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**Electric Energy, Inc.**

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Project No.  
**1940074920**

# **2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**

## **JOPPA EAST ASH POND, JOPPA POWER STATION**



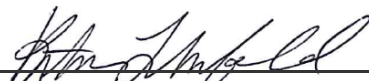
Bright ideas. Sustainable change.

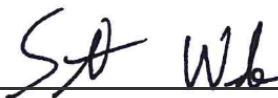
**2020 ANNUAL GROUNDWATER MONITORING AND  
CORRECTIVE ACTION REPORT  
JOPPA EAST ASH POND, JOPPA POWER STATION**

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Project no. **1940074920**  
Recipient **Electric Energy, Inc.**  
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Description **Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

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## ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
CCR	Coal Combustion Residuals
CMA	Corrective Measures Assessment
EAP	East Ash Pond
GWPS	Groundwater Protection Standard
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

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## 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 Joppa East Ash Pond (EAP) located at Joppa Power Station near Joppa, Illinois.

Groundwater is being monitored at Joppa EAP in accordance with the Assessment Monitoring Program requirements specified in 40 C.F.R. § 257.95. Assessment Monitoring was initiated at Joppa EAP on April 9, 2018.

No changes were made to the monitoring system in 2020 (no wells were installed or decommissioned).

No Statistically Significant Levels (SSLs) of 40 C.F.R. Part 257 Appendix IV parameters were determined. Consequently, a Corrective Measures Assessment (CMA) is not required and Joppa EAP remains in the Assessment Monitoring Program.

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## 1. INTRODUCTION

This report has been prepared by Ramboll Americas Engineering Solutions Inc. (Ramboll) on behalf of Electric Energy, Inc., to provide the information required by 40 C.F.R. § 257.90(e) for Joppa EAP located at Joppa Power Station near Joppa, 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 [SSI] relative to background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.
6. A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:
  - i. At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
  - ii. At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
  - iii. If it was determined that there was a SSI over background for one or more constituents listed in Appendix III of §257 pursuant to §257.94(e):
    - A. Identify those constituents listed in Appendix III of §257 and the names of the monitoring wells associated with the SSI(s).
    - B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

- iv. If it was determined that there was a SSL above the Groundwater Protection Standard (GWPS) for one or more constituents listed in Appendix IV of §257 pursuant to §257.95(g) include all of the following:
  - A. Identify those constituents listed in Appendix IV of §257 and the names of the monitoring wells associated with the SSL(s).
  - B. Provide the date when the CMA was initiated for the CCR unit.
  - C. Provide the date when the public meeting was held for CMA for the CCR unit.
  - D. Provide the date when the CMA was completed for the CCR unit.
- v. Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection.
- vi. Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.

This report provides the required information for Joppa EAP for calendar year 2020.

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## **2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS**

No changes have occurred to the Monitoring Program status in calendar year 2020, and Joppa EAP remains in the Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95.

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### 3. KEY ACTIONS COMPLETED IN 2020

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 2020. 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 (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2020, and analytical results for the September 2019 sampling event, are presented in Tables 1 and 2. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any Statistically Significant Levels (SSLs) of Appendix IV parameters over GWPSs.

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

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**Table A – 2019-2020 Assessment Monitoring Program Summary**

Sampling Dates	Analytical Data Receipt Date	Parameters Collected	SSL(s)	SSL(s) Determination Date
September 9, 2019	October 15, 2019	Appendix III Appendix IV Detected <sup>1</sup>	None	January 13, 2020
March 30, 2020	April 28, 2020	Appendix III Appendix IV	None	July 27, 2020
September 23, 2020	October 16, 2020	Appendix III Appendix IV Detected <sup>1</sup>	TBD	TBD

**Notes:**

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).

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#### **4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS**

No problems were encountered with the Groundwater Monitoring Program during 2020. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a), and all data were accepted.

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## 5. KEY ACTIVITIES PLANNED FOR 2021

The following key activities are planned for 2021:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2021.
- 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 2021 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 2021 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, Joppa East Ash Pond, Joppa Power Station, Joppa, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b, Statistical Analysis Plan, Joppa Power Station, Electric Energy, Inc., October 17, 2017.

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## TABLES

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**TABLE 1.**  
**ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS**  
**2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**  
 JOPPA POWER STATION  
 401 - EAST ASH POND  
 JOPPA, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft)	Groundwater Elevation (ft NAVD88)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (field) (STD)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
				6020A	6020A	6020A	6020A	9251	9214	SM4500 H+B	9036	SM 2540C
G01D Background	37.22042921	-88.85717876	9/9/2019	42.75	321.44	<0.025	25.6	8	0.23	6.4	37	336
			3/30/2020	33.73	330.46	<0.025	22.7	8	0.21	6.8	35	296
			9/23/2020			<0.025	24.4	10	0.21	6.7	34	294
			9/24/2020	43.87	320.32							
G02D Background	37.2207148	-88.85331072	9/9/2019	42.37	321.28	0.0429	40.3	18	0.21	6.5	20	264
			3/30/2020	33.7	329.95	0.0449	33.5	20	0.18	6.6	22	222
			9/23/2020			0.0442	45.8	19	0.18	6.6	22	234
			9/24/2020	43.51	320.14							
G51D Downgradient	37.216016	-88.855653	9/9/2019	43.83	320.02	0.501	31.3	6	<0.1	5.3	109	320
			3/30/2020	33.67	330.18	0.697	31.2	6	<0.1	5.6	130	304
			9/23/2020			0.863	42.1	6	<0.1	5.7	121	314
			9/24/2020	44.94	318.91							
G52D Downgradient	37.20962587	-88.85294308	9/9/2019	22.92	325.49	<0.025	52.2	14	0.27	6.0	78	370
			3/30/2020	20.59	327.82	<0.025	48.8	14	0.27	6.4	84	362
			9/23/2020			<0.025	59	15	0.26	6.5	84	336
			9/24/2020	25.7	322.71							
G53D Downgradient	37.21506911	-88.84936671	9/9/2019	36.99	318.48	0.385	42.2	18	0.67	6.2	80	364
			3/30/2020	26.49	328.98	0.334	34.8	17	0.63	6.7	66	296
			9/23/2020			0.411	44.4	20	0.74	6.7	79	342
			9/24/2020	38.06	317.41							
G54D Downgradient	37.21226413	-88.85748523	9/9/2019	42.95	314.08	0.614	79.9	<25	0.32	6.4	136	482
			3/30/2020	27.9	329.13	0.766	84.9	22	0.33	6.8	184	508
			9/23/2020			0.819	122	25	0.33	6.7	173	508
			9/24/2020	43.85	313.18							

**TABLE 1.**  
**ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS**  
**2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**

JOPPA POWER STATION  
401 - EAST ASH POND  
JOPPA, IL

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.

4-digit numbers below parameter represent SW-846 analytical methods and alpha-numeric values that begin with SM represent Standard Methods for the Examination of Water and Wastewater.

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**TABLE 2.**  
**ANALYTICAL RESULTS - APPENDIX IV PARAMETERS**  
**2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**  
 JOPPA POWER STATION  
 401 - EAST ASH POND  
 JOPPA, IL

Well ID	Date	Antimony, total (mg/L) 6020A	Arsenic, total (mg/L) 6020A	Barium, total (mg/L) 6020A	Beryllium, total (mg/L) 6020A	Cadmium, total (mg/L) 6020A	Chromium, total (mg/L) 6020A	Cobalt, total (mg/L) 6020A	Fluoride, total (mg/L) 6020A	Lead, total (mg/L) 6020A	Lithium, total (mg/L) 6020A	Mercury, total (mg/L) 7470A	Molybdenum, total (mg/L) 6020A	Radium-226 + Radium 228, total (pCi/L) 6020A	Selenium, total (mg/L) 6020A	Thallium, total (mg/L) 6020A
G01D Background	9/9/2019		<0.001	0.123			0.0044	0.0014	0.23	0.0012	<0.003			0.79	0.0011	
	3/30/2020	<0.001	0.0011	0.13	<0.001	<0.001	0.0065	0.0018	0.21	0.0019	0.0034	<0.0002	<0.0015	1.44	0.0013	<0.002
	9/23/2020		0.0014	0.123			0.004	0.0016	0.21	0.0014	<0.003			2.27	0.0011	
G02D Background	9/9/2019		<0.001	0.208			<0.0015	<0.001	0.21	<0.001	<0.003			0.49	0.0021	
	3/30/2020	<0.001	<0.001	0.202	<0.001	<0.001	<0.0015	<0.001	0.18	<0.001	<0.003	<0.0002	<0.0015	0.79	0.0035	<0.002
	9/23/2020		<0.001	0.253			<0.0015	<0.001	0.18	<0.001	<0.003			5.93	0.0052	
G51D Downgradient	9/9/2019		<0.001	0.0377			<0.0015	0.0017	<0.1	<0.001	0.0057			0.36	0.0042	
	3/30/2020	<0.001	<0.001	0.0445	<0.001	<0.001	0.0019	0.0024	<0.1	<0.001	0.0065	<0.0002	<0.0015	0.9	0.0048	<0.002
	9/23/2020		<0.001	0.0445			<0.0015	0.002	<0.1	<0.001	0.0071			1.4	0.0063	
G52D Downgradient	9/9/2019		0.0021	0.254			<0.0015	0.0022	0.27	<0.001	<0.003			1.54	<0.001	
	3/30/2020	<0.001	0.0017	0.254	<0.001	<0.001	<0.0015	0.0033	0.27	<0.001	<0.003	<0.0002	<0.0015	1.3	<0.001	<0.002
	9/23/2020		0.0014	0.278			<0.0015	0.0015	0.26	<0.001	<0.003			0.61	<0.001	
G53D Downgradient	9/9/2019		<0.001	0.128			<0.0015	0.002	0.67	<0.001	<0.003			0.03	<0.001	
	3/30/2020	<0.001	<0.001	0.109	<0.001	<0.001	<0.0015	<0.001	0.63	<0.001	<0.003	<0.0002	<0.0015	1.32	<0.001	<0.002
	9/23/2020		<0.001	0.122			<0.0015	0.0024	0.74	<0.001	<0.003			1.16	<0.001	
G54D Downgradient	9/9/2019		<0.001	0.128			<0.0015	0.0117	0.32	<0.001	0.0037			0.84	<0.001	
	3/30/2020	<0.001	<0.001	0.105	<0.001	<0.001	<0.0015	0.013	0.33	<0.001	0.0036	<0.0002	<0.0015	0.89	<0.001	<0.002
	9/23/2020		<0.001	0.16			<0.0015	0.0163	0.33	<0.001	0.0047			1.18	<0.001	

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.  
 4-digit numbers below parameter represent SW-846 analytical methods and 3-digit numbers represent Clean Water Act analytical methods.

**TABLE 3.**  
**STATISTICAL BACKGROUND VALUES**  
**2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**  
 JOPPA POWER STATION  
 401 - EAST ASH POND  
 JOPPA, ILLINOIS  
 ASSESSMENT MONITORING PROGRAM

Parameter	Statistical Background Value (UPL)
<b>40 C.F.R. Part 257 Appendix III</b>	
Boron (mg/L)	0.06
Calcium (mg/L)	46
Chloride (mg/L)	29
Fluoride (mg/L)	0.28
pH (S.U.)	6.2 / 6.9
Sulfate (mg/L)	180
Total Dissolved Solids (mg/L)	526

[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

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**TABLE 4.**  
**GROUNDWATER PROTECTION STANDARDS**  
**2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT**  
 JOPPA POWER STATION  
 401 - EAST ASH POND  
 JOPPA, ILLINOIS  
 ASSESSMENT MONITORING PROGRAM

Parameter	Groundwater Protection Standard <sup>1</sup>
<b>40 C.F.R. Part 257 Appendix IV</b>	
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)	0.037
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

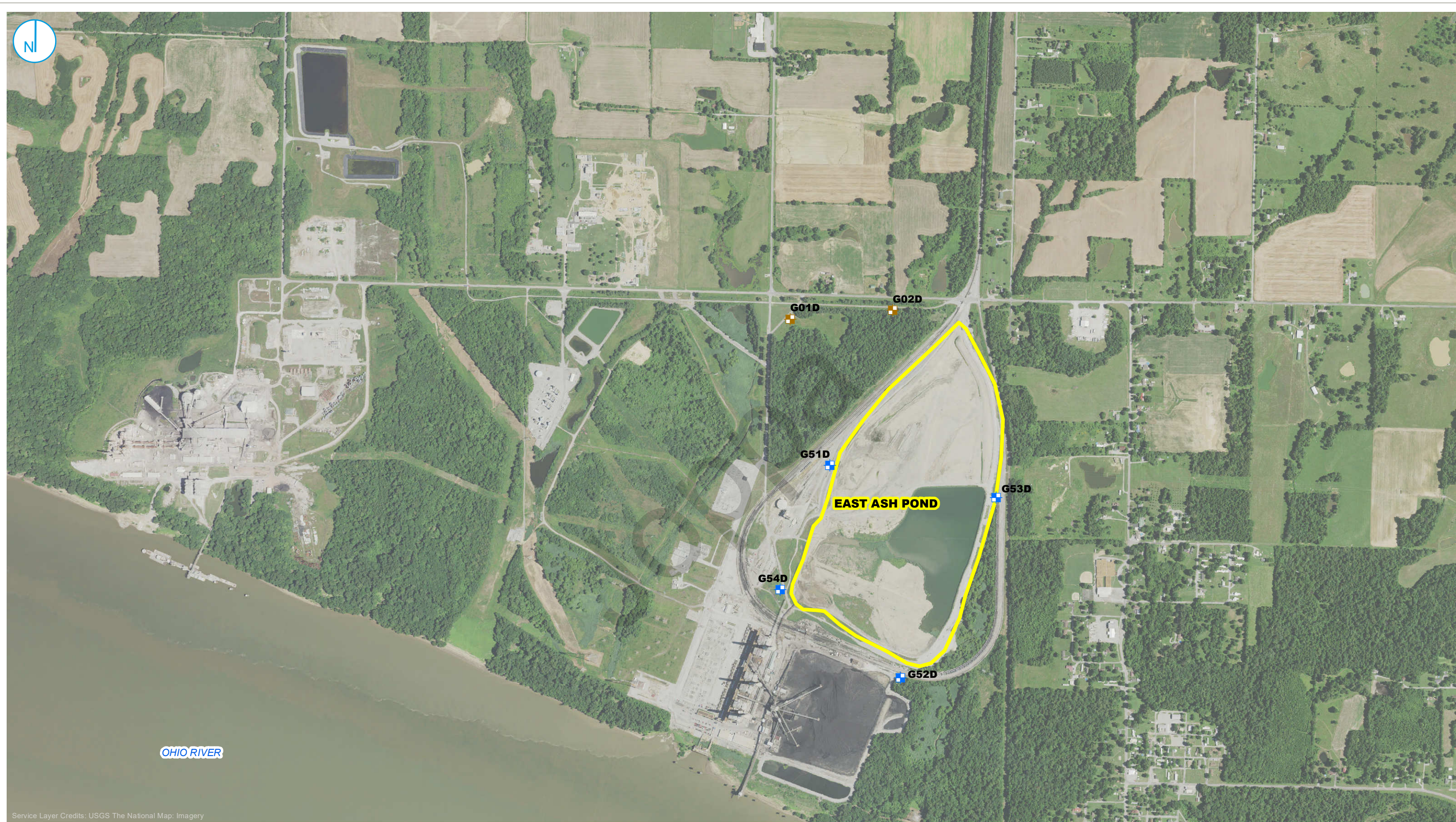
<sup>1</sup>Groundwater Protection Standard is the higher of the Maximum Contaminant Level / Health-Based Level or background.

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## FIGURES

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- BACKGROUND MONITORING WELL LOCATION
- DOWNGRAIDENT MONITORING WELL LOCATION
- CCR MONITORED UNIT



### MONITORING WELL LOCATION MAP JOPPA EAST ASH POND UNIT ID:401

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT  
VISTRA CCR RULE GROUNDWATER MONITORING  
JOPPA POWER STATION  
JOPPA, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.

