

Prepared for  
**Electric Energy, Inc.**

Date  
**January 31, 2022**

Project No.  
**1940100711-009**

**2021 ANNUAL GROUNDWATER  
MONITORING AND CORRECTIVE  
ACTION REPORT**  
**LANDFILL**  
**JOPPA POWER PLANT**  
**JOPPA, ILLINOIS**  
**CCR UNIT 402**

**2021 ANNUAL GROUNDWATER MONITORING AND  
CORRECTIVE ACTION REPORT  
JOPPA POWER PLANT LANDFILL**

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Approved by **Eric J. Tlachac**  
Description **Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

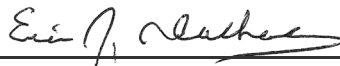
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## ACRONYMS AND ABBREVIATIONS

§	Section
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	coal combustion residuals
CMA	Corrective Measures Assessment
GWPS	groundwater protection standard
JPP	Joppa Power Plant
LF	Landfill
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SAP	Sampling and Analysis Plan
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TBD	to be determined

## 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.) Section (§) 257.90(e) for the Landfill (LF) located at Joppa Power Plant (JPP) near Joppa, Illinois.

Groundwater is being monitored at the LF in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94.

No changes were made to the monitoring system in 2021 (no wells were installed or decommissioned).

The following Statistically Significant Increases (SSIs) of 40 C.F.R. § 257 Appendix III parameter concentrations greater than background concentrations were determined:

- Chloride at well G105

Alternate Source Demonstrations (ASDs) were completed for the SSIs referenced above and the LF remains in the Detection Monitoring Program.

## 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 the LF located at the JPP 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 [Statistically Significant Level] 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 corrective measures assessment [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 the LF for calendar year 2021.

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

No changes have occurred to the monitoring program status in calendar year 2021 and the LF remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.



### 3. KEY ACTIONS COMPLETED IN 2021

The Detection Monitoring Program is summarized in **Table A** on the following page. The groundwater monitoring system, including the CCR unit and all background and compliance monitoring wells, is presented in **Figure 1**. No changes were made to the monitoring system in 2021. In general, one groundwater sample was collected from each background and compliance well during each monitoring event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (SAP; Natural Resource Technology, an OBG Company [NRT/OBG], 2017a). All monitoring data obtained under 40 C.F.R. § 257.90 through 257.98 (as applicable) in 2021, and analytical results for the September 2020 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 SSIs of Appendix III parameters relative to background concentrations.

Statistical background values are provided in **Table 3**. The background values reported in **Table 3** are slightly different from those reported previously because different software was utilized to calculate these values in 2021.

Potential alternate sources were evaluated as outlined in the 40 C.F.R. § 257.94(e)(2). ASDs were completed and certified by a qualified professional engineer. The dates the ASDs were completed are provided in **Table A**. The ASDs are included in **Appendix A**.

**Table A. 2020-2021 Detection Monitoring Program Summary**

<b>Sampling Date</b>	<b>Analytical Data Receipt Date</b>	<b>Parameters Collected</b>	<b>SSI(s)</b>	<b>SSI(s) Determination Date</b>	<b>ASD Completion Date</b>
September 23, 2020	October 16, 2020	Appendix III	Chloride at well G105	January 14, 2021	April 14, 2021
March 25, 2021	April 14, 2021	Appendix III	none	July 13, 2021	none
September 20, 2021	October 6, 2021	Appendix III	none	TBD	none

**Notes:**

TBD: to be determined

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

No problems were encountered with the Groundwater Monitoring Program during 2021. Groundwater samples were collected and analyzed in accordance with the SAP (NRT/OBG, 2017a), and all data were accepted.

## 5. KEY ACTIVITIES PLANNED FOR 2022

The following key activities are planned for 2022:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2022.
- Complete evaluation of analytical data from the compliance wells, using background data to determine whether an SSI of Appendix III parameters detected at concentrations greater than background concentrations has occurred.
- If an SSI is identified, potential alternate sources (*i.e.*, a source other than the CCR unit caused the SSI or that the SSI 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 SSI, a written demonstration will be completed within 90 days of SSI determination and included in the 2022 Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 C.F.R. § 257.94 through 257.98 as may apply in 2022 (*e.g.*, Assessment Monitoring) 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 Landfill, 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.

## **TABLES**

**TABLE 1**  
**GROUNDWATER ELEVATIONS**  
 2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT  
 JOPPA POWER PLANT  
 402 - LANDFILL  
 JOPPA, IL

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft BMP)	Groundwater Elevation (ft NAVD88)
G101	Compliance	37.22860	-88.87309	09/24/2020	45.03	330.26
G102	Compliance	37.22868	-88.87503	09/24/2020	57.35	329.96
				03/03/2021	Not Measured	
				03/24/2021	55.88	331.43
				09/20/2021	58.44	328.87
G105	Compliance	37.22754	-88.87587	09/24/2020	52.29	328.44
				03/03/2021	Not Measured	
				03/24/2021	53.38	327.35
				09/20/2021	57.28	323.45
G107	Compliance	37.22589	-88.87558	09/24/2020	56.66	320.67
				03/03/2021	Not Measured	
				03/24/2021	50.05	327.28
				09/20/2021	57.52	319.81
G109	Compliance	37.22579	-88.87461	09/24/2020	52.89	323.10
				03/03/2021	Not Measured	
				03/24/2021	49.35	326.64
				09/20/2021	54.18	321.81
G111	Compliance	37.22574	-88.87384	09/24/2020	50.69	322.95
				03/03/2021	Not Measured	
				03/24/2021	47.13	326.51

**Notes:**  
 BMP = below measuring point  
 ft = foot/feet  
 NAVD88 = North American Vertical Datum of 1988

**TABLE 2**  
**ANALYTICAL RESULTS - APPENDIX III PARAMETERS**  
 2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT  
 JOPPA POWER PLANT  
 402 - LANDFILL  
 JOPPA, IL

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (field) (SU)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
G101	Compliance	37.22860	-88.87309	09/23/2020	<0.025	9.42	4	0.28	6.5	37	184
				03/25/2021	<0.025	9.77	3	0.31	6.5	37	210
				09/20/2021	<0.025	9.85	4	0.28	6.4	36	188
G102	Compliance	37.22868	-88.87503	09/23/2020	<0.025	7.24	5	0.16	6.2	34	154
				03/25/2021	<0.025	6.47	5	0.21	6.5	35	176
				09/20/2021	<0.025	9	4	0.2	6.4	38	204
G105	Compliance	37.22754	-88.87587	09/23/2020	<0.025	31.8	70	0.15	6.2	16	268
				03/25/2021	<0.025	22.8	34	0.16	6.1	12	226
				09/20/2021	<0.025	28.5	52	0.15	6.1	13	244
G107	Compliance	37.22589	-88.87558	09/23/2020	0.0353	83.4	92	0.23	6.7	101	544
				03/25/2021	0.0291	76	102	0.2	6.5	54	510
				09/20/2021	0.0282	80.9	90	0.2	6.6	67	488
G109	Compliance	37.22579	-88.87461	09/23/2020	<0.025	25	15	0.23	6.6	42	236
				03/25/2021	<0.025	20.9	12	0.25	6.3	32	242
				09/20/2021	<0.025	17.4	17	0.21	6.5	27	196
G111	Compliance	37.22574	-88.87384	09/23/2020	<0.025	22.4	9	0.27	6.6	31	238
				03/25/2021	<0.025	20.6	6	0.23	6.4	33	230
				09/20/2021	<0.025	17.4	9	0.25	6.5	21	212

**Notes:**

mg/L = milligrams per liter

SU = 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 they are not utilized in statistics to determine Statistically Significant Increases (SSIs) over background

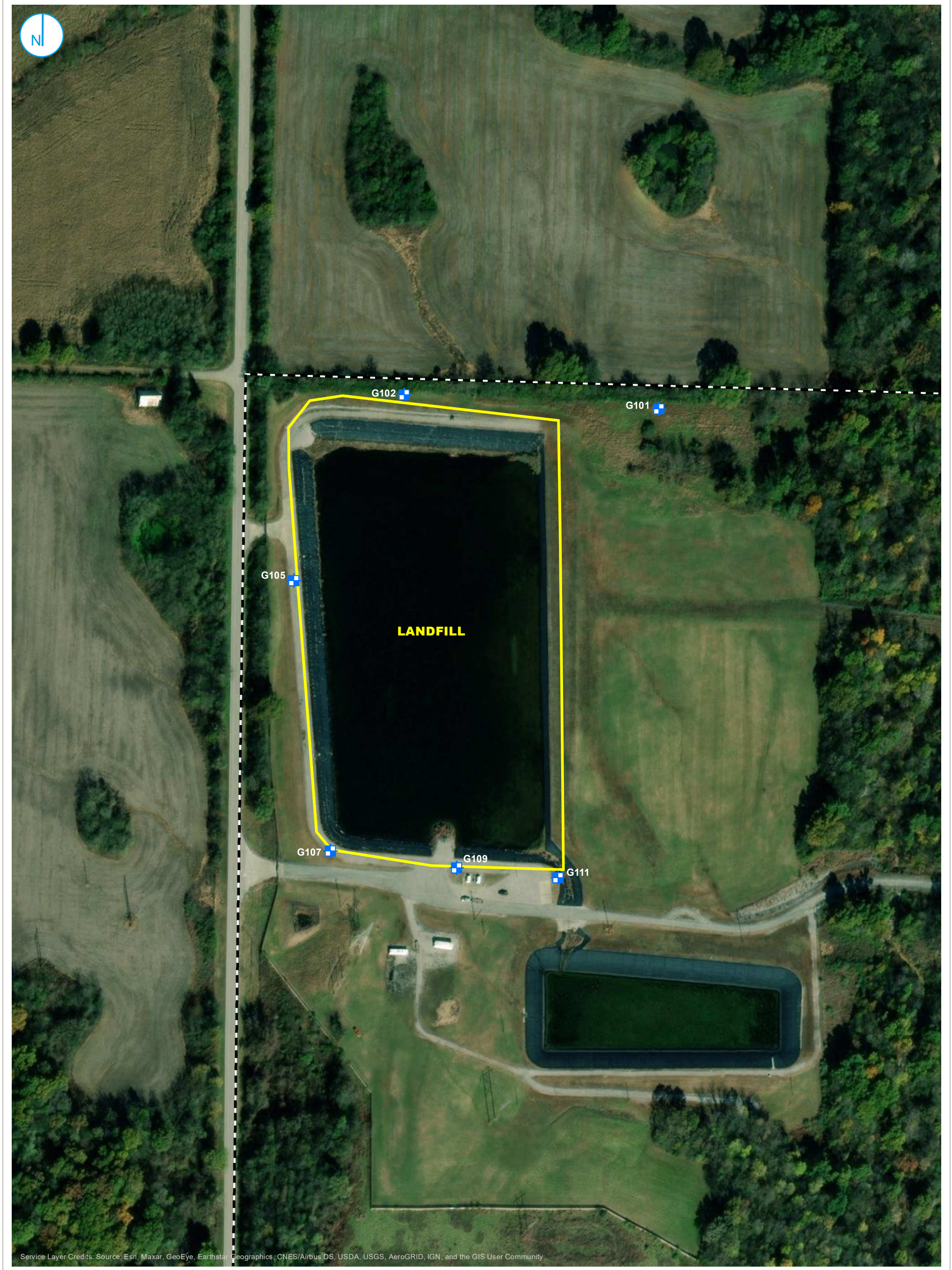


**TABLE 3**  
**STATISTICAL BACKGROUND VALUES**  
 2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT  
 JOPPA POWER PLANT  
 402 - LANDFILL  
 JOPPA, IL




Parameter	Well ID	Statistical Background Value (LPL/UPL)
40 C.F.R. Part 257 Appendix III		
Boron (mg/L)	G105	0.025
Boron (mg/L)	G107	0.0373
Boron (mg/L)	G109	0.0315
Boron (mg/L)	G111	0.0404
Calcium (mg/L)	G105	45.3
Calcium (mg/L)	G107	108
Calcium (mg/L)	G109	54.6
Calcium (mg/L)	G111	27.6
Chloride (mg/L)	G105	61.0
Chloride (mg/L)	G107	140
Chloride (mg/L)	G109	27.0
Chloride (mg/L)	G111	21.0
Fluoride (mg/L)	G105	0.290
Fluoride (mg/L)	G107	0.260
Fluoride (mg/L)	G109	0.390
Fluoride (mg/L)	G111	0.380
pH (field) (SU)	G105	5.8/6.7
pH (field) (SU)	G107	6.1/7.0
pH (field) (SU)	G109	6.1/7.1
pH (field) (SU)	G111	0.0/6.8
Sulfate (mg/L)	G105	16.0
Sulfate (mg/L)	G107	148
Sulfate (mg/L)	G109	95.4
Sulfate (mg/L)	G111	54.3
Total Dissolved Solids (mg/L)	G105	280
Total Dissolved Solids (mg/L)	G107	790
Total Dissolved Solids (mg/L)	G109	510
Total Dissolved Solids (mg/L)	G111	370

**Notes:**  
 40 C.F.R. = Title 40 of the Code of Federal Regulations  
 LPL = Lower Prediction Limit (applicable for pH only)  
 mg/L = milligrams per liter  
 SU = Standard Units  
 UPL = Upper Prediction Limit

## FIGURES



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

-  COMPLIANCE WELL
-  PART 257 REGULATED UNIT (SUBJECT UNIT)
-  PROPERTY BOUNDARY

### MONITORING WELL LOCATION MAP

FIGURE 1

0 100 200  
Feet

2021 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
**LANDFILL**  
JOPPA POWER PLANT  
JOPPA, ILLINOIS

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.



## **APPENDICES**

**APPENDIX A  
ALTERNATE SOURCE DEMONSTRATIONS**

Intended for  
**Electric Energy, Inc.**

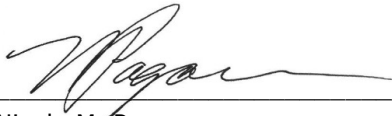
Date  
**April 14, 2021**

Project No.  
**1940100711-009**

# **40 C.F.R. § 257.94(E)(2): ALTERNATE SOURCE DEMONSTRATION JOPPA LANDFILL**

## CERTIFICATIONS

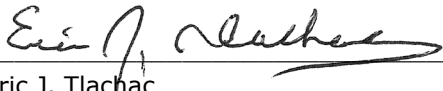
I, Nicole M. Pagano, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.



Nicole M. Pagano  
Professional Geologist  
196-000750  
Illinois  
Ramboll Americas Engineering Solutions, Inc.  
Date: April 14, 2021



I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report 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.  
Date: April 14, 2021



## ALTERNATE SOURCE DEMONSTRATION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of a Statistically Significant Increase (SSI) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Electric Energy, Inc., by Ramboll Americas Engineering Solutions, Inc. to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for Joppa Landfill located at Joppa Power Station near Joppa, Illinois.

The most recent Detection Monitoring sampling event (Detection Monitoring Round 7 [D7]) was completed on September 23, 2020, and analytical data were received on October 16, 2020. Analytical data from D7 were evaluated in accordance with the Statistical Analysis Plan<sup>1</sup> (NRT/OBG 2017) to determine any SSIs of Appendix III parameters over background concentrations. That evaluation identified SSIs at a downgradient monitoring well as follows:

- Chloride at well G105

Pursuant to 40 C.F.R. § 257.94(e)(2), Joppa Landfill is not the source of the SSI identified at well G105. Joppa Landfill was constructed in 2009 but never placed into service. Joppa Landfill has never received and does not contain CCR waste.

This ASD was completed by April 14, 2021, within 90 days of determination of the SSIs (January 14, 2021), as required by 40 C.F.R. § 257.94(e)(2).

<sup>1</sup> Natural Resource Technology, an OBG Company (NRT/OBG), 2017, Statistical Analysis Plan, Joppa Power Station, Electric Energy, Inc., October 17, 2017.