

2018 Annual Groundwater Monitoring and Corrective Action Report

Joppa East Ash Pond – CCR Unit ID 401
Joppa Power Station
2100 Portland Road
Joppa, Illinois 62953

Electric Energy, Inc.

January 31, 2019



JANUARY 31, 2019 | PROJECT #70091

2018 Annual Groundwater Monitoring and Corrective Action Report

Joppa East Ash Pond – CCR Unit ID 401
Joppa Power Station
Joppa, Illinois

Prepared for:
Electric Energy, Inc.



RACHEL A. BANOFF
Environmental Engineer



NATHANIEL R. KELLER, PG
Senior Hydrogeologist

TABLE OF CONTENTS

List of Figures.....	i
List of Tables.....	i
Acronyms and Abbreviations.....	ii
Section 1: Introduction.....	1
Section 2: Monitoring and Corrective Action Program Status.....	2
Section 3: Key Actions Completed in 2018.....	3
Section 4: Problems Encountered and Actions to Resolve the Problems.....	4
Section 5: Key Activities Planned for 2019.....	5
References.....	6

LIST OF FIGURES

Figure 1 Groundwater Sampling Well Location Map

LIST OF TABLES

Table 1 Statistical Background Values
Table 2 Groundwater Protection Standards
Table 3 Appendix III Analytical Results
Table 4 Appendix IV Analytical Results

ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, part of Ramboll
pCi/L	picoCuries per liter
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
S.U.	Standard Units
TDS	Total Dissolved Solids

Joppa

SECTION 1: INTRODUCTION

This report has been prepared on behalf of Electric Energy, Inc. by O'Brien & Gere Engineers, part of Ramboll (OBG), to provide the information required by the Code of Federal Regulations (CFR) found in 40 CFR 257.90(e) for the Joppa East Ash Pond located at Joppa Power Station near Joppa, Illinois.

In accordance with 40 CFR § 257.90(e), the owner or operator of an existing 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 over background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98¹.

This report provides the required information for the Joppa East Ash Pond for calendar year 2018.

¹ For calendar year 2018, corrective action and other information required to be included in the annual report as specified in §§ 257.96 through 257.98 is not applicable.

SECTION 2: MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

Detection Monitoring Program sampling event dates and parameters collected are provided in the detection monitoring program summary table below. One sample was collected from each background and downgradient well in the monitoring system during each sampling event. Analytical data was evaluated after each event in accordance with the Statistical Analysis Plan, Joppa Power Station, Electric Energy, Inc. (NRT/OBG, 2017a) to identify any statistically significant increases (SSIs) of Appendix III parameters over background concentrations. The sampling event and whether SSIs were identified are provided in the detection monitoring program summary table below.

Detection Monitoring Program Summary

Sampling Dates	Parameters Collected	SSIs	Assessment Monitoring Program Established
November 30, 2017	Appendix III	Yes	April 9, 2018

Alternate source evaluations were inconclusive for one or more of the SSIs. Consequently, and in accordance with 40 CFR § 257.94(e)(2), an Assessment Monitoring Program was established for Joppa East Ash Pond on April 9, 2018 and the required notifications completed.

The first Assessment Monitoring sampling event was completed on June 19, 2018. One sample was collected from each background and downgradient well in the monitoring system and analyzed for Appendix III and Appendix IV parameters. In accordance with 40 CFR § 257.95(d)(1), all wells were resampled on September 5, 2018 for all Appendix III parameters and Appendix IV parameters detected during the first Assessment Monitoring sampling event. One sample was collected from each background and downgradient well in the monitoring system. Analytical data from the resampling event was evaluated in accordance with the statistical analysis plan (NRT/OBG, 2017a) to determine any SSIs of Appendix III parameters over background concentrations or statistically significant levels (SSLs) of Appendix IV parameters over Groundwater Protection Standards (GWPSs). The assessment monitoring program summary table below provides a summary of the Assessment Monitoring Program and results of SSL determinations.

Assessment Monitoring Program Summary

Sampling Dates	Parameters Collected	SSLs
June 19, 2018	Appendix III Appendix IV	Not Applicable
September 5, 2018	Appendix III Appendix IV Detected	To Be Determined

Statistical background values are provided in Table 1 and GWPSs in Table 2. Analytical results from the events summarized in the detection and assessment monitoring summary tables above are included in Tables 3 and 4.

The Joppa East Ash Pond remains in the Assessment Monitoring Program in accordance with 40 CFR § 257.95.

SECTION 3: KEY ACTIONS COMPLETED IN 2018

Two groundwater monitoring events were completed in 2018 under the Assessment Monitoring Program. These events occurred in June and September, and are detailed in Section 2. One groundwater sample was collected from each background and downgradient well in the monitoring system during each event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017b). All monitoring data obtained under 40 CFR §§ 257.90 through 257.98 (as applicable) in 2018 are presented in Tables 3 and 4. The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1.

Joppa

SECTION 4: PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the groundwater monitoring program during 2018. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017b), and all data was accepted.

Joppa

SECTION 5: KEY ACTIVITIES PLANNED FOR 2019

The following key activities are planned for 2019:

- Continuation of the Assessment Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2019.
- 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 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 annual groundwater monitoring and corrective action report for 2019.
 - » If an alternate source(s) is not identified to be the cause of the SSL, the applicable requirements of 40 CFR §§ 257.94 through 257.98 (e.g., assessment of corrective measures) as may apply in 2019 will be met, including associated recordkeeping/notifications required by 40 CFR §§ 257.105 through 257.108.

Joppa

REFERENCES

Natural Resource Technology, an OBG Company, 2017a, Statistical Analysis Plan, Joppa Power Station, Electric Energy, Inc., October 17, 2017.

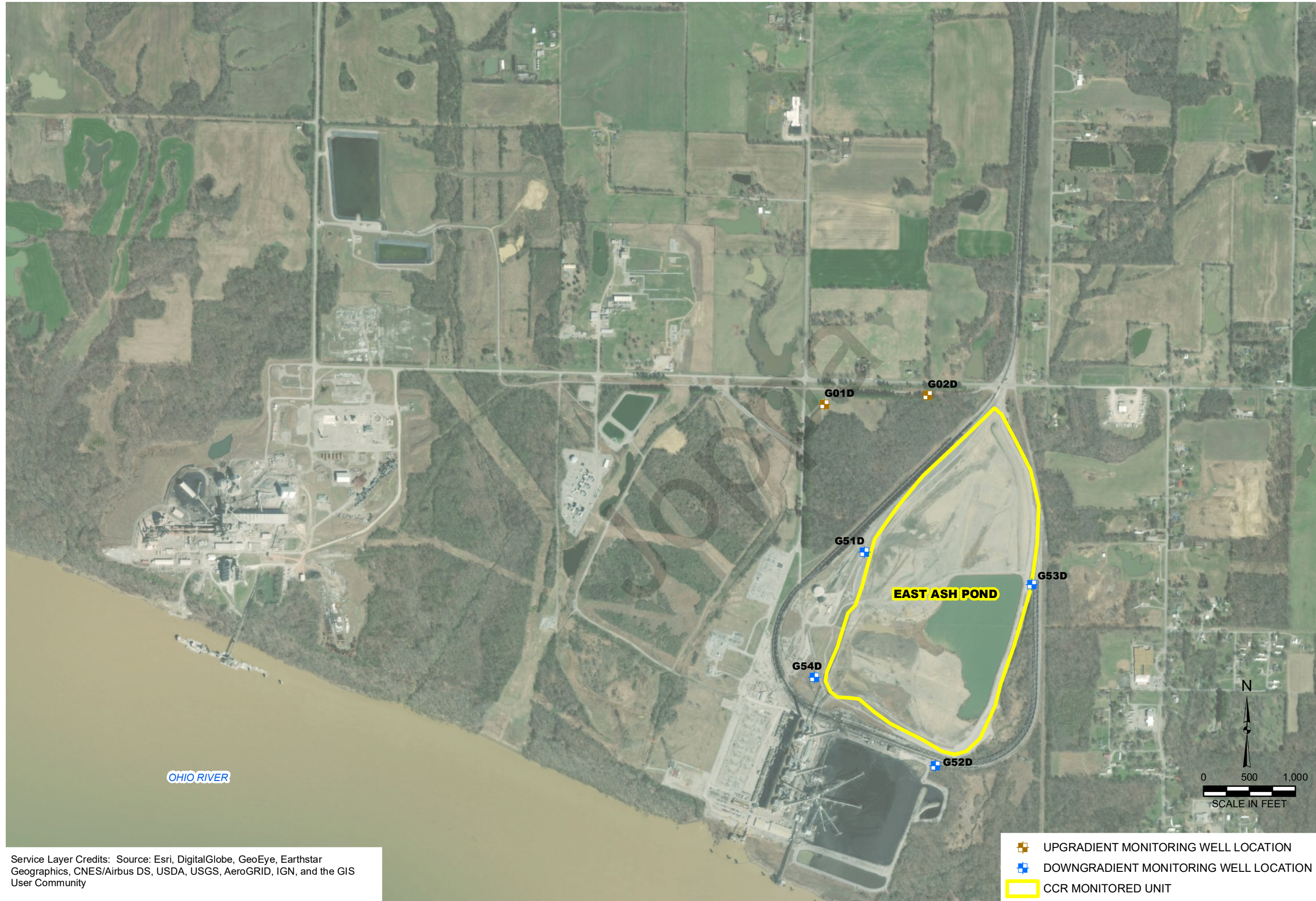
Natural Resource Technology, an OBG Company, 2017b, Sampling and Analysis Plan, Joppa East Ash Pond, Joppa Power Station, Joppa, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Joppa

Figures

Joppa

Y:\Mapping\Projects\222285\MXD\2018_AnnualGWM_CAR\Figure 1_CWS_WellLoc_JoppaE.mxd Author: stotzsd Date/Time: 1/28/2019, 1:54:21 PM



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

- UPGRADIENT MONITORING WELL LOCATION
- DOWNGRADIENT MONITORING WELL LOCATION
- CCR MONITORED UNIT

DRAWN BY/DATE:
SDS 11/28/18
REVIEWED BY/DATE:
AJB 1/24/19
APPROVED BY/DATE:
NRK 1/28/19

GROUNDWATER SAMPLING WELL LOCATION MAP
 JOPPA EAST ASH POND
 UNIT ID: 401
 2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
 VISTRA CCR RULE GROUNDWATER MONITORING
 JOPPA POWER STATION
 JOPPA, ILLINOIS

PROJECT NO: 70091

FIGURE NO: 1



Tables

Joppa

Table 1. Statistical Background Values

2018 Annual Groundwater Monitoring and Corrective Action Report

Joppa Power Station

Unit ID 401 - Joppa East Ash Pond

Parameter	Statistical Background Value
Appendix III	
Boron (mg/L)	0.0552
Calcium (mg/L)	46.072
Chloride (mg/L)	29
Fluoride (mg/L)	0.28
pH (S.U.)	6.2 / 6.9
Sulfate (mg/L)	180
TDS (mg/L)	526

[O: KLS 8/28/18, C: RAB 8/30/18]

Notes:

mg/L = milligrams per liter

S.U. = Standard Units

TDS = Total Dissolved Solids

Joppa

Table 2. Groundwater Protection Standards

2018 Annual Groundwater Monitoring and Corrective Action Report
Joppa Power Station
Unit ID 401 - Joppa East Ash Pond

Parameter	Groundwater Protection Standard
Appendix IV	
Antimony (mg/L)	0.006
Arsenic (mg/L)	0.01
Barium (mg/L)	2
Beryllium (mg/L)	0.004
Cadmium (mg/L)	0.005
Chromium (mg/L)	0.10
Cobalt (mg/L)	0.0366
Fluoride (mg/L)	4
Lead (mg/L)	0.015
Lithium (mg/L)	0.04
Mercury (mg/L)	0.002
Molybdenum (mg/L)	0.10
Selenium (mg/L)	0.05
Thallium (mg/L)	0.002
Radium 226+228 (pCi/L)	5

[O: KLS 8/28/18, C: RAB 8/30/18]

Notes:

mg/L = milligrams per liter

pCi/L = picoCuries per liter

Table 3. Appendix III Analytical Results

2018 Annual Groundwater Monitoring and Corrective Action Report

Joppa Power Station

Unit ID 401 - Joppa East Ash Pond

Sample Location	Date Sampled	B, total (mg/L)	Ca, total (mg/L)	Cl, total (mg/L)	F, total (mg/L)	pH (field) (S.U.)	SO4, total (mg/L)	TDS (mg/L)
Background / Upgradient Monitoring Wells								
G01D	11/30/2017	<0.025	37.2	18	0.22	6.8	117	450
	6/19/2018	<0.025	29.5	13	0.24	6.8	70	394
	9/5/2018	<0.025	30.5	14	0.20	7.0	94	414
G02D	11/30/2017	0.0496	40.1	23	0.21	6.9	17	246
	6/19/2018	0.0404	33.9	23	0.21	6.7	17	232
	9/5/2018	0.0468	36.3	23	0.18	6.6	19	252
Downgradient Monitoring Wells								
G51D	11/30/2017	0.302	34.4	8	<0.1	5.6	138	356
	6/19/2018	0.337	31.1	7	<0.1	5.7	124	324
	9/5/2018	0.263	29.1	7	<0.1	6.0	134	342
G52D	11/30/2017	<0.025	54.7	15	0.26	6.0	97	392
	6/19/2018	<0.025	50.1	15	0.26	6.4	97	388
	9/5/2018	<0.025	49.8	14	0.24	6.3	101	384
G53D	11/30/2017	0.427	44.6	20	0.74	6.6	98	348
	6/19/2018	0.361	37.8	18	0.66	6.6	84	360
	9/5/2018	0.392	40.3	20	0.61	6.8	81	390
G54D	11/30/2017	0.646	76.2	26	0.33	6.7	136	472
	6/19/2018	0.631	72.7	26	0.34	6.7	146	486
	9/5/2018	0.660	73.6	25	0.30	6.5	152	480

[O: RAB 12/27/18, C: JQW 12/27/18]

Notes:

mg/L = milligrams per liter

S.U. = Standard Units

TDS = Total Dissolved Solids

< = concentration is less than the reporting limit

Table 4. Appendix IV Analytical Results

2018 Annual Groundwater Monitoring and Corrective Action Report

Joppa Power Station

Unit ID 401 - Joppa East Ash Pond

Sample Location	Date Sampled	Sb, total (mg/L)	As, total (mg/L)	Ba, total (mg/L)	Be, total (mg/L)	Cd, total (mg/L)	Cr, total (mg/L)	Co, total (mg/L)	F, total (mg/L)	Pb, total (mg/L)	Li, total (mg/L)	Hg, total (mg/L)	Mo, total (mg/L)	Ra226/228 Combined (pCi/L)	Se, total (mg/L)	Tl, total (mg/L)
Background / Upgradient Monitoring Wells																
G01D	6/19/2018	<0.001	0.0019	0.202	<0.001	<0.001	0.0093	0.0057	0.24	0.0034	0.0038	<0.0002	<0.0015	1.41	<0.001	<0.002
	9/5/2018 ^a	NA	<0.001	0.147	NA	NA	0.0026	0.0022	0.20	<0.001	0.0017	NA	NA	0.37	0.001	NA
G02D	6/19/2018	<0.001	<0.001	0.245	<0.001	<0.001	<0.0015	<0.001	0.21	<0.001	<0.0015	<0.0002	<0.0015	0.92	0.0023	<0.002
	9/5/2018 ^a	NA	<0.001	0.209	NA	NA	<0.0015	<0.001	0.18	<0.001	<0.0015	NA	NA	0.46	0.002	NA
Downgradient Monitoring Wells																
G51D	6/19/2018	<0.001	<0.001	0.0756	<0.001	<0.001	<0.0015	0.0038	<0.1	<0.001	0.0070	<0.0002	<0.0015	1.22	0.0035	<0.002
	9/5/2018 ^a	NA	<0.001	0.0395	NA	NA	<0.0015	0.0043	<0.1	<0.001	0.0054	NA	NA	0.42	0.0036	NA
G52D	6/19/2018	<0.001	0.0025	0.340	<0.001	<0.001	<0.0015	0.0045	0.26	<0.001	0.0035	<0.0002	<0.0015	1.64	<0.001	<0.002
	9/5/2018 ^a	NA	0.0014	0.275	NA	NA	<0.0015	0.0019	0.24	<0.001	0.0032	NA	NA	0.68	<0.001	NA
G53D	6/19/2018	<0.001	<0.001	0.176	<0.001	<0.001	<0.0015	<0.001	0.66	<0.001	0.0019	<0.0002	<0.0015	0.77	<0.001	<0.002
	9/5/2018 ^a	NA	<0.001	0.133	NA	NA	<0.0015	0.0016	0.61	<0.001	0.0018	NA	NA	0.55	<0.001	NA
G54D	6/19/2018	<0.001	0.0019	0.196	<0.001	<0.001	0.0019	0.0134	0.34	<0.001	0.0060	<0.0002	<0.0015	1.00	<0.001	<0.002
	9/5/2018 ^a	NA	0.0010	0.131	NA	NA	0.002	0.0109	0.30	<0.001	0.0046	NA	NA	1.32	<0.001	NA

[O: RAB 12/27/18, C: JQW 12/27/18, U: AJB 1/28/19]

Notes:

mg/L = milligrams per liter

pCi/L = picoCuries per liter

NA = Not Applicable

< = concentration is less than the reporting limit

^aOnly the parameters detected during the previous sampling event were analyzed during this sampling event, in accordance with 40CFR § 257.95(d)(1).

Joppa