, medium plasticity, moist. *(continued)* 12.2' dark grayish brown (2.5Y 4/2) with olive yellow (2.5Y 6/6) mottling. 12.5' wet.	CL/ML									
8 SS	24 24	1 2 4 5	14 15											
9 SS	24 21	2 2 2 3	16	15.3 - 16.9' **SILTY CLAY** CL/ML, light olive brown (2.5Y 5/4), trace sand, trace fine gravel, cohesive, nonplastic, wet.	CL/ML									
			17	16.9 - 18' **SILTY SAND:** SM, light olive brown (2.5Y 5/4), mostly fine grained sand, silt is cohesive and nonplastic.	SM									
10 SS	24 23	1 2 25 50 for 6"	18	18 - 18.4' **SILT:** ML, light olive brown (2.5Y 5/4), trace sand, cohesive, nonplastic, wet.	ML									
			19	18.4 - 20.8' **SILTY CLAY** CL/ML, light olive brown (2.5Y 5/3), 5-15% sand and gravel, hard, dry.	CL/ML									
11 SS	9 9	44 53 for 3"	20	20' trace sand and gravel.										
			21	20.8 - 21' Overdrilled to Install Monitoring Well. 21' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		B-12

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/20/2015	7/21/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
	Feet (NAVD88)	588.86 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,944.76 N, 2,485,453.08 E E/W
1/4 of 1/4 of Section , T N, R

Lat 39° 36' 0.722"
Long -89° 29' 46.969"

Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	Illinois	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 15	1 3 7 6	0–2	0 - 2' **FILL, SILT:** ML, very dark gray (2.5YR 3/1), mostly silt, trace clay, roots, and subangular gravel, noncohesive, dry. 0.9' dark grayish brown (2.5YR 4/2), no roots, noncohesive to cohesive.	(FILL) ML									
2 SS	24 20	4 6 7 7	2–4	2 - 4' **FILL, CLAYEY SILT** ML/CL, dark grayish brown (2.5YR 4/2), trace gravel, trace fine sand seams, nonplastic, cohesive, dry to moist. 3.3' very dark grayish brown (2.5YR 3/2), trace ash, trace slag, trace clear glass fragments.	(FILL) ML/CL									
3 ST	24 17		4–6	4 - 6' Shelby Tube Sample.										ST3: 24" push at 150 lbs of pressure.
4 SS	24 17	2 1 2 1	6–8	6 - 6.2' **FILL, CLAYEY SILT** ML/CL, dark grayish brown (2.5YR 4/2), trace gravel, trace fine sand seams, trace fine to coarse ash, nonplastic, cohesive, moist. 6.2 - 8' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), trace sand seams, trace gravel. 6.9' noncohesive to cohesive, wet.	(FILL) ML/CL CL/ML									
5 SS	24 20	1 1 1 4	8–10	8 - 10' **CLAYEY SILT** ML/CL, yellowish brown (10YR 5/4), trace gravel, trace to few fine sand, wet. 9.4' nonplastic, noncohesive to cohesive.	ML/CL									
6 SS	24 16.5	5 9 13 19	10–12	10 - 12' **CLAYEY SAND:** SC, yellowish brown (10YR 5/4), trace yellowish brown (10YR 5/8) mottling, clay content decreasing with depth, trace fine gravel, noncohesive, moist.	SC									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 18	2 4 5 7	13	12 - 14.4' **WELL-GRADED SAND:** SW, yellowish brown (10YR 5/4), trace clay, trace subrounded gravel, noncohesive, wet.	SW									
8 SS	24 22	13 23 45 50	14, 15	14.4 - 16' **SILTY SAND:** SW-SM, yellowish brown (10YR 5/4), mostly very fine sand, trace yellowish brown (10YR 5/8) mottling, trace fine sand seams, trace gravel, trace black silt, trace clay, nonplastic, cohesive, moist to dry.	SW-SM									
9 ST	9 5		16, 17	16 - 18' Shelby Tube Sample.										ST9: 9" push at 950lbs of pressure.
10 SS	23 20	20 28 34 50 for 5"	18, 19	18 - 30' **SILTY CLAY** to **POORLY-GRADED SAND:** CL/ML, gray (2.5YR 5/1), some very fine sand, little clay, nonplastic, cohesive, dry. 19.2' dark gray (2.5YR 4/1), trace coarse sand.	CL/ML									
11 SS	12 13	28 50 for 6"	20, 21	20' - 21.2' trace clay, trace coarse sand to fine gravel.										
12 SS	17 14	16 39 50 for 5"	22, 23	22' - 23.2' trace to little clay, trace coarse sand. 22.8' trace gravel.										
13 SS	12 13	31 50 for 6"	24, 25	24' -25.1' clay (0-15%), trace coarse sand.										
14 SS	11 4.5	43 50 for 5"	26, 27	26' clay (15-30%).										
15 SS	12 11	37 50 for 6"	28, 29											
16 ST	8 0		30, 31, 32	30 - 32' Shelby Tube Sample, No Recovery.										ST16: 8" push at 650lbs of pressure.

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 ST	6 4		32	32 - 34' Shelby Tube Sample.										ST17: 6" push at 650lbs of pressure.
18 SS	23 21.5	12 23 42 50 for 5"	34	34 - 42' **CLAYEY SILT** ML/CL, gray (2.5YR 5/1), trace to few fine to coarse sand, nonplastic to low plasticity, cohesive, hard (>4.5 tsf), moist.										
			35	35.2' trace gravel.										
19 SS	23 24	10 18 34 50 for 5"	36	36' olive brown (2.5YR 4/4) mottling, trace fine sand, trace coarse sand, hard (>4.5 tsf), moist to dry.										
20 SS	18 18	16 24 50 for 6"	38	37.9' trace fine sand seams, hard (4.0 - 4.5+ tsf).	ML/CL									
21 SS	17 22	25 33 50 for 5"	40	40' low plasticity, stiff to very stiff (1.5 - 3.0 tsf), dry.										
22 ST	4.5 5		42	42 - 44' Shelby Tube Sample.										ST22: 4.5" push at 700lbs of pressure.
23 SS	6 6	50 for 6"	44	44 - 48' **LEAN CLAY:** CL, very dark gray (10YR 3/1), trace silt, medium plasticity, cohesive, soft (0.5 tsf), dry.										
24 SS	6 6	50 for 6"	46	46 - 48' trace gravel-sized shale pieces, very stiff to hard (3.0 - 4.5+ tsf).	CL									
25 ST	5 5		48	48 - 50' Shelby Tube Sample.										ST25: 5" push at 700lbs of pressure.
26 SS	6 5	50 for 6"	50	50 - 52' **LEAN CLAY:** CL, as above, hard (>4.5 tsf).	CL									
			52											

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
27 SS 28 CORE	1 0 119 116	50 for 1"		52 - 52.1' No Recovery. 52.1 - 62' **LIMESTONE:** BDX (LS), white (GLEY 1 8/N), trace shaley limestone, fossiliferous, vuggy texture, microcrystalline, massive, intensely fractured, very narrow to moderately narrow apertures. 53.5' no vuggy texture. 54.8' mud-filled fracture. 57.6' color change to light gray (GLEY 17/N). 60.2' shale layer (0.1" thick).	BDX (LS)									Split Spoon Refusal at 52.1' bgs. RQD = 61.3% (fair).
				62' End of Boring.										

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-12

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/22/2015	7/23/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-12	Feet (NAVD88)	588.86 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,944.76 N, 2,485,453.08 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 39° 36' 0.722"
Long -89° 29' 46.969"

Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	Illinois	Kincaid

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–2	0 - 2' **FILL, SILT:** ML.	(FILL) ML									0-15' Blind Drilled. See log B-12 for soil description details.
			2–4	2 - 4' **FILL, CLAYEY SILT** ML/CL.	(FILL) ML/CL									
			4–6	4 - 6' Shelby Tube Sample Collected at Location B-12.										
			6–6.2	6 - 6.2' **FILL, CLAYEY SILT** ML/CL.	(FILL) ML/CL									
			6.2–8	6.2 - 8' **SILTY CLAY** CL/ML.	CL/ML									
			8–10	8 - 10' **CLAYEY SILT** ML/CL.	ML/CL									
			10–12	10 - 12' **CLAYEY SAND:** SC.	SC									

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12–14.4	12 - 14.4' **WELL-GRADED SAND:** SW.	SW									
			14.4–15	14.4 - 15' **SILTY SAND:** SW-SM.	SW-SM									
1 SS	24 20	9 19 26 26	15–15.2	15 - 15.2' **SILT:** ML, very dark gray (2.5YR 3/1), trace roots, clay, gravel, and sand, noncohesive, moist.	ML									
			15.2–17	15.2 - 17' **CLAYEY SILT** to **SANDY SILT:** ML/CL, yellowish brown (10YR 5/4), very fine sand, sand content increasing with depth, nonplastic, cohesive, moist. 15.9' gray (2.5YR 5/1).	ML/CL									
2 SS	24 15	9 19 32 48	17–17.4	17 - 17.4' **SILTY SAND:** SM, gray (2.5YR 5/1), trace clay, moist.	SM									
			17.4–19	17.4 - 19' **SILTY CLAY** to **CLAYEY SILT** CL/ML, gray (2.5YR 5/1), trace coarse sand, clay content decreasing with depth, low to medium plasticity, cohesive.	CL/ML									
3 SS	23 22	19 36 40 50 for 5"	19–23	19 - 23' **CLAYEY SILT** ML/CL, gray (2.5YR 5/1), trace coarse sand, low plasticity, cohesive, moist.	ML/CL									
4 SS	17 15	25 43 50 for 5"												
			23–25	23 - 25' **SILTY CLAY** to **POORLY-GRADED SAND:** CL/ML.	CL/ML									23-25' Overdrilled. See log B-12 for soil description details.
			25	25' End of Boring.										

NATURAL RESOURCE TECHNOLOGY

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Station	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 35.176" Long. -89° 29' 28.013" or	MW-11
Facility ID	St. Plane 1,066,371.19 ft. N, 2,486,955.55 ft. E. E/(W)	Date Well Installed 06/17/2015
Type of Well mw	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen, Cascade
Distance from Waste/Source ft. / State Illinois	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☒ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation ____ ft. (NAVD88)

B. Well casing, top elevation 601.81 ft. (NAVD88)

C. Land surface elevation 599.27 ft. (NAVD88)

D. Surface seal, bottom 598.8 ft. (NAVD88) or 0.5 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☒
Other ☐

15. Drilling fluid used: Water ☒ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Village of Pawnee, IL

E. Bentonite seal, top 598.8 ft. (NAVD88) or 0.5 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 590.3 ft. (NAVD88) or 9.0 ft.

H. Screen joint, top 588.3 ft. (NAVD88) or 11.0 ft.

I. Well bottom 578.3 ft. (NAVD88) or 21.0 ft.

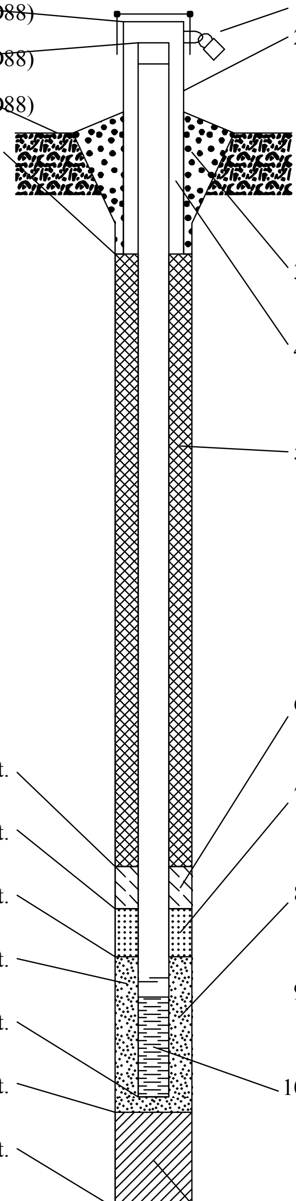
J. Filter pack, bottom 578.3 ft. (NAVD88) or 21.0 ft.

K. Borehole, bottom 578.3 ft. (NAVD88) or 21.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Three steel bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. ____Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Red Flint Sand and Gravel, Well Pack
   b. Volume added ____ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer ____
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 11/30/2015

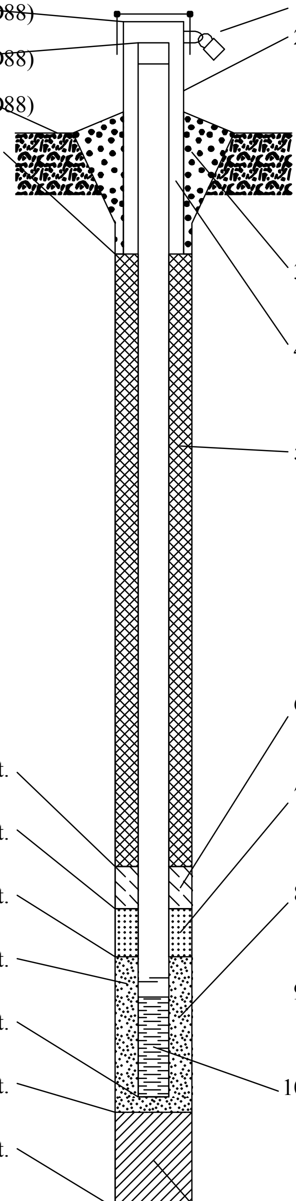
Signature [signature]

Firm Natural Resource Technology
234 W. Florida Street, Floor 5, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

MONITORING WELL CONSTRUCTION

Facility/Project Name Kincaid Power Station	Local Grid Location of Well ______ft. ☐ N. ☐ S. ______ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 36' 0.722" Long. -89° 29' 46.969" or	MW-12
Facility ID	St. Plane 1,068,944.76 ft. N, 2,485,453.08 ft. E. E /(W)	Date Well Installed 07/23/2015
Type of Well mw	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Chad Dutton Bulldog Drilling
Distance from Waste/ Source ft. / State Illinois	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☒ Downgradient n ☐ Not Known / Gov. Lot Number	



A. Protective pipe, top elevation ______ ft. (NAVD88)

B. Well casing, top elevation 591.44 ft. (NAVD88)

C. Land surface elevation 588.86 ft. (NAVD88)

D. Surface seal, bottom 587.9 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☒
______ Other ☐

15. Drilling fluid used: Water ☒ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required):
Village of Pawnee, IL

E. Bentonite seal, top 587.9 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ______ ft. (NAVD88) or ______ ft.

G. Filter pack, top 575.9 ft. (NAVD88) or 13.0 ft.

H. Screen joint, top 573.9 ft. (NAVD88) or 15.0 ft.

I. Well bottom 563.9 ft. (NAVD88) or 25.0 ft.

J. Filter pack, bottom 563.9 ft. (NAVD88) or 25.0 ft.

K. Borehole, bottom 563.9 ft. (NAVD88) or 25.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

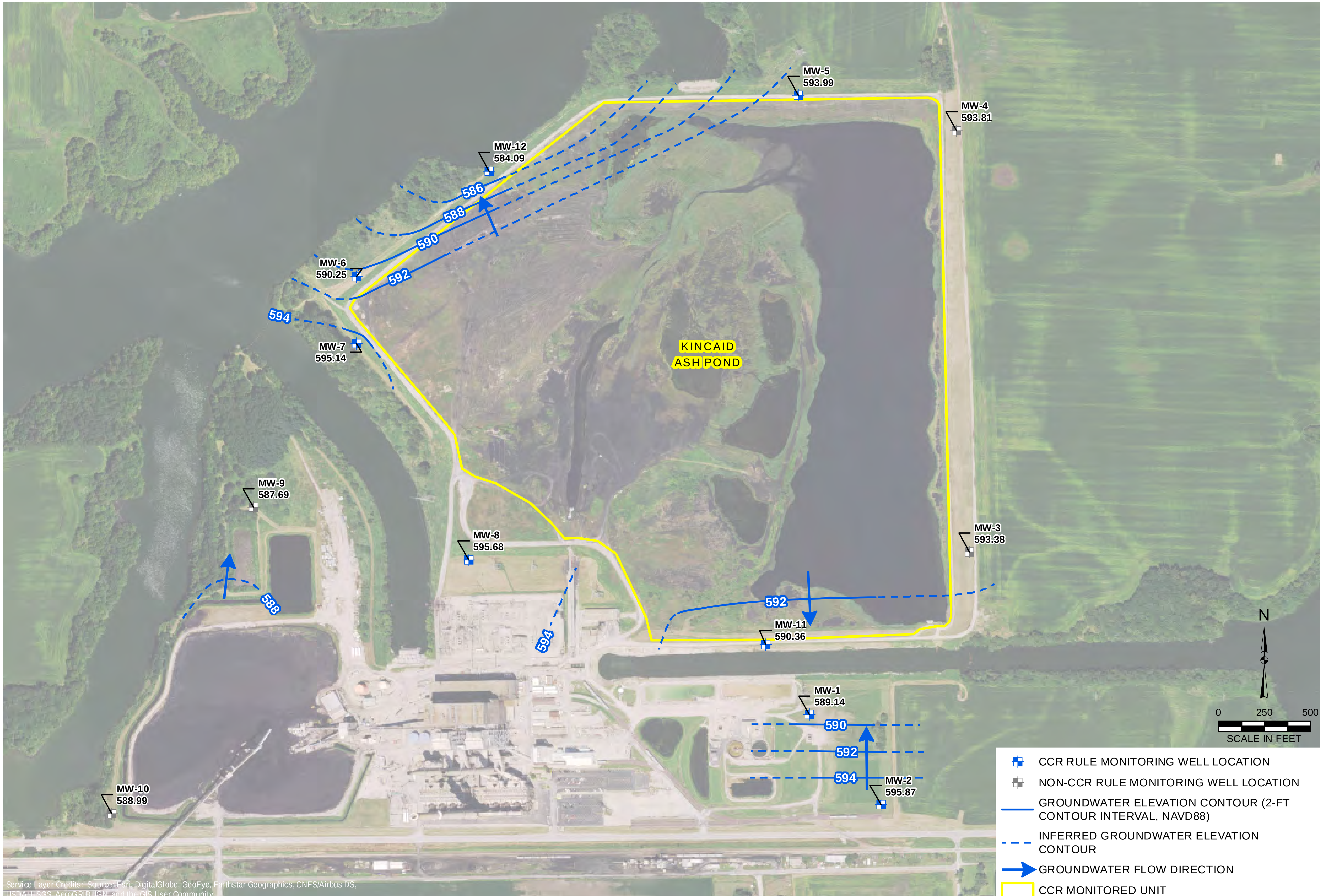
1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒
   ______ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Two steel bollards
3. Surface seal: Bentonite ☐
   Concrete ☒
   ______ Other ☐
4. Material between well casing and protective pipe:
   Bentonite ☒
   ______ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. 30 % Bentonite . . . Bentonite-cement grout ☒
   e. ______ Ft^3 volume added for any of the above
   f. How installed: Tremie ☐
   Tremie pumped ☒
   Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Unimin Corporation, FILTERSIL
   b. Volume added ______ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   ______ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒
   Continuous slot ☐
   ______ Other ☐
   b. Manufacturer ______
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒
   ______ Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Date Modified: 11/30/2015

Signature	Firm	
[signature]	Natural Resource Technology 234 W. Florida Street, Floor 5, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

ATTACHMENT 4 – MAPS OF THE DIRECTION OF GROUNDWATER FLOW



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SDS 1/24/17
REVIEWED BY/DATE:
ANS 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

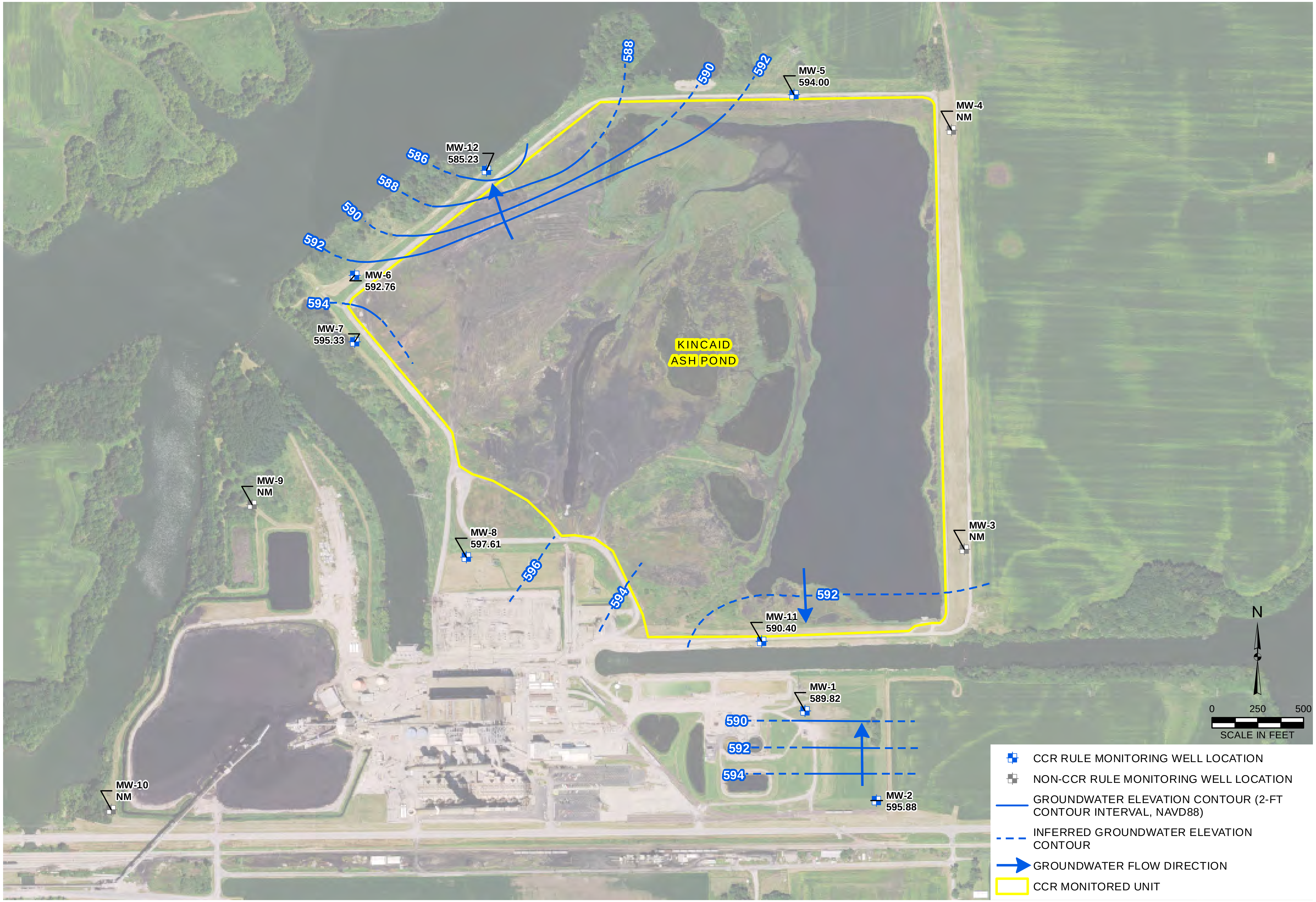
KINCAID ASH POND (UNIT ID: 141)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 1: DECEMBER 14, 2015

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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REVIEWED BY/DATE: ANS 1/25/17
APPROVED BY/DATE: JJW 2/8/17

KINCAID ASH POND (UNIT ID: 141)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: FEBRUARY 29, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285/1.5

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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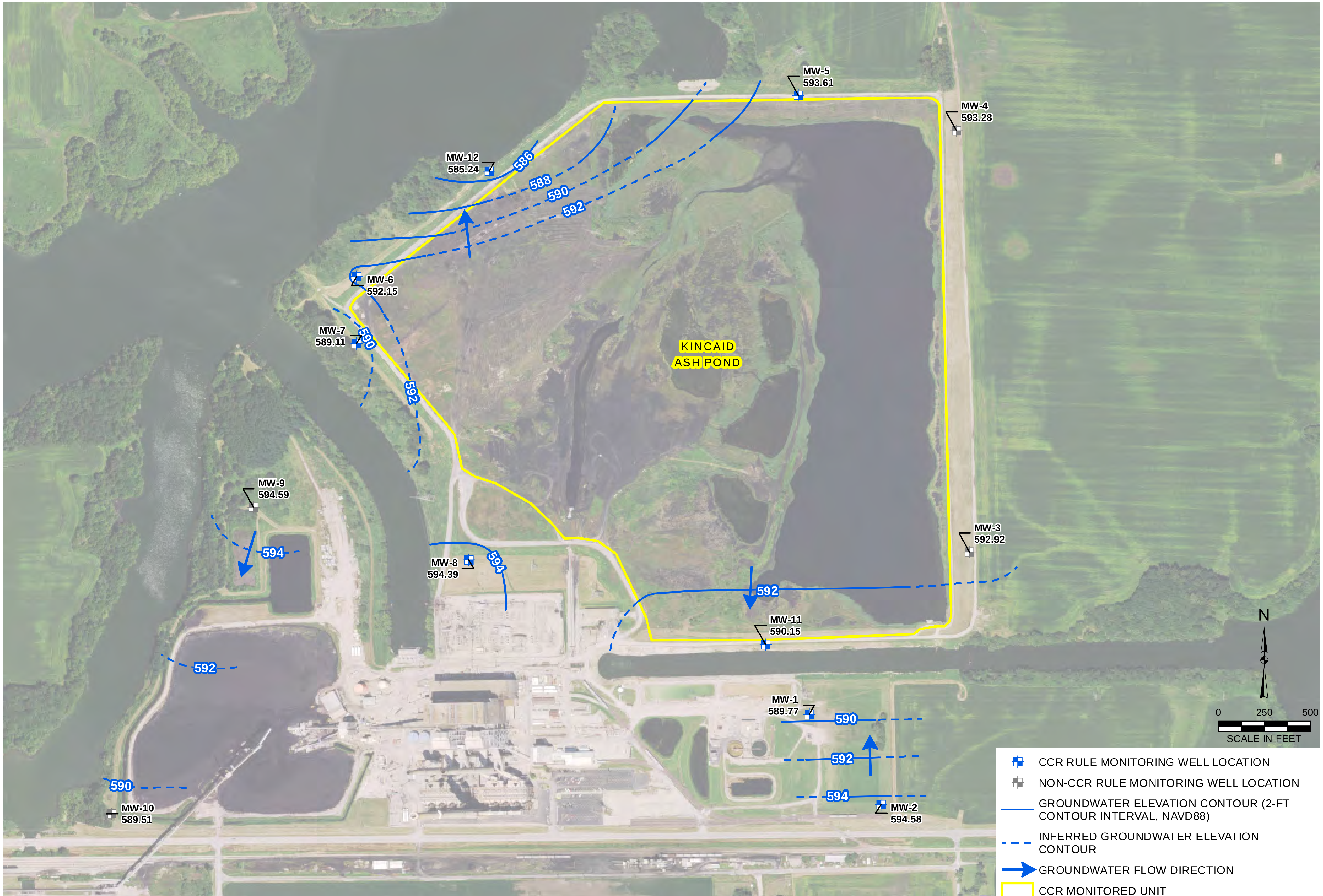

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APPROVED BY/DATE: JJW 2/8/17

KINCAID ASH POND (UNIT ID: 141) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 3: MAY 16, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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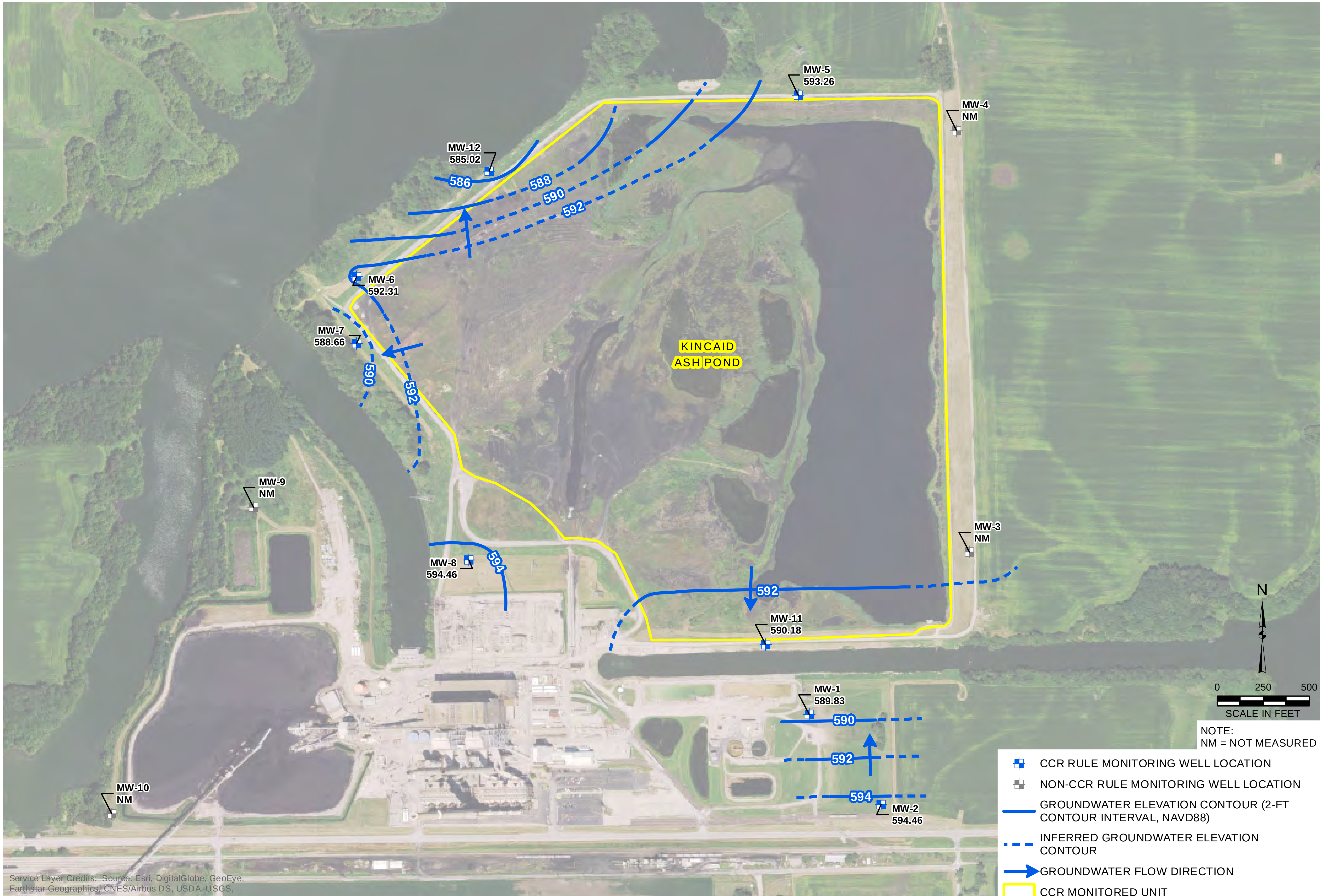

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REVIEWED BY/DATE:
ANS 1/26/17
APPROVED BY/DATE:
JJW 2/8/17

KINCAID ASH POND (UNIT ID: 141)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: AUGUST 22, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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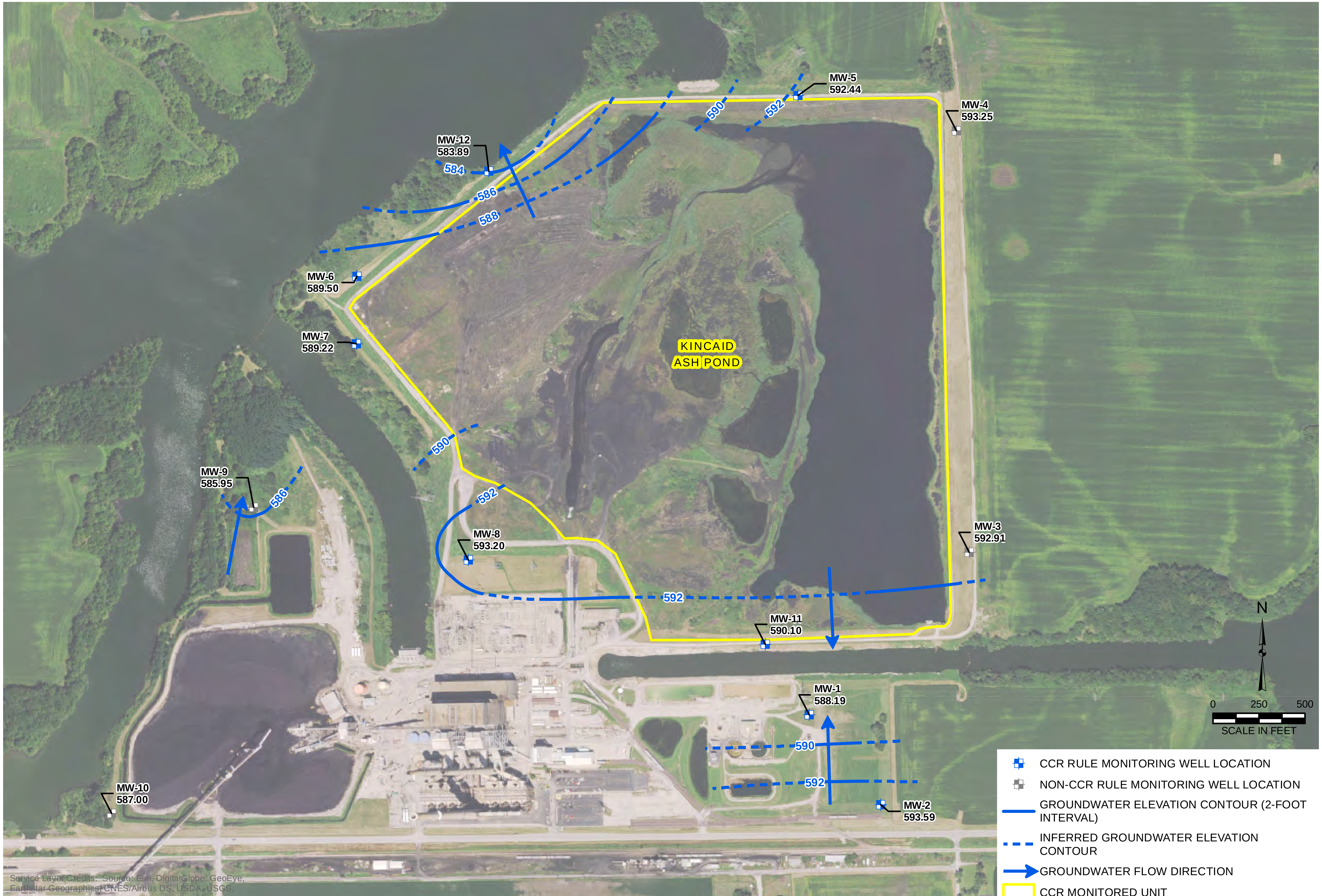

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REVIEWED BY/DATE:
ANS 3/7/17
APPROVED BY/DATE:
JJW 8/30/17

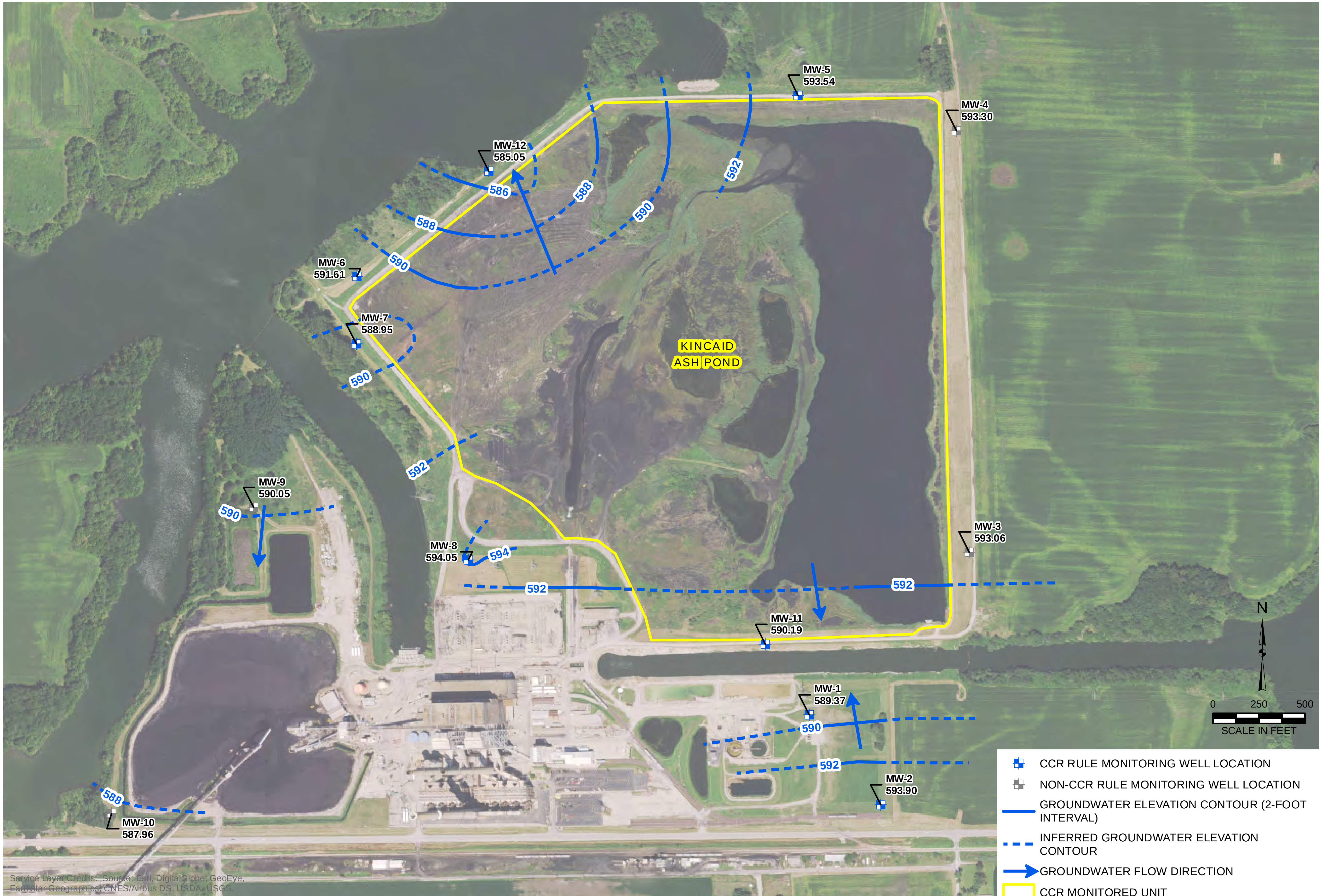
KINCAID ASH POND (UNIT ID: 141)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 5: NOVEMBER 15, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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APPROVED BY/DATE: JJW 9/1/17

KINCAID ASH POND (UNIT ID: 141) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 6: FEBRUARY 13, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology AN OBG COMPANY

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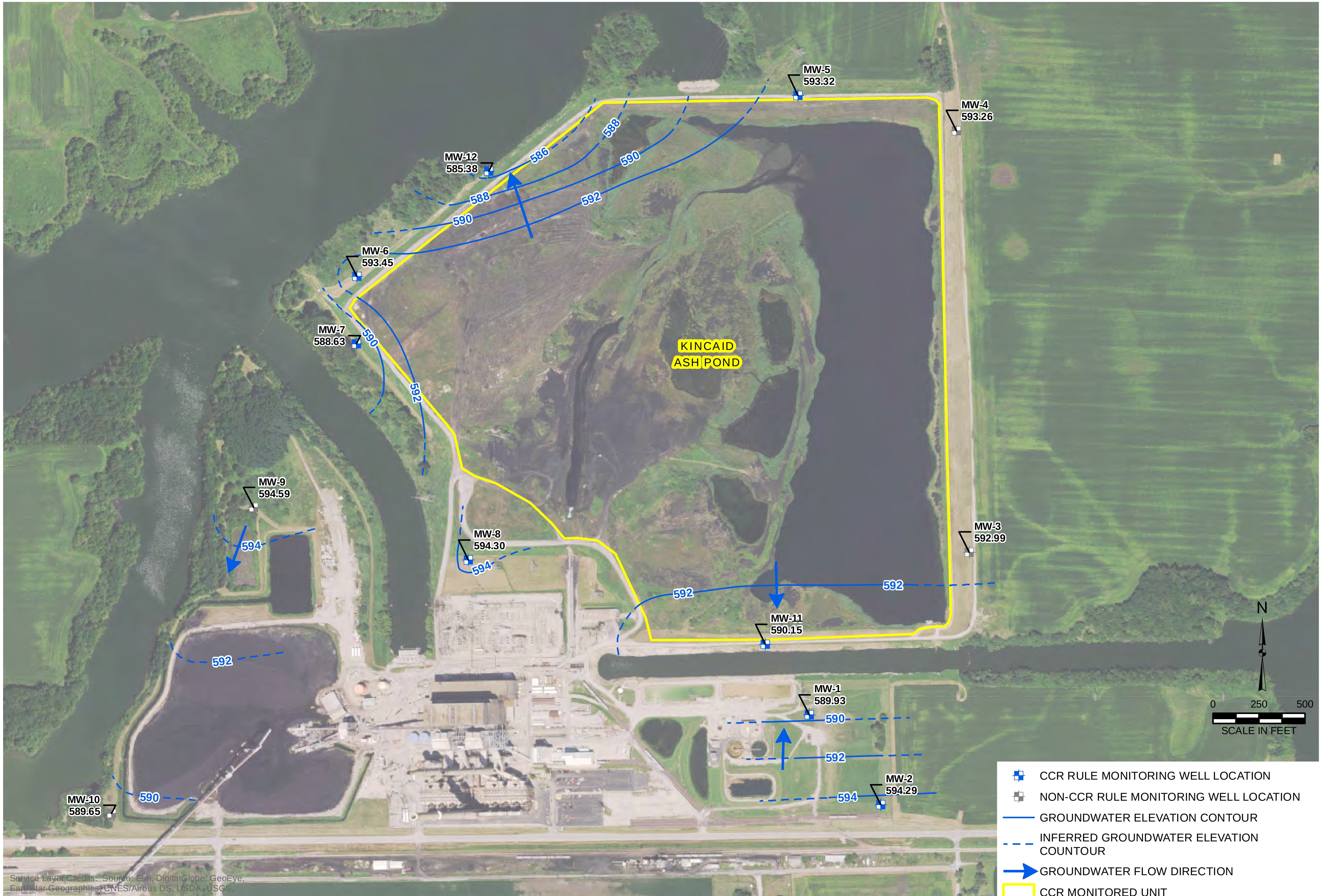

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APPROVED BY/DATE: JJW 9/1/17

KINCAID ASH POND (UNIT ID: 141) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 7: MAY 18, 2017

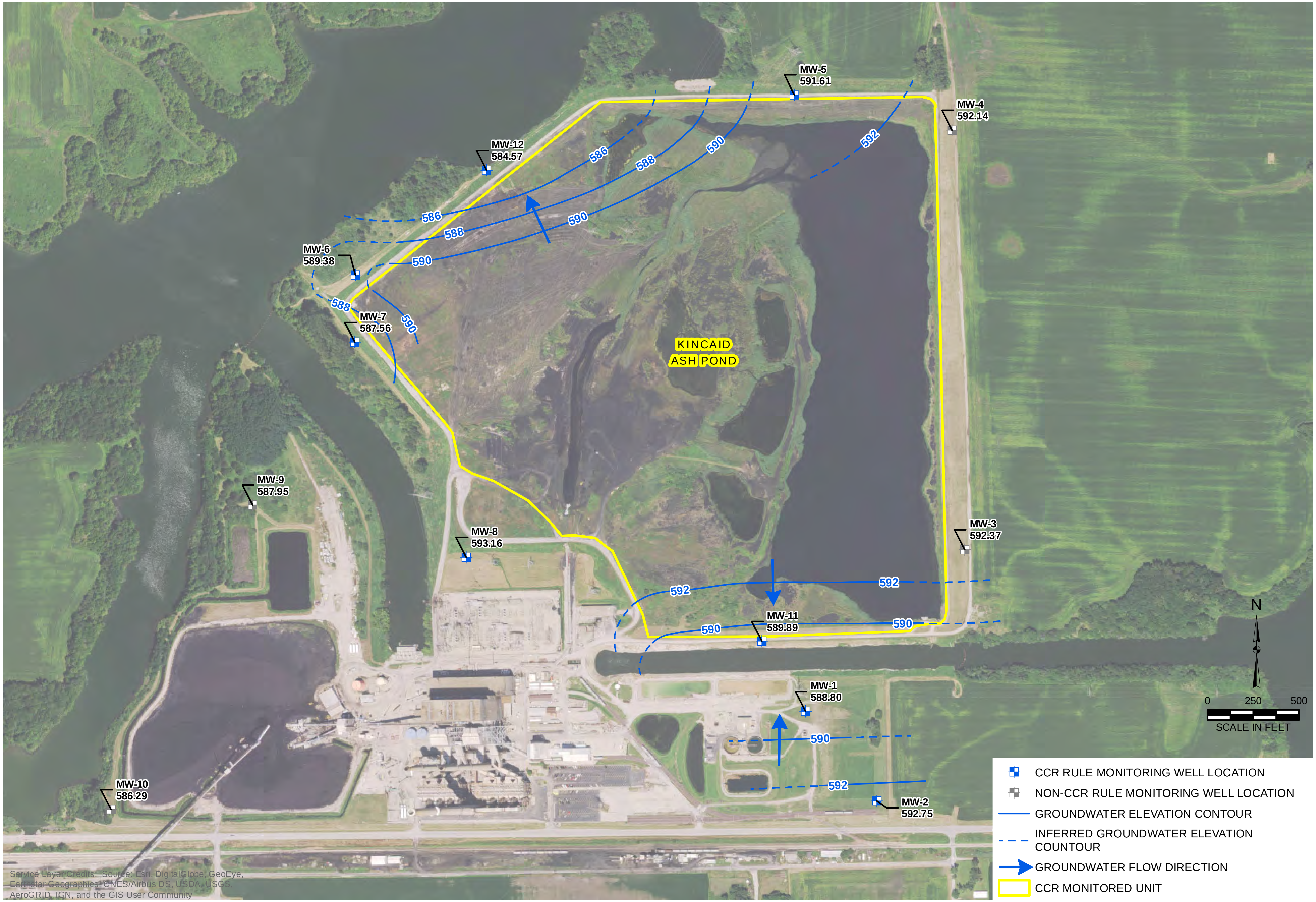
DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_07\R7_Kincaid_GW_Contours.mxd Author: stolzsd; Date/Time: 9/8/2017 5:00:02 PM



CCR RULE MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR
INFERRED GROUNDWATER ELEVATION COUNTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT

DRAWN BY/DATE: SDS 8/16/17
REVIEWED BY/DATE: ANS 8/16/17
APPROVED BY/DATE: JJW 9/1/17

KINCAID ASH POND (UNIT ID: 141)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 8: JULY 18, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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CCR RULE MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT

CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

0 125 250 500
Feet

N

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 6, 2017

O'BRIEN & GERE ENGINEERS, INC.

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2018_2Q\R2018_2Q_Kincaid_GW_Contours.mxd

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE. ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE. THE AVERAGE ELEVATION FROM MAY 31 TO JUNE 1, 2018 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

0 125 250 500
Feet

N

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
MAY 31 - JUNE 1, 2018

O'BRIEN & GERE ENGINEERS, INC.

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE. ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE. THE AVERAGE ELEVATION FROM AUG. 28, 2018 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.

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- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

0 125 250 500
Feet

N

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 28, 2018

O'BRIEN & GERE ENGINEERS, INC.

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE. ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE. THE AVERAGE ELEVATION FROM FEB. 14TH, 2019 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.

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CCR RULE MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT

CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

0 125 250 500
Feet

N

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 14, 2019

O'BRIEN & GERE ENGINEERS, INC.

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE. ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE. THE AVERAGE ELEVATION FROM AUG. 20TH, 2019 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.

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- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

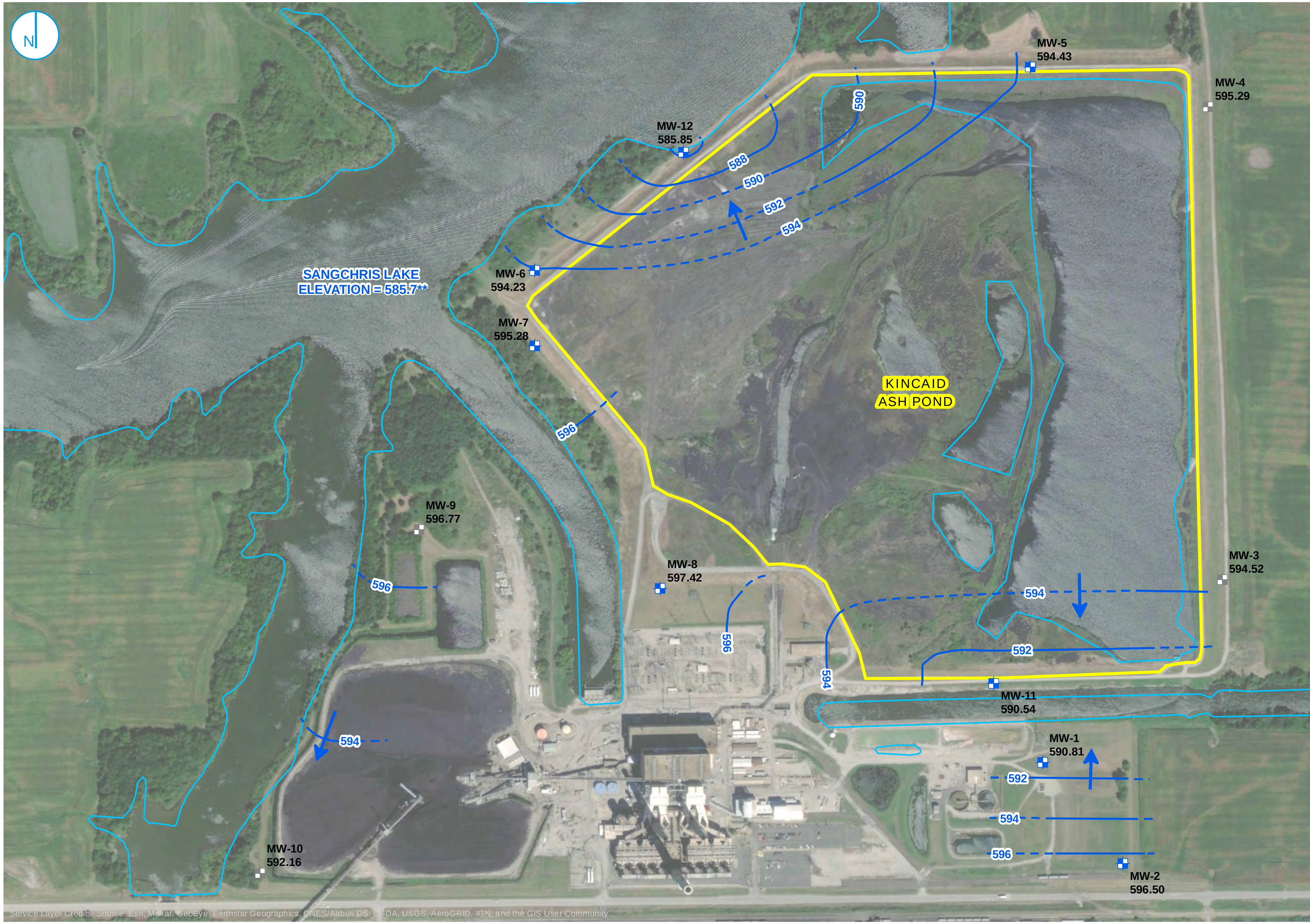
CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

N

0 125 250 500
Feet

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 20, 2019

O'BRIEN & GERE ENGINEERS, INC.



NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE. ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. AT THE TIME OF THIS DRAWING, THE DATA WAS PRELIMINARY AND SUBJECT TO CHANGE. THE AVERAGE ELEVATION FROM FEBRUARY 11, 2020 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.

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PROJECT: 169000XXXX | DATED: 9/15/2020 | DESIGNER: galarnmc

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FEATURE
- CCR MONITORED UNIT

0 250 500 Feet

KINCAID ASH POND (UNIT ID: 141)
GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 11, 2020

CCR RULE GROUNDWATER MONITORING
KINCAID POWER STATION
KINCAID, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

ATTACHMENT 5 – TABLES SUMMARIZING CONSTITUENT CONCENTRATIONS AT EACH MONITORING WELL

Analytical Results - Appendix III
Kincaid Ash Pond

Sample Location	Date Sampled	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (s.u.)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
Background Wells								
MW-1	12/15/2015	0.255	58.8	12	0.19	6.6	113	314
MW-1	2/29/2016	0.203	63.9	11	0.16	6.6	117	292
MW-1	5/16/2016	0.229	59.3	10	0.16	6.9	108	336
MW-1	8/22/2016	0.269	61.1	11	0.18	6.8	117	358
MW-1	11/15/2016	0.271	57.6	11	0.18	7.0	109	390
MW-1	2/13/2017	0.228	57.5	10	0.16	6.8	105	326
MW-1	5/18/2017	0.256	57.0	12	0.16	6.7	109	370
MW-1	7/18/2017	0.273	55.6	11	0.18	6.7	101	334
MW-1	11/6/2017	0.281	60.3	11	0.18	6.8	104	340
MW-1	5/31/2018	0.234	59.1	12	0.19	6.5	91	356
MW-1	8/28/2018	0.258	59.8	11	0.18	6.2	94	374
MW-1	2/14/2019	0.243	66.0	10	0.17	6.7	92	312
MW-1	8/21/2019	0.290	60.2	10	0.18	6.3	80	334
MW-1	2/11/2020	0.222	59.6	8	0.18	6.6	92	366
MW-2	12/15/2015	0.110	105	16	0.47	7.1	171	566
MW-2	2/29/2016	0.0873	104	17	0.43	7.2	143	416
MW-2	5/16/2016	0.0892	101	15	0.45	7.4	159	534
MW-2	8/22/2016	0.0808	97.3	14	0.47	7.4	169	566
MW-2	11/15/2016	0.102	101	13	0.47	7.5	161	576
MW-2	2/13/2017	0.101	97.5	14	0.44	7.2	173	520
MW-2	5/18/2017	0.106	104	14	0.43	7.2	178	596
MW-2	7/18/2017	0.111	99.2	15	0.45	7.3	159	512
MW-2	11/6/2017	0.0848	102	14	0.44	7.1	159	506
MW-2	5/31/2018	0.0787	125	14	0.50	7.0	142	538
MW-2	8/28/2018	0.0907	104	14	0.44	6.8	145	558
MW-2	2/14/2019	0.0701	104	18	0.55	7.4	136	442
MW-2	8/20/2019	0.0667	94.2	16	0.48	7.1	119	488
MW-2	2/11/2020	0.0565	94.9	18	0.52	7.4	138	508

Analytical Results - Appendix III
Kincaid Ash Pond

Sample Location	Date Sampled	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (s.u.)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
Downgradient Wells								
MW-5	12/15/2015	0.573	137	41	0.17	6.6	<10	620
MW-5	2/29/2016	0.555	148	39	0.15	6.6	<10	564
MW-5	5/16/2016	0.588	133	38	0.15	7.0	11	646
MW-5	8/22/2016	0.540	135	41	0.16	7.2	11	660
MW-5	11/15/2016	0.507	133	41	0.15	7.2	<10	698
MW-5	2/13/2017	0.473	130	39	0.15	6.7	<10	624
MW-5	5/18/2017	0.571	136	43	0.18	6.7	10	680
MW-5	7/18/2017	0.574	142	39	0.16	6.8	<10	660
MW-5	11/6/2017	0.515	141	40	0.15	7.1	<10	652
MW-5	5/31/2018	0.657	136	43	0.18	6.7	<10	666
MW-5	8/28/2018	0.567	135	41	0.17	6.8	12	696
MW-5	2/14/2019	0.530	147	42	0.16	7.0	12	650
MW-5	8/21/2019	0.547	150	41	0.18	6.6	<10	646
MW-5	2/11/2020	0.542	146	44	0.18	6.7	<10	684
MW-6	12/15/2015	1.58	113	7	0.18	6.5	287	676
MW-6	2/29/2016	0.837	101	5	0.17	6.7	164	358
MW-6	5/16/2016	0.874	98.6	5	0.19	7.0	167	484
MW-6	8/22/2016	1.16	116	<5	0.20	6.5	187	588
MW-6	11/15/2016	1.54	113	7	0.17	6.8	275	726
MW-6	2/13/2017	1.04	100	<5	0.16	6.6	246	624
MW-6	5/18/2017	1.02	96.0	<5	0.19	6.6	153	530
MW-6	7/18/2017	1.48	105	<5	0.17	6.5	238	622
MW-6	11/6/2017	1.91	139	11	0.16	6.7	335	780
MW-6	5/31/2018	1.07	93.6	<5	0.19	6.5	195	554
MW-6	8/28/2018	1.16	122	<5	0.22	6.6	133	544
MW-6	2/15/2019	0.649	101	<5	0.19	6.7	106	464
MW-6	8/21/2019	1.32	113	<5	0.19	6.4	153	550
MW-6	2/11/2020	0.632	90.9	<5	0.20	6.7	97	478
MW-7	12/15/2015	0.178	145	<5	0.25	7.1	439	766
MW-7	2/29/2016	0.103	107	<5	0.22	7.3	249	430
MW-7	5/16/2016	0.251	105	<5	0.24	7.3	170	498
MW-7	8/22/2016	0.287	115	<5	0.27	6.9	177	610
MW-7	11/15/2016	0.648	128	<5	0.32	7.3	247	740
MW-7	2/13/2017	0.139	149	<5	0.23	7.1	395	816
MW-7	5/19/2017	0.235	105	<5	0.26	7.0	158	504
MW-7	7/18/2017	0.360	120	<5	0.31	7.1	201	646
MW-7	11/7/2017	0.462	127	<5	0.32	7.0	247	674
MW-7	6/1/2018	0.240	112	<5	0.32	7.0	172	602
MW-7	8/28/2018	0.276	104	<5	0.33	7.0	143	578
MW-7	2/15/2019	0.114	170	<5	0.22	7.2	193	726
MW-7	8/21/2019	0.395	133	<5	0.25	6.7	150	654
MW-7	2/11/2020	0.120	110	<5	0.21	7.2	168	556

Analytical Results - Appendix III
Kincaid Ash Pond

Sample Location	Date Sampled	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (s.u.)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
MW-8	12/15/2015	0.965	167	27	0.22	6.6	316	866
MW-8	2/29/2016	1.02	180	25	0.19	6.6	336	862
MW-8	5/16/2016	0.997	162	24	0.20	6.8	325	932
MW-8	8/22/2016	0.954	159	25	0.20	6.5	348	952
MW-8	11/15/2016	1.51	162	25	0.20	7.0	327	986
MW-8	2/13/2017	0.900	157	25	0.21	6.6	324	936
MW-8	5/19/2017	1.09	159	26	0.20	6.6	311	940
MW-8	7/18/2017	1.17	169	25	0.20	6.8	273	898
MW-8	11/7/2017	1.09	164	24	0.20	6.9	285	872
MW-8	6/1/2018	1.14	163	25	0.22	6.6	264	898
MW-8	8/28/2018	1.05	157	25	0.21	6.6	255	884
MW-8	2/14/2019	1.02	175	21	0.23	6.9	332	946
MW-8	8/21/2019	1.10	166	19	0.21	6.5	258	864
MW-8	2/11/2020	0.858	168	17	0.26	6.7	337	966
MW-11	12/15/2015	1.79	130	45	0.53	6.9	135	660
MW-11	2/29/2016	1.65	135	45	0.42	6.9	130	624
MW-11	5/16/2016	1.46	125	41	0.46	7.1	130	670
MW-11	8/22/2016	1.75	121	43	0.51	7.3	130	664
MW-11	11/15/2016	1.67	123	42	0.52	7.4	115	678
MW-11	2/13/2017	1.38	117	42	0.44	6.9	123	660
MW-11	5/18/2017	1.61	121	42	0.48	7.0	121	670
MW-11	7/18/2017	1.79	133	42	0.50	7.0	106	664
MW-11	11/6/2017	1.95	125	39	0.49	7.0	114	646
MW-11	5/31/2018	1.52	127	40	0.52	6.8	102	662
MW-11	8/28/2018	1.73	114	41	0.54	6.8	103	658
MW-11	2/14/2019	1.69	131	38	0.52	7.1	103	616
MW-11	8/21/2019	1.85	125	30	0.49	6.7	88	628
MW-11	2/11/2020	1.49	121	34	0.53	6.9	95	658
MW-12	12/15/2015	2.10	197	49	0.22	6.9	326	1070
MW-12	2/29/2016	2.64	220	39	0.18	6.8	390	1140
MW-12	5/16/2016	2.48	205	44	0.18	7.0	379	1140
MW-12	8/22/2016	2.53	198	44	0.19	7.2	398	1160
MW-12	11/15/2016	2.43	200	42	0.21	7.2	330	1140
MW-12	2/13/2017	3.03	199	41	0.17	6.7	390	1180
MW-12	5/18/2017	2.51	199	33	0.18	6.7	406	1170
MW-12	7/18/2017	3.55	235	39	0.18	6.9	383	1170
MW-12	11/6/2017	2.99	212	38	0.18	7.1	388	1110
MW-12	5/31/2018	3.87	214	35	0.16	6.6	413	1230
MW-12	8/28/2018	3.00	209	33	0.18	6.7	388	1160
MW-12	2/14/2019	3.06	224	32	0.19	6.9	393	1130
MW-12	8/20/2019	4.42	219	29	0.18	6.4	371	1160
MW-12	2/11/2020	2.26	197	22	0.17	6.7	370	1070

Notes:
1. Abbreviations: mg/L - milligrams per liter; s.u. - standard units.

Analytical Results - Appendix IV
Kincaid Ash Pond

Sample Location	Date Sampled	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Cadmium, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	Radium-226 + Radium 228, tot (pCi/L)	Selenium, total (mg/L)	Thallium, total (mg/L)
Background Wells																
MW-1	12/15/2015	<0.001	<0.001	0.0458	<0.001	<0.001	<0.001	<0.001	0.19	<0.001	0.0019	<0.0002	<0.001	0.47	<0.001	<0.001
MW-1	2/29/2016	<0.001	<0.001	0.0448	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	0.0017	<0.0002	<0.001	0.537	<0.001	<0.001
MW-1	5/16/2016	<0.001	<0.001	0.0446	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	0.0016	<0.0002	<0.001	0.34	<0.001	<0.001
MW-1	8/22/2016	<0.001	<0.001	0.0465	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0016	<0.0002	<0.001	1.03	<0.001	<0.001
MW-1	11/15/2016	<0.001	<0.001	0.0471	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0021	<0.0002	<0.001	0.16	<0.001	<0.001
MW-1	2/13/2017	<0.001	<0.001	0.0437	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	0.0015	<0.0002	<0.001	0.58	<0.001	<0.001
MW-1	5/18/2017	<0.001	<0.001	0.0465	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	0.0017	<0.0002	<0.001	0.41	<0.001	<0.001
MW-1	7/18/2017	<0.001	<0.001	0.0443	<0.001	<0.001	0.0018	<0.001	0.18	<0.001	0.0020	<0.0002	<0.001	1.35	<0.001	<0.001
MW-1	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.18	NA	NA	NA	NA	NA	NA	NA
MW-1	5/31/2018	<0.001	<0.001	0.0444	<0.001	<0.001	0.0016	<0.001	0.19	<0.001	0.0017	<0.0002	<0.0015	0.66	<0.001	<0.002
MW-1	8/28/2018	NA	<0.001	0.0440	NA	NA	0.009	<0.001	0.18	<0.001	0.0026	NA	0.0016	0.41	<0.001	NA
MW-1	2/14/2019	<0.001	<0.001	0.0498	<0.001	<0.001	<0.0015	<0.001	0.17	<0.001	0.0019	<0.0002	<0.0015	0.92	<0.001	<0.002
MW-1	8/21/2019	NA	<0.001	0.0489	NA	NA	<0.0015	<0.001	0.18	<0.001	<0.003	NA	<0.0015	0.68	<0.001	NA
MW-1	2/11/2020	<0.001	<0.001	0.0466	<0.001	<0.001	<0.0015	<0.001	0.18	<0.001	<0.003	<0.0002	<0.0015	2.38	<0.001	<0.002
MW-2	12/15/2015	<0.001	0.0022	0.127	<0.001	<0.001	0.0025	0.0012	0.47	0.0014	0.0068	<0.0002	0.0040	0.58	0.0048	<0.001
MW-2	2/29/2016	<0.001	<0.001	0.111	<0.001	<0.001	<0.001	<0.001	0.43	<0.001	0.0063	<0.0002	0.0053	0.16	<0.001	<0.001
MW-2	5/16/2016	<0.001	0.0011	0.113	<0.001	<0.001	<0.001	<0.001	0.45	<0.001	0.0056	<0.0002	0.0043	0.87	0.0016	<0.001
MW-2	8/22/2016	<0.001	<0.001	0.114	<0.001	<0.001	<0.001	<0.001	0.47	<0.001	0.0055	<0.0002	0.0039	1.26	<0.001	<0.001
MW-2	11/15/2016	<0.001	0.0011	0.113	<0.001	<0.001	<0.001	<0.001	0.47	<0.001	0.0057	<0.0002	0.0040	0.01	<0.001	<0.001
MW-2	2/13/2017	<0.001	<0.001	0.112	<0.001	<0.001	<0.001	<0.001	0.44	<0.001	0.0058	<0.0002	0.0043	0.00	<0.001	<0.001
MW-2	5/18/2017	<0.001	<0.001	0.112	<0.001	<0.001	<0.001	<0.001	0.43	<0.001	0.0051	<0.0002	0.0037	1.16	<0.001	<0.001
MW-2	7/18/2017	<0.001	0.0015	0.112	<0.001	<0.001	0.0019	<0.001	0.45	<0.001	0.0055	<0.0002	0.0042	1.72	<0.001	<0.001
MW-2	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.44	NA	NA	NA	NA	NA	NA	NA
MW-2	5/31/2018	<0.001	0.0058	0.163	<0.001	<0.001	0.0139	0.0052	0.50	0.0067	0.016	<0.0002	0.0051	0.73	0.0026	<0.002
MW-2	8/28/2018	NA	0.0013	0.103	NA	NA	0.0023	<0.001	0.44	<0.001	0.0043	NA	0.0033	0.42	0.0023	NA
MW-2	2/14/2019	<0.001	0.0015	0.116	<0.001	<0.001	<0.0015	<0.001	0.55	<0.001	0.0070	<0.0002	0.0058	0.24	<0.001	<0.002
MW-2	8/20/2019	NA	0.0010	0.107	NA	NA	<0.0015	<0.001	0.48	<0.001	0.0051	NA	0.0046	0.94	<0.001	NA
MW-2	2/11/2020	<0.001	0.0021	0.117	<0.001	<0.001	<0.0015	<0.001	0.52	<0.001	0.0070	<0.0002	0.0050	0.99	<0.001	<0.002

Analytical Results - Appendix IV
Kincaid Ash Pond

Sample Location	Date Sampled	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Cadmium, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	Radium-226 + Radium 228, tot (pCi/L)	Selenium, total (mg/L)	Thallium, total (mg/L)
Downgradient Wells																
MW-5	12/15/2015	<0.001	<0.001	0.141	<0.001	<0.001	<0.001	0.0013	0.17	<0.001	0.0029	<0.0002	<0.001	0.78	<0.001	<0.001
MW-5	2/29/2016	<0.001	<0.001	0.143	<0.001	<0.001	<0.001	0.001	0.15	<0.001	0.0030	<0.0002	<0.001	0.35	<0.001	<0.001
MW-5	5/16/2016	<0.001	<0.001	0.141	<0.001	<0.001	<0.001	<0.001	0.15	<0.001	0.0029	<0.0002	<0.001	0.89	<0.001	<0.001
MW-5	8/22/2016	<0.001	<0.001	0.137	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	0.0027	<0.0002	<0.001	1.11	<0.001	<0.001
MW-5	11/15/2016	<0.001	<0.001	0.139	<0.001	<0.001	<0.001	<0.001	0.15	<0.001	0.0027	<0.0002	<0.001	1.08	<0.001	<0.001
MW-5	2/13/2017	<0.001	<0.001	0.140	<0.001	<0.001	<0.001	<0.001	0.15	<0.001	0.0029	<0.0002	<0.001	0.34	<0.001	<0.001
MW-5	5/18/2017	<0.001	<0.001	0.145	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0031	<0.0002	<0.001	0.95	<0.001	<0.001
MW-5	7/18/2017	<0.001	<0.001	0.143	<0.001	<0.001	<0.001	<0.001	0.16	0.0013	0.0029	<0.0002	<0.001	2.41	<0.001	<0.001
MW-5	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.15	NA	NA	NA	NA	NA	NA	NA
MW-5	5/31/2018	<0.001	<0.001	0.179	<0.001	<0.001	<0.0015	<0.001	0.18	<0.001	0.0033	<0.0002	<0.0015	0.61	<0.001	<0.002
MW-5	8/28/2018	NA	<0.001	0.132	NA	NA	<0.0015	<0.001	0.17	<0.001	0.0029	NA	<0.0015	0.55	<0.001	NA
MW-5	2/14/2019	<0.001	<0.001	0.156	<0.001	<0.001	<0.0015	<0.001	0.16	<0.001	0.0029	<0.0002	<0.0015	0.04	<0.001	<0.002
MW-5	8/21/2019	NA	<0.001	0.150	NA	NA	<0.0015	<0.001	0.18	<0.001	<0.003	NA	<0.0015	1.15	<0.001	NA
MW-5	2/11/2020	<0.001	<0.001	0.131	<0.001	<0.001	<0.0015	<0.001	0.18	<0.001	<0.003	<0.0002	<0.0015	0.85	<0.001	<0.002
MW-6	12/15/2015	<0.001	<0.001	0.0316	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0012	<0.0002	<0.001	0.48	<0.001	<0.001
MW-6	2/29/2016	<0.001	<0.001	0.0274	<0.001	<0.001	<0.001	<0.001	0.17	<0.001	<0.001	<0.0002	<0.001	0.01	<0.001	<0.001
MW-6	5/16/2016	<0.001	<0.001	0.0298	<0.001	<0.001	<0.001	<0.001	0.19	<0.001	<0.001	<0.0002	<0.001	0.91	<0.001	<0.001
MW-6	8/22/2016	<0.001	<0.001	0.0368	<0.001	<0.001	<0.001	<0.001	0.20	<0.001	0.0012	<0.0002	<0.001	1.08	<0.001	<0.001
MW-6	11/15/2016	<0.001	<0.001	0.0343	<0.001	<0.001	<0.001	<0.001	0.17	<0.001	0.0012	<0.0002	<0.001	0.29	<0.001	<0.001
MW-6	2/13/2017	<0.001	<0.001	0.0286	<0.001	<0.001	<0.001	<0.001	0.16	<0.001	<0.001	<0.0002	<0.001	0.35	<0.001	<0.001
MW-6	5/18/2017	<0.001	<0.001	0.0292	<0.001	<0.001	<0.001	<0.001	0.19	<0.001	<0.001	<0.0002	<0.001	0.27	<0.001	<0.001
MW-6	7/18/2017	<0.001	<0.001	0.0597	<0.001	<0.001	<0.001	<0.001	0.17	<0.001	<0.001	<0.0002	<0.001	3.14	<0.001	<0.001
MW-6	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.16	NA	NA	NA	NA	NA	NA	NA
MW-6	5/31/2018	<0.001	<0.001	0.0322	<0.001	<0.001	<0.0015	<0.001	0.19	<0.001	<0.0015	<0.0002	<0.0015	1.97	<0.001	<0.002
MW-6	8/28/2018	NA	<0.001	0.0436	NA	NA	0.0016	<0.001	0.22	<0.001	<0.0015	NA	<0.0015	0.53	0.001	NA
MW-6	2/15/2019	<0.001	<0.001	0.0366	<0.001	<0.001	<0.0015	<0.001	0.19	<0.001	<0.0015	<0.0002	<0.0015	0.37	<0.001	<0.002
MW-6	8/21/2019	NA	<0.001	0.0395	NA	NA	<0.0015	<0.001	0.19	<0.001	<0.003	NA	<0.0015	0.75	<0.001	NA
MW-6	2/11/2020	<0.001	<0.001	0.0267	<0.001	<0.001	<0.0015	<0.001	0.20	<0.001	<0.003	<0.0002	<0.0015	1.25	<0.001	<0.002
MW-7	12/15/2015	<0.001	<0.001	0.0848	<0.001	<0.001	<0.001	<0.001	0.25	<0.001	0.0034	<0.0002	0.0033	1.29	<0.001	<0.001
MW-7	2/29/2016	<0.001	<0.001	0.0515	<0.001	<0.001	<0.001	<0.001	0.22	<0.001	0.0023	<0.0002	0.0033	0.32	<0.001	<0.001
MW-7	5/16/2016	<0.001	<0.001	0.0572	<0.001	<0.001	<0.001	<0.001	0.24	<0.001	0.0030	<0.0002	0.0027	0.99	<0.001	<0.001
MW-7	8/22/2016	<0.001	0.0011	0.0656	<0.001	<0.001	<0.001	<0.001	0.27	<0.001	0.0048	<0.0002	0.0037	1.74	<0.001	<0.001
MW-7	11/15/2016	<0.001	0.0015	0.0629	<0.001	<0.001	0.0024	<0.001	0.32	<0.001	0.0040	<0.0002	0.0032	2.16	<0.001	<0.001
MW-7	2/13/2017	<0.001	<0.001	0.0656	<0.001	<0.001	<0.001	<0.001	0.23	<0.001	0.0031	<0.0002	0.0021	0.81	<0.001	<0.001
MW-7	5/19/2017	<0.001	<0.001	0.0505	<0.001	<0.001	<0.001	<0.001	0.26	<0.001	0.0033	<0.0002	0.0028	0.64	<0.001	<0.001
MW-7	7/18/2017	<0.001	<0.001	0.0516	<0.001	<0.001	<0.001	<0.001	0.31	<0.001	0.0029	<0.0002	0.0033	1.76	<0.001	<0.001
MW-7	11/7/2017	NA	NA	NA	NA	NA	NA	NA	0.32	NA	NA	NA	NA	NA	NA	NA
MW-7	6/1/2018	<0.001	<0.001	0.0363	<0.001	<0.001	<0.0015	<0.001	0.32	<0.001	0.0026	<0.0002	0.0029	0.66	<0.001	<0.002
MW-7	8/28/2018	NA	0.0013	0.0349	NA	NA	0.0029	<0.001	0.33	<0.001	0.0046	NA	0.0046	0.41	<0.001	NA
MW-7	2/15/2019	<0.001	<0.001	0.0681	<0.001	<0.001	<0.0015	<0.001	0.22	<0.001	0.0044	<0.0002	0.0023	0.38	<0.001	<0.002
MW-7	8/21/2019	NA	0.0017	0.0634	NA	NA	<0.0015	0.0011	0.25	<0.001	0.0048	NA	0.0033	0.41	<0.001	NA
MW-7	2/11/2020	<0.001	<0.001	0.0473	<0.001	<0.001	<0.0015	<0.001	0.21	<0.001	<0.003	<0.0002	0.0022	0.25	<0.001	<0.002

Analytical Results - Appendix IV
Kincaid Ash Pond

Sample Location	Date Sampled	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Cadmium, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	Radium-226 + Radium 228, tot (pCi/L)	Selenium, total (mg/L)	Thallium, total (mg/L)
MW-8	12/15/2015	<0.001	<0.001	0.0364	<0.001	<0.001	<0.001	0.002	0.22	<0.001	0.0019	<0.0002	<0.001	2.08	<0.001	<0.001
MW-8	2/29/2016	<0.001	<0.001	0.0329	<0.001	<0.001	<0.001	0.0013	0.19	<0.001	0.0019	<0.0002	<0.001	0.15	<0.001	<0.001
MW-8	5/16/2016	<0.001	<0.001	0.0328	<0.001	<0.001	<0.001	0.0014	0.20	<0.001	0.0020	<0.0002	<0.001	0.70	<0.001	<0.001
MW-8	8/22/2016	<0.001	<0.001	0.0335	<0.001	<0.001	<0.001	0.0016	0.20	<0.001	0.0016	<0.0002	<0.001	2.11	<0.001	<0.001
MW-8	11/15/2016	<0.001	<0.001	0.0359	<0.001	<0.001	<0.001	0.0019	0.20	<0.001	0.0022	<0.0002	<0.001	0.00	<0.001	<0.001
MW-8	2/13/2017	<0.001	<0.001	0.0296	<0.001	<0.001	<0.001	0.0013	0.21	<0.001	0.0020	<0.0002	<0.001	0.31	<0.001	<0.001
MW-8	5/19/2017	<0.001	<0.001	0.0322	<0.001	<0.001	<0.001	0.0013	0.20	<0.001	0.0020	<0.0002	<0.001	0.66	<0.001	<0.001
MW-8	7/18/2017	<0.001	<0.001	0.0326	<0.001	<0.001	<0.001	0.0016	0.20	<0.001	0.0021	<0.0002	<0.001	2.32	<0.001	<0.001
MW-8	11/7/2017	NA	NA	NA	NA	NA	NA	NA	0.20	NA	NA	NA	NA	NA	NA	NA
MW-8	6/1/2018	<0.001	<0.001	0.0338	<0.001	<0.001	<0.0015	0.0014	0.22	<0.001	0.0022	<0.0002	<0.0015	0.14	<0.001	<0.002
MW-8	8/28/2018	NA	<0.001	0.0303	NA	NA	<0.0015	0.0014	0.21	<0.001	0.0020	NA	<0.0015	0.39	<0.001	NA
MW-8	2/14/2019	<0.001	<0.001	0.0267	<0.001	<0.001	<0.0015	<0.001	0.23	<0.001	0.0032	<0.0002	<0.0015	0.20	<0.001	<0.002
MW-8	8/21/2019	NA	<0.001	0.0330	NA	NA	<0.0015	0.0014	0.21	<0.001	<0.003	NA	<0.0015	0.34	<0.001	NA
MW-8	2/11/2020	<0.001	<0.001	0.0222	<0.001	<0.001	<0.0015	<0.001	0.26	<0.001	<0.003	<0.0002	<0.0015	0.23	<0.001	<0.002
MW-11	12/15/2015	<0.001	0.0028	0.157	<0.001	<0.001	<0.001	<0.001	0.53	<0.001	0.0030	<0.0002	0.0026	0.18	<0.001	<0.001
MW-11	2/29/2016	<0.001	0.0028	0.147	<0.001	<0.001	<0.001	<0.001	0.42	<0.001	0.0020	<0.0002	0.0026	0.64	0.0012	<0.001
MW-11	5/16/2016	<0.001	0.0013	0.139	<0.001	<0.001	<0.001	<0.001	0.46	<0.001	0.0021	<0.0002	0.0025	0.86	<0.001	<0.001
MW-11	8/22/2016	<0.001	0.0015	0.140	<0.001	<0.001	<0.001	<0.001	0.51	<0.001	0.0022	<0.0002	0.002	0.56	<0.001	<0.001
MW-11	11/15/2016	<0.001	0.0019	0.150	<0.001	<0.001	<0.001	<0.001	0.52	<0.001	0.0026	<0.0002	0.0025	1.54	<0.001	<0.001
MW-11	2/13/2017	<0.001	0.0012	0.136	<0.001	<0.001	<0.001	<0.001	0.44	<0.001	0.0019	<0.0002	0.0023	0.39	<0.001	<0.001
MW-11	5/18/2017	<0.001	<0.001	0.134	<0.001	<0.001	<0.001	<0.001	0.48	<0.001	0.0029	<0.0002	0.0023	1.02	0.0015	<0.001
MW-11	7/18/2017	<0.001	0.0016	0.136	<0.001	<0.001	<0.001	<0.001	0.50	<0.001	0.0025	<0.0002	0.0022	1.22	0.0021	<0.001
MW-11	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.49	NA	NA	NA	NA	NA	NA	NA
MW-11	5/31/2018	<0.001	0.0020	0.126	<0.001	<0.001	<0.0015	<0.001	0.52	<0.001	0.0021	<0.0002	0.0036	1.16	0.0011	<0.002
MW-11	8/28/2018	NA	0.0017	0.126	NA	NA	0.0018	<0.001	0.54	<0.001	0.0032	NA	0.0032	0.29	<0.001	NA
MW-11	2/14/2019	<0.001	0.0081	0.138	<0.001	<0.001	<0.0015	0.0011	0.52	<0.001	0.0025	<0.0002	0.0025	0.81	<0.001	<0.002
MW-11	8/21/2019	NA	0.0012	0.129	NA	NA	<0.0015	<0.001	0.49	<0.001	<0.003	NA	0.0024	0.70	0.0027	NA
MW-11	2/11/2020	<0.001	0.0011	0.113	<0.001	<0.001	<0.0015	<0.001	0.53	<0.001	<0.003	<0.0002	0.0020	1.28	0.0016	<0.002
MW-12	12/15/2015	<0.001	<0.001	0.137	<0.001	<0.001	<0.001	<0.001	0.22	<0.001	0.0093	<0.0002	0.0013	0.13	<0.001	<0.001
MW-12	2/29/2016	<0.001	<0.001	0.113	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0082	<0.0002	<0.001	0.19	<0.001	<0.001
MW-12	5/16/2016	<0.001	<0.001	0.119	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0088	<0.0002	<0.001	1.12	<0.001	<0.001
MW-12	8/22/2016	<0.001	<0.001	0.115	<0.001	<0.001	<0.001	<0.001	0.19	<0.001	0.0102	<0.0002	<0.001	1.51	<0.001	<0.001
MW-12	11/15/2016	<0.001	<0.001	0.112	<0.001	<0.001	<0.001	<0.001	0.21	<0.001	0.0106	<0.0002	0.0011	0.56	<0.001	<0.001
MW-12	2/13/2017	<0.001	<0.001	0.0941	<0.001	<0.001	<0.001	<0.001	0.17	<0.001	0.0088	<0.0002	<0.001	0.00	<0.001	<0.001
MW-12	5/18/2017	<0.001	<0.001	0.106	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0090	<0.0002	<0.001	0.64	<0.001	<0.001
MW-12	7/18/2017	<0.001	<0.001	0.0953	<0.001	<0.001	<0.001	<0.001	0.18	<0.001	0.0097	<0.0002	<0.001	2.65	<0.001	<0.001
MW-12	11/6/2017	NA	NA	NA	NA	NA	NA	NA	0.18	NA	NA	NA	NA	NA	NA	NA
MW-12	5/31/2018	<0.001	<0.001	0.0701	<0.001	<0.001	<0.0015	<0.001	0.16	<0.001	0.0085	<0.0002	<0.0015	1.44	<0.001	<0.002
MW-12	8/28/2018	NA	<0.001	0.0815	NA	NA	<0.0015	<0.001	0.18	<0.001	0.0097	NA	<0.0015	1.05	<0.001	NA
MW-12	2/14/2019	<0.001	<0.001	0.0892	<0.001	<0.001	<0.0015	<0.001	0.19	<0.001	0.0095	<0.0002	<0.0015	0.40	<0.001	<0.002
MW-12	8/20/2019	NA	<0.001	0.0655	NA	NA	<0.0015	<0.001	0.18	<0.001	0.0087	NA	<0.0015	1.02	<0.001	NA
MW-12	2/11/2020	<0.001	<0.001	0.0560	<0.001	<0.001	<0.0015	<0.001	0.17	<0.001	0.0068	<0.0002	<0.0015	0.99	<0.001	<0.002

Notes:
1. Abbreviations: mg/L - milligrams per liter; NA - not analyzed; pCi/L - picocurie per liter;

ATTACHMENT 6 – SITE HYDROGEOLOGY AND STRATIGRAPHIC CROSS-SECTIONS OF THE SITE

CONCEPTUAL SITE MODEL AND DESCRIPTION OF SITE HYDROGEOLOGY (KINCAID ASH POND)

The Kincaid Power Station (Power Station) conceptual site model (CSM) and Description of Site Hydrogeology for the Kincaid Ash Pond (AP), located near Kincaid, Illinois are described in the following sections.

REGIONAL SETTING

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. The AP and surrounding properties are relatively flat at an elevation of approximately 600 feet above mean sea level (msl). Sangchris Lake was created to provide a source of cooling water for the Power Station and forms the western and part of the northern border of the AP, and is connected on the eastern edge by a discharge channel from the Power Station, which is located to the south. Agricultural land is located to the east.

The AP is located in the Springfield Plain, which is in the Till Plains Section of the Central Lowland Physiographic province. Surficial soils in the vicinity include loamy undulating orthents derived from fill material originating from former soil materials and to a lesser extent Ipava and Osco silt loams, which are poorly drained soils derived from ground moraines. The surficial soils are underlain by unlithified materials of Cahokia Alluvium and the Vandalia Till Member of the Glasford Formation (i.e., diamicton deposits). Where present, the Cahokia Alluvium deposits are comprised of silts and clays interbedded with thin sand lenses near Sangchris Lake. The Vandalia Till deposits are comprised of dense clay and silt with varying amounts of sand and gravel.

The bedrock below the till is the Pennsylvanian-age Bond Formation, which underlies the unlithified materials and consists mainly of limestone with lesser amounts of shale and sandstone.

SITE GEOLOGY

The materials encountered in borings completed by Natural Resource Technology, Inc. (NRT) in 2015 to 2016 included surficial clay and silt to depths up to 44 feet bgs, followed by a thin sandy unit overlying dense clay till. Occasional silt and sand lenses, less than 5 feet thick, were also present within the uppermost clay unit. These shallow silt and sand lenses are not laterally continuous across the AP.

Underlying the semi-confining clay and silt is a sandy unit which is considered the uppermost aquifer. The description of the aquifer ranges from well graded sand to sandy clay, but in most locations it is described as silty or clayey sand. It is important to note that the sandy unit, or uppermost aquifer, occurs directly above the clay till (i.e., sandy or silty zones within the shallow clay above the till are not considered part of the uppermost aquifer). This glacial clay till is composed of sand, clay, and gravel, and the thickness of this unit measured on-site ranged from 36 feet to 57 feet. Underlying the till is limestone or shale bedrock of the Bond Formation. A cross-section showing the subsurface materials encountered at the AP is included as an attachment to this demonstration.

In addition to visual classification of soil in the borings, soil samples were also collected from several locations for grain size analysis. Samples collected from within the semi-confining unit contained over 83% silt and clay with 2% to 17% sand, while those collected from within or near the sandy unit contained 34% to 61% sand.

SITE HYDROGEOLOGY

The CCR groundwater monitoring system consists of eight monitoring wells installed in the uppermost aquifer and adjacent to the AP (MW-1, MW-2, MW-5, MW-6, MW-7, MW-8, MW-11, and MW-12) (see Monitoring Well Location Map, and Well Construction Diagrams and Drilling Logs attached to this demonstration). The unit utilizes two background monitoring wells (MW-1, MW-2) as part of the CCR groundwater monitoring system.

The determination that the sand unit is the uppermost aquifer is supported by the well search performed in the vicinity of the AP. Many of the nearby potable wells indicate the presence of this aquifer at a similar elevation to what was encountered at the AP. Potable well construction logs also identify this unit as the initial source of water.

The lower limit of the aquifer is composed of Vandalia Till. Vertical permeability analysis from the till unit (4.8×10^{-8} centimeter per second (cm/s)) indicates that it is unlikely that this unit is used for potable water.

Hydraulic Conductivity

The median result from field hydraulic conductivity tests (i.e., slug tests) of the semi-confining unit is approximately 4×10^{-5} cm/s and the sandy aquifer unit is 2×10^{-4} cm/s. The geometric mean of laboratory vertical permeability results from samples collected in the confining unit is 4×10^{-6} cm/s, or approximately ten times lower than the horizontal permeability.

The effective porosity of the clayey sand/silty sand aquifer (20%) was estimated from literature values (Sanders, 1998) to calculate the velocity of the groundwater.

Groundwater Elevations, Flow Direction and Velocity

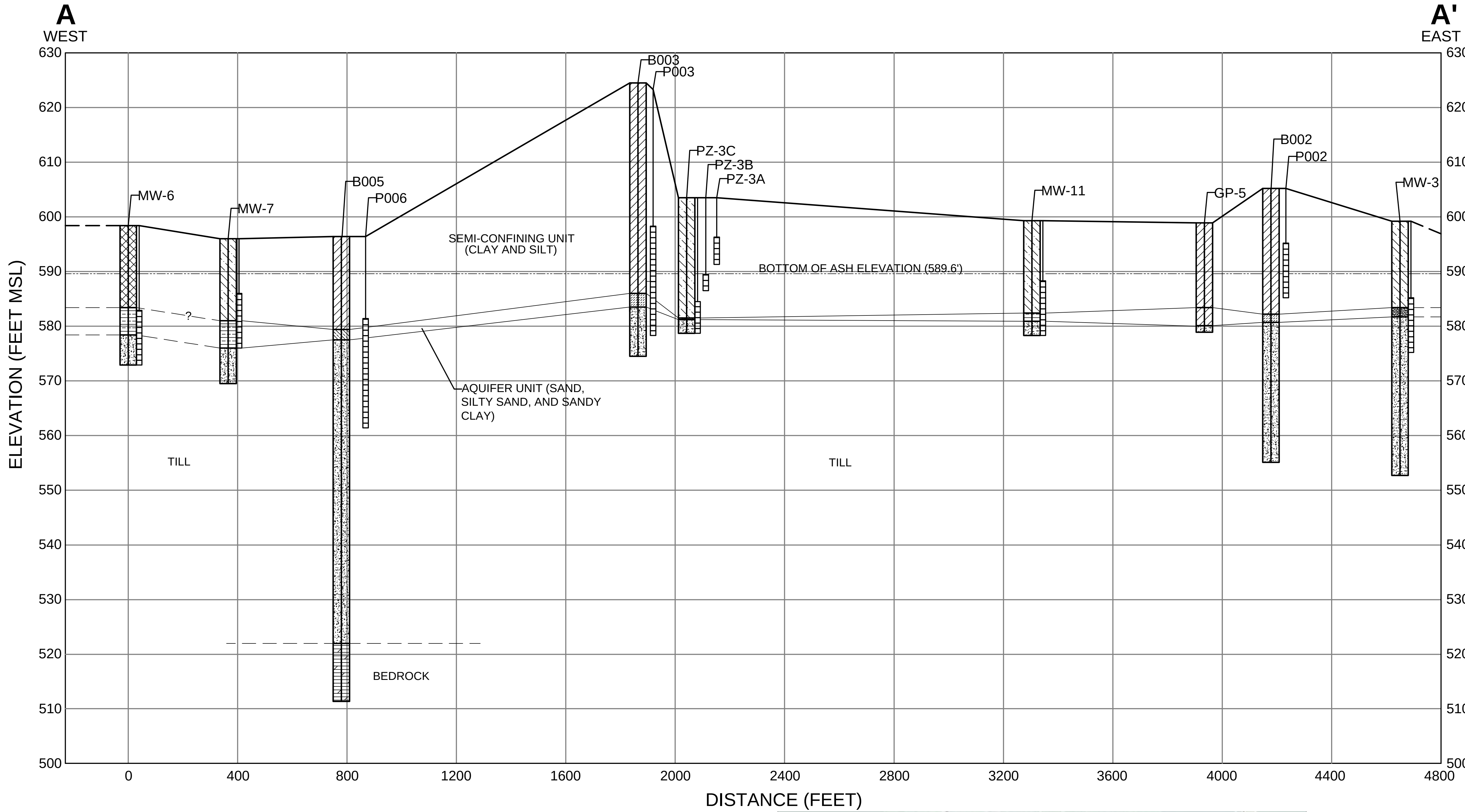
Groundwater elevations adjacent to the AP for the period of November 2015 through May 2017 range from approximately 583.9 ft MSL (North American Vertical Datum of 1988 [NAVD88]) in MW-12 to 597.6 ft MSL (NAVD88) in MW-8 as shown in the November 2015 through May 2017 groundwater elevation contour maps included as an attachment to this demonstration.

Typically, groundwater flows from east to west and discharges to Sangchris Lake as illustrated in the February 2020 contour map included as an attachment to this demonstration, although there appears to be radial flow from the Unit during portions of the year.

Groundwater flow velocity was 0.07 and 0.03 feet per day (ft/day) as determined by the interpolated groundwater elevation contours in November 2016 and February 2017, respectively.

REFERENCES

Sanders, L. L., 1998. A Manual of Field Hydrogeology, Prentice Hall, Inc.



W10B

MONITORING WELL LOCATION

A — A' CROSS-SECTION TRANSECT

WELL SCREEN

SILT

SILT AND CLAY

SILT AND SAND

CLAY

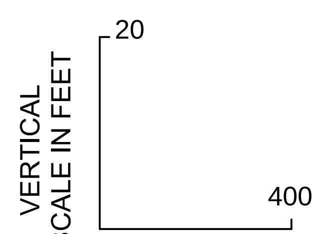
SAND

CLAYEY SAND

SANDY CLAY

TILL

BEDROCK



VERTICAL EXAGGERATION =20

N

0 250 500 1000

SCALE IN FEET

SOURCE NOTES:

1. ESRI, DIGITALGLOBE,GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY
2. COORDINATE SYSTEM IS ILLINOIS STATE PLANE WEST, U.S. FOOT.

DRAWN BY: AGC DATE: 04/21/16

CHECKED BY: NRK DATE: 04/22/16

APPROVED BY: SJC DATE: 07/18/17

DRAWING NO: Figure 3_Geologic Cross-Section A-A'

REFERENCE: .

GEOLOGIC CROSS-SECTION A-A'

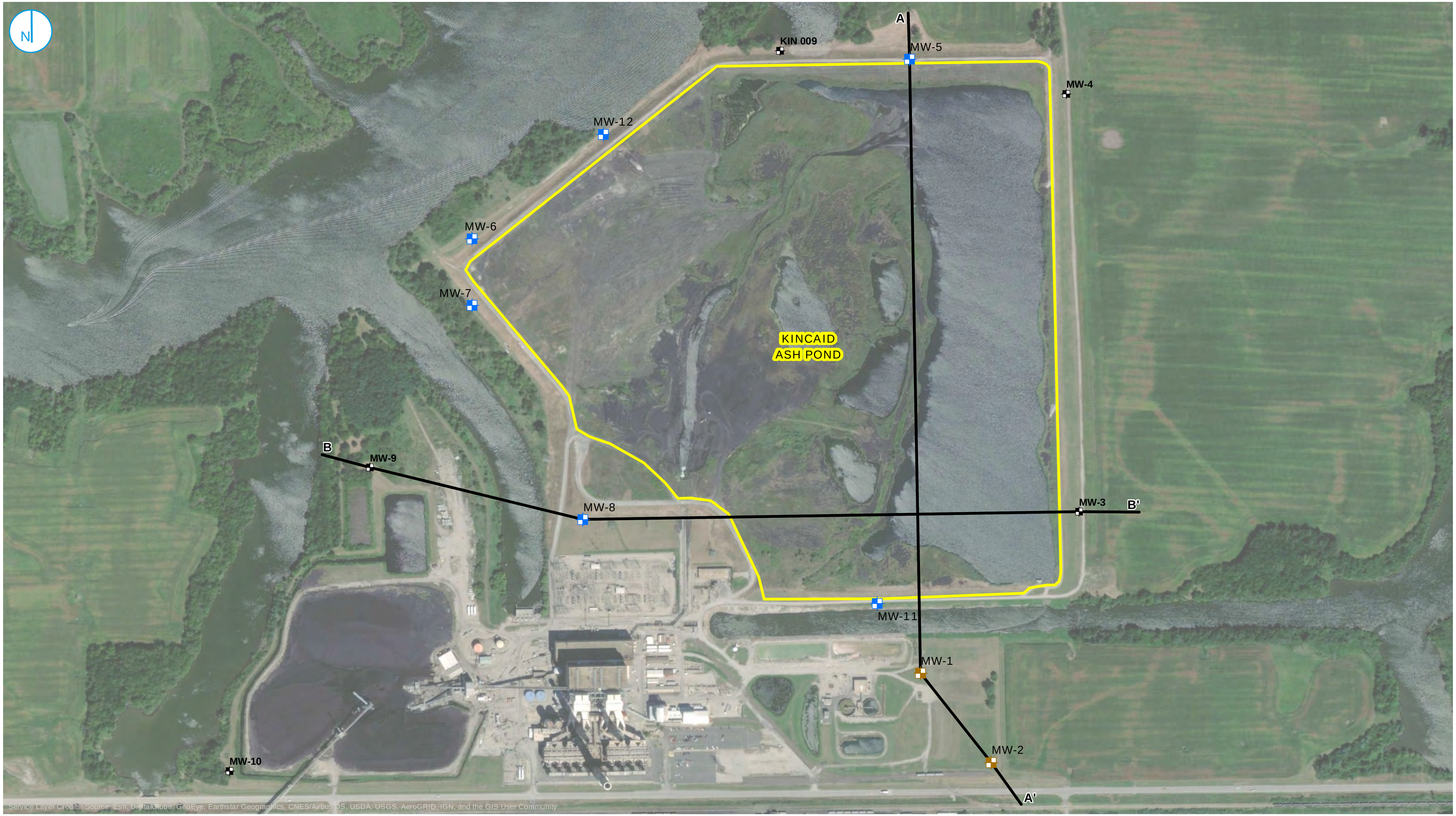
KINCAID ASH POND
KINCAID POWER STATION
KINCAID, ILLINOIS

NATURAL RESOURCE TECHNOLOGY

PROJECT NO.
2365/5.0

FIGURE NO.
3

May 19, 2016 4:09pm PLOTTED BY: acawrse SAVED BY: acawrse
Y:\Mapping\Projects\23\2365\CAD\Figure 3_Geologic Cross-Section A-A'.dwg Layout1
IMAGES: Y:\Mapping\Projects\23\2365\Imagery\World_Imagery_1-to-500.jpg;
XREFS:



DOWNGRADIENT MONITORING WELL LOCATION
UPGRADIENT MONITORING WELL LOCATION
NON-CCR MONITORING WELL LOCATION
CROSS SECTION
CCR MONITORED UNIT

0 250 500 Feet

GROUNDWATER SAMPLING WELL LOCATION MAP

KINCAID POWER STATION
KINCAID, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

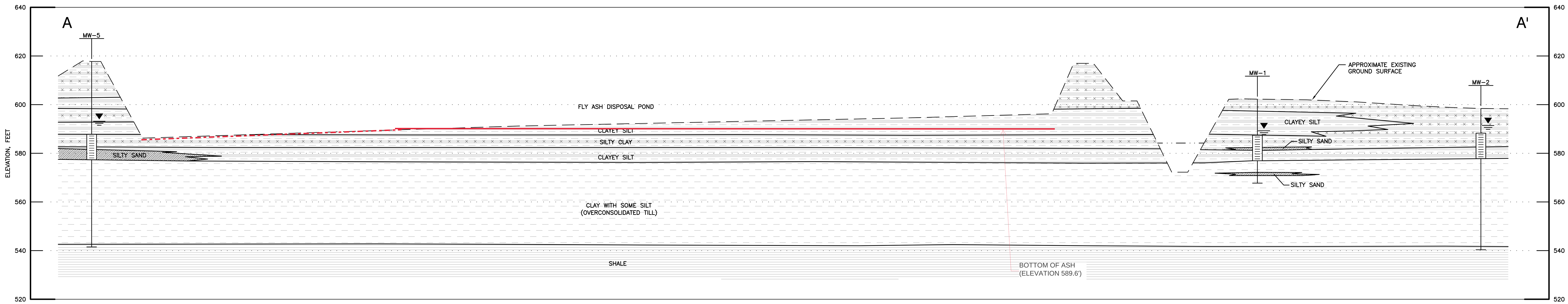
RAMBOLL

Y:\Mapping\Projects\22\2285_Kincaid\MXD\Figure 1_GW Sampling Well Location.mxd

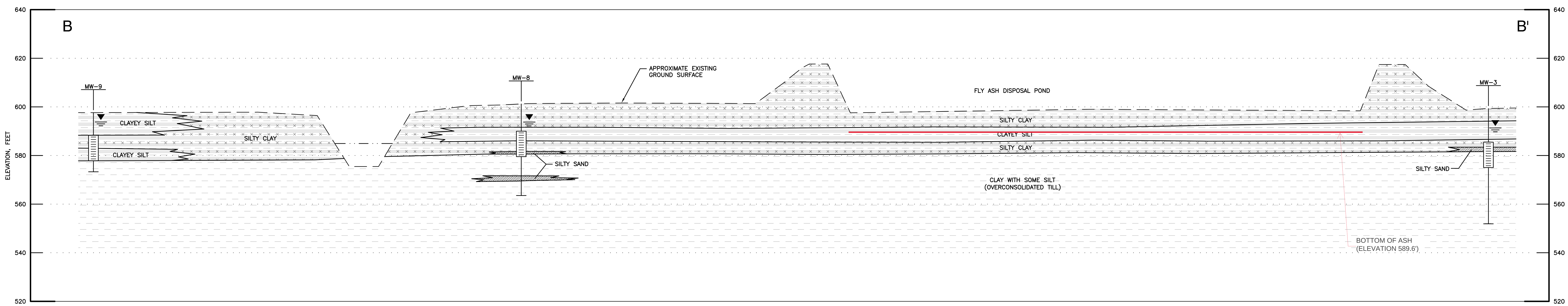
PROJECT: 169000XXXX | DATED: 9/4/2020 | DESIGNER: galarnmc

REVISION RECORD		
NO	DATE	DESCRIPTION

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION



SECTION A-A'



SECTION B-B'

LEGEND

- SILTY CLAY
- CLAYEY SILT
- SILTY SAND
- CLAY TILL
- SHALE
- GROUNDWATER ELEVATION
- MONITORING WELL

REVISION NOTE:
RED LINE INDICATES THE BOTTOM OF ASH (ELEVATION 589.6')
(RAMBOLL, 9/9/2020)

HORIZONTAL SCALE
0 150 300

VERTICAL SCALE
0 20 40

CEC
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DOMINION RESOURCES
KINCAID POWER STATION
KINCAID, ILLINOIS

DRAWN BY: DWD	CHECKED BY: RAE	APPROVED BY:
DATE: 5/24/10	DWG SCALE: AS SHOWN	PROJECT NO: 100-399

GEOLOGIC CROSS SECTIONS

DRAWING NO.: **3**

P:\2010\100-399\-CADD\DWG\100399-FIGURE_3.DWG[SECTIONS] (DDAVBLE) - JUN 22, 2010 - 8:26:58

ATTACHMENT 7 – STRUCTURAL STABILITY ASSESSMENT

AECOM

Submitted to
Kincaid Generation, LLC
199 Route 104
Kincaid, IL 62540

Submitted by
AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Structural Stability Assessment

For

Kincaid Ash Pond

At Kincaid Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Kincaid Ash Pond at the Kincaid Generation, LLC Kincaid Power Station meets the structural stability assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(d), except as noted herein. The Kincaid Ash Pond is located near Kincaid, Illinois in Christian County, approximately 0.1 miles northeast of the Kincaid Power Station. The Kincaid Ash Pond serves as the wet impoundment basin for CCR materials produced by the Kincaid Power Station.

The Kincaid Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that an initial structural stability assessment for an existing CCR surface impoundment be completed by October 17, 2016. In general, the initial structural stability assessment must document that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial structural stability assessment was conducted in accordance with the requirements of 40 CFR § 257.73(d). The owner or operator must prepare a periodic structural stability assessment every five years.

2 Initial Structural Stability Assessment

40 CFR §257.73(d)(1)
The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with [the standards in (d)(1)(i)-(vii)].

An initial structural stability assessment has been performed to document that the design, construction, operation and maintenance of the Kincaid Ash Pond 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 the Kincaid Ash Pond were found to be consistent with recognized and generally accepted good engineering practices, and meets the standards in 257.73(d)(1)(i)-(vii), except as noted herein.

2.1 Foundations and Abutments (§257.73(d)(1)(i))

CCR unit designed, constructed, operated, and maintained with stable foundations and abutments.

The stability of the foundations was evaluated using soil data from field investigations and reviewing design drawings, information about operations and maintenance, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the foundations. The Kincaid Ash Pond is a ring dike structure and does not have abutments.

The foundation consists of soft to very stiff soil, overlying hard glacial till, which indicates stable foundations. Slope stability analyses exceed the criteria listed in §257.73(e)(1)(i) through (iii) for slip surfaces passing through the foundation. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Kincaid Ash Pond at Kincaid Power Station* (October 2016). Additional slope stability analyses were performed to evaluate the effects of cyclic softening in the foundation, and were found to satisfy the criteria listed in §257.73(e)(1)(iv) applicable to dikes. A review of information about operations and maintenance as well as current and past performance of the dikes has determined appropriate processes are in place for continued operational performance.

Based on the conditions observed by AECOM, the Kincaid Ash Pond was designed and constructed with stable foundations. Any issues related to the stability of foundations is addressed during operations and maintenance; therefore, the Kincaid Ash Pond meets the requirements in §257.73(d)(1)(i).

2.2 Slope Protection (§257.73(d)(1)(ii))

CCR unit designed, constructed, operated, and maintained with adequate slope protection to protect against surface erosion, wave action and adverse effects of sudden drawdown.

The adequacy of slope protection was evaluated by reviewing design drawings, information about operations and maintenance, and conditions observed in the field by AECOM.

Based on this evaluation, adequate slope protection was designed and constructed at the Kincaid Ash Pond. No evidence of significant areas of erosion or wave action were observed. The interior slopes are protected with vegetation and stacked bottom ash, and the exterior slopes are protected with vegetation and crushed stone where adjacent to Sangchris Lake. Repairs to the vegetation and stacked bottom ash are performed as needed during operations and maintenance and are appropriate to protect against surface erosion or wave action. Sudden drawdown of the pool in the Kincaid Ash Pond is not expected to occur due to operational controls associated with lowering the pool level. Therefore, slope protection to protect against the adverse effects of sudden drawdown is not required as sudden drawdown conditions are not expected to occur. Therefore, the Kincaid Ash Pond meets the requirements in §257.73(d)(1)(ii).

2.3 Dike Compaction (§257.73(d)(1)(iii))

CCR unit designed, constructed, operated, and maintained with dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.

The density of the dike materials was evaluated using soil data from field investigations and reviewing design drawings, information about operations and maintenance, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the dike over the range of expected loading conditions as defined within §257.73(e)(1).

Based on this evaluation, the dike consists of medium stiff to very stiff material, which is indicative of mechanically compacted dikes. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the dike. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Kincaid Ash Pond at Kincaid Power Station* (October 2016); therefore, the original design and construction of the Kincaid Ash Pond included sufficient dike compaction. Deficiencies related to compaction of the dikes are identified and mitigated as part of operations and maintenance, in order to maintain sufficient compaction of the dikes to withstand the range of loading conditions. Therefore, the Kincaid Ash Pond meets the requirements in §257.73(d)(1)(iii).

2.4 Vegetated Slopes (§257.73(d)(1)(iv))[1]

CCR unit designed, constructed, operated, and maintained with vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection.

The adequacy of slope vegetation was evaluated by reviewing design drawings, information about operations and maintenance, and conditions observed in the field by AECOM.

Based on this evaluation, the vegetation on the exterior slopes is adequate as no substantial bare or overgrown areas were observed. Crushed stone is also present on the exterior slopes adjacent to Sangchris Lake, which is an alternate form of slope protection. Stacked bottom ash is present on some portions of the interior slopes and is used as an alternate form of slope protection, which is adequate as significant areas of erosion were not observed. Therefore, the original design and construction of the Kincaid Ash Pond included adequate vegetation of the dikes and surrounding areas. Vegetation growth management, including mowing and seeding any bare areas, is performed as part of operations and maintenance, as evidenced by the conditions observed by AECOM. Therefore, the Kincaid Ash Pond meets the requirements in §257.73(d)(1)(iv).

[1] As modified by court order issued June 14, 2016, Utility Solid Waste Activities Group v. EPA, D.C. Cir. No. 15-1219 (order granting remand and vacatur of specific regulatory provisions).

2.5 Spillways (§257.73(d)(1)(v))

CCR unit designed, constructed, operated, and maintained with a single spillway or a combination of spillways configured as specified in [paragraph (A) and (B)]:

(A) All spillways must be either:

(1) of non-erodible construction and designed to carry sustained flows; or

(2) earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.

(B) The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:

(1) Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or

(2) 1000-year flood for a significant hazard potential CCR surface impoundment; or

(3) 100-year flood for a low hazard potential CCR surface impoundment.

The spillways were evaluated using design drawings, information about operations and maintenance, and conditions observed in the field by AECOM. Additionally, hydrologic and hydraulic analyses were completed to evaluate the capacity of the spillway relative to inflow estimated for the 1,000-year flood event for the significant hazard potential Kincaid Ash Pond. A hazard potential classification assessment was performed by Stantec in 2016 in accordance with §257.73(a)(2).

The spillways are comprised of a reinforced concrete recycle intake structure pipe and an emergency outlet structure consisting of a concrete riser and corrugated metal outflow pipe, which are non-erodible materials designed to carry sustained flows. The capacity of the spillways was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The analysis found that the spillways can adequately manage flow during peak discharge resulting from the 1,000-year storm event without overtopping of the embankments. The hydrologic and hydraulic analyses are discussed in the *CCR Rule Report: Initial Inflow Design Flood Control System Plan for Kincaid Ash Pond at Kincaid Power Station* (October 2016). Any issues with the spillways are repaired and debris or other obstructions are removed from the spillway during operations and maintenance, as appropriate and as evidenced by the conditions observed by AECOM. Therefore, the Kincaid Ash Pond meets the requirements in §257.73(d)(1)(v).

2.6 Stability and Structural Integrity of Hydraulic Structures (§257.73(d)(1)(vi))

CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation,

Two hydraulic structures pass through the dike at the Kincaid Ash Pond: the reinforced concrete recycle intake structure (primary outflow) and the corrugated metal pipe (CMP) emergency outlet structure. The stability and structural integrity of the pipes was evaluated using design drawings, information about operations and maintenance, inspections, and conditions observed in the field by AECOM. No other hydraulic structures are known to pass through the dike of or underlie the base of the Kincaid Ash Pond.

The evaluation of design drawings, information about operations and maintenance and conditions observed in the field did not identify any issues with the recycle intake structure pipe. However, the evaluation of the stability and structural integrity of the recycle intake structure pipe has not been fully completed because high pipe flows required for operation of the Kincaid Power Station precluded closed circuit television (CCTV) inspection.

The CCTV pipe inspection of the emergency outlet structure pipe covered the complete length of the pipe and found the pipe to be free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris that may negatively affect the operation of the hydraulic structure. Evaluation of design drawings and information about operations and maintenance for this pipe also did not identify any issues.

Based on this evaluation, all Kincaid Ash Pond hydraulic structures cannot be certified to meet the requirements of §257.73(d)(1)(vi) because a CCTV inspection of the recycle intake structure pipe has not yet been performed, thus, precluding completion of the evaluation of the stability and structural integrity of that pipe. In accordance with §257.73(d)(2), AECOM recommends that a CCTV pipe inspection of the recycle intake structure pipe be completed as soon as feasible and that this assessment be updated once the inspection is completed.

2.7 Downstream Slope Inundation/Stability (§257.73(d)(1)(vii))

CCR unit designed, constructed, operated, and maintained with, for CCR units 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 structural stability of the downstream slopes of the Kincaid Ash Pond was evaluated by comparing the location of the Kincaid Ash Pond relative to adjacent water bodies using published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), aerial imagery, conditions observed in the field by AECOM, and sudden drawdown slope stability analyses.

Based on this evaluation, Sangchris Lake is adjacent to the northern downstream slopes of the Kincaid Ash Pond. No other downstream water bodies are adjacent to the downstream slopes of the Kincaid Ash Pond. A sudden drawdown slope stability analysis was performed at a cross-section identified as critical for sudden drawdown slope stability, and considered a drawdown of the pool in Sangchris Lake from a normal pool to empty pool condition, thereby evaluating both sudden drawdown and low pool conditions. The resulting factor of safety was found to satisfy the criteria listed in United States Army Corps of Engineers Engineer Manual 1110-2-1902 for drawdown from normal to low pool, as factor of safety criteria for sudden drawdown slope stability is not expressly stated as a requirement of §257.73(d)(1)(vii). Therefore, the Kincaid Ash Pond meets the requirements listed in §257.73(d)(1)(vii).

3 Certification Statement

CCR Unit: Kincaid Generation, LLC; Kincaid Power Station; Kincaid Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial structural stability assessment dated October 13, 2016 was conducted in accordance with the requirements of 40 CFR § 257.73(d).

VICTOR A MODEER JR.
Printed Name

10/13/16
Date

VICTOR ALBERT MODEER JR.
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ATTACHMENT 8 – SAFETY FACTOR ASSESSMENT

AECOM

Submitted to
Kincaid Generation, LLC
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Kincaid, IL 62540

Submitted by
AECOM
1001 Highlands Plaza Drive West
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St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Safety Factor Assessment

For

Kincaid Ash Pond

At Kincaid Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Kincaid Ash Pond at the Kincaid Generation, LLC Kincaid Power Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The Kincaid Ash Pond is located near Kincaid, Illinois in Christian County, approximately 0.1 miles northeast of the Kincaid Power Station. The Kincaid Ash Pond serves as the wet impoundment basin for CCR produced by the Kincaid Power Station.

The Kincaid Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the initial safety factor assessment for an existing CCR surface impoundment be completed by October 17, 2016.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial safety factor assessment meets the requirements of 40 CFR § 257.73(e). The owner or operator must prepare a safety factor assessment every five years.

2 Initial Safety Factor Assessment

40 CFR §257.73(e)(1)
The owner or operator must conduct initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified in (e)(1)(i) through (iv) of 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.

(i) The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.
(ii) The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.
(iii) The calculated seismic factor of safety must equal or exceed 1.00.
(iv) 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 to evaluate the design, performance, and condition of the earthen dikes of the Kincaid Ash Pond. The exploration consisted of hollow-stem auger borings, cone penetration tests, installation of piezometers, and laboratory program including strength, hydraulic conductivity, consolidation, and index testing. Data collected from the geotechnical investigation, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents were utilized to perform the safety factor assessment and geotechnical analyses.

In general, the subsurface conditions at the Kincaid Ash Pond consist of medium stiff to very stiff embankment fill (clay) overlying soft to very stiff clay foundation soils, which in turn overlies hard glacial till (clay). Phreatic water is typically at or slightly above the embankment/foundation interface.

Five (5) representative cross sections were analyzed using limit equilibrium slope stability analysis software to evaluate stability of the perimeter dike system and foundations. The cross sections were located to represent critical surface geometry, subsurface stratigraphy, and phreatic conditions across the site. Each cross section was evaluated for each of the loading conditions stipulated in §257.73(e)(1).

The Soils Susceptible to Liquefaction loading condition, §257.73(e)(1)(iv), was not evaluated because a liquefaction susceptibly evaluation did not find soils susceptible to liquefaction within the Kincaid Ash Pond dikes. As a result, this loading condition is not applicable to the Kincaid Ash Pond.

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

Table 1 – Summary of Initial Safety Factor Assessments

Loading Conditions	§257.73(e)(1) Subsection	Minimum Factor of Safety	Calculated Factor of Safety
Maximum Storage Pool Loading	(i)	1.50	1.57
Maximum Surcharge Pool Loading	(ii)	1.40	1.57
Seismic	(iii)	1.00	1.27
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

Based on this evaluation, the Kincaid Ash Pond meets the requirements in §257.73(e)(1).

3 Certification Statement

CCR Unit: Kincaid Generation, LLC; Kincaid Power Station; Kincaid Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial safety factor assessment dated October 13, 2016 meets the requirements of 40 CFR §257.73(e).

VICTOR A MODEER

Printed Name

10/13/16

Date

VICTOR ALBERT MODEER JR.
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ATTACHMENT 9 – ADDENDUM TO THE CLOSURE PLAN (SEPTEMBER 2020)

ADDENDUM NO. 1
KINCAID ASH POND CLOSURE PLAN

This Addendum No. 1 to the Closure Plan for Existing Coal Combustion Residuals (CCR) Impoundment for the Kincaid Ash Pond at the Kincaid Power Station, Revision 0 - October 17, 2016 has been prepared to meet the requirements of Title 40 of the Code of Federal Regulations (40 C.F.R.) Section 257.103(f)(2)(v)(D) as a component of the demonstration that the Kincaid Ash Pond qualifies for a site-specific alternative deadline to initiate closure due to permanent cessation of a coal-fired boiler by a certain date.

The Kincaid Ash Pond will begin construction of closure by April 17, 2025 and cease receipt and placement of CCR and non-CCR wastestreams by no later than July 17, 2027 as indicated in the Kincaid Power Station Alternative Closure Demonstration dated September 29, 2020. Closure will be completed by October 17, 2028 within the 5-year timeframe included in the Closure Schedule identified in the Kincaid Ash Pond Closure Plan in accordance with 40 C.F.R. § 257.102(f)(ii).

All other aspects of the Closure Plan remain unchanged.

CERTIFICATION

I, Eric J. Tlachac, a Qualified Professional Engineer in good standing in the State of Illinois, certify that the information in this addendum is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

____
Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: September 29, 2020

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