



Electric Energy, Inc  
1500 Eastport Plaza Dr.  
Collinsville, IL 62234

January 30, 2024

Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

**Re: Joppa East Ash Pond (IEPA ID: W127010004-02) 2023 Annual Consolidated Report**

Dear Mr. LeCrone:

In accordance with 35 IAC § 845.550, Energy Electric, Inc (EEI) is submitting the annual consolidated report for the Joppa East Ash Pond (IEPA ID: W127010004-02), as enclosed.

Sincerely,

A handwritten signature in blue ink that reads "Dianna Tickner".

Dianna Tickner  
Sr. Director Decommissioning & Demolition

Enclosures

Annual Consolidated Report  
Electric Energy, Inc  
Joppa Power Plant  
East Ash Pond; IEPA ID W127010004-02

In accordance with 35 IAC § 845.550, Electric Energy, Inc (EEI) has prepared the annual consolidated report. The report is provided in three sections as follows:

Section 1

1) Annual CCR fugitive dust control report (Section 845.500(c))

Section 2

2) Annual inspection report (Section 845.540(b)), including:

- A) Annual hazard potential classification certification
- B) Annual structural stability assessment certification
- C) Annual safety factor assessment certification
- D) Inflow design flood control system plan certification

Section 3

3) Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Section 1

Annual CCR Fugitive Dust Control Report

**Annual CCR Fugitive Dust Control Report**  
**for**  
**Retired Joppa Power Plant**

*Prepared for:*

**Vistra Corp.**


**Electric Energy Inc.  
2100 Portland Road  
Joppa, IL 62953**

**November 2023**



**Retired Joppa Power Plant  
ANNUAL CCR FUGITIVE DUST CONTROL REPORT**

Reporting Year: 4<sup>th</sup> Quarter 2022 through 3<sup>rd</sup> Quarter 2023

Signed by:  Plant Closure Manager  
 Name Title

This Annual CCR Fugitive Dust Control Report has been prepared for the Retired Joppa Power Plant in accordance with 40 CFR 257.80(c) and 35 IAC 845.500. Section 1 provides a description of the actions taken to control CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken. Section 2 provides a record of citizen complaints received concerning CCR fugitive dust at the facility during the reporting year, including a summary of any corrective measures taken.

**Section 1 Actions Taken to Control CCR Fugitive Dust**

In accordance with the Joppa Power Plant CCR Fugitive Dust Control Plan (Plan), the following measures were used to control CCR fugitive dust from becoming airborne at the facility during the reporting year:

CCR Activity	Actions Taken to Control CCR Fugitive Dust
Management of CCR in the facility's CCR units	CCR to be emplaced in the landfill will be conditioned before loading into vehicles for transport to the landfill.
	Water areas of exposed CCR in CCR units, as necessary.
	Naturally occurring grass vegetation in areas of exposed CCR in CCR surface impoundments.
	Apply chemical dust suppressant on areas of exposed CCR in CCR units, as necessary.
Handling of CCR at the facility	Pneumatically convey dry CCR fly ash to storage silos in an enclosed system.
	CCR fly ash to be emplaced in the landfill will be conditioned before loading into trucks for transport to the landfill.
	CCR fly ash to be placed in the surface impoundments is conditioned before loading into trucks for transport to the surface impoundments.
	Load CCR dry fly ash to transport trucks from the CCR fly ash silos using a telescoping chute.



**Retired Joppa Power Plant  
ANNUAL CCR FUGITIVE DUST CONTROL REPORT**

CCR Activity	Actions Taken to Control CCR Fugitive Dust
Handling of CCR at the facility	Perform housekeeping, as necessary, in the fly ash loading area.
	Operate fly ash handling system in accordance with good operating practices.
	Maintain and repair as necessary dust controls on the fly ash handling system.
Transportation of CCR at the facility	CCR to be emplaced in the landfill will be conditioned before loaded into vehicles for transport to the landfill.
	CCR fly ash to be placed in the surface impoundments is conditioned before loading into trucks for transport to the surface impoundments
	Cover or enclose trucks used to transport CCR onsite, as necessary.
	Limit the speed of vehicles to no more than 15 mph on facility roads.
	Sweep or rinse off the outside of the trucks transporting CCR, as necessary.
	Cover or enclose trucks used to transport CCR offsite.
	Water CCR haul roads, as necessary.
	Remove CCR deposited on facility road surfaces during transport as necessary.

Based on a review of the Plan and inspections associated with CCR fugitive dust control performed in the reporting year, the control measures identified in the Plan as implemented at the facility effectively minimized CCR from becoming airborne at the facility. Due to plant closure on Aug 31<sup>st</sup>, 2022, sluicing bottom ash and wet transport of ash to the landfill and at the CCR surface impoundments was removed from this report.

No material changes occurred in the reporting year in site conditions potentially resulting in CCR fugitive dust becoming airborne at the facility that warrant an amendment of the Plan.

**Section 2 Record of Citizen Complaints**

No citizen complaints were received regarding CCR fugitive dust at the Retired Joppa Power Plant in the reporting year.



## **Section 2**

Annual inspection report (Section 845.540(b)), including:

A) Annual hazard potential classification certification, if applicable (Section 845.440)

B) Annual structural stability assessment certification, if applicable (Section 845.450)

C) Annual safety factor assessment certification, if applicable (Section 845.460)

D) Inflow design flood control system plan certification (Section 845.510(c))

**ANNUAL INSPECTION BY A QUALIFIED PROFESSIONAL ENGINEER**  
**35 IAC § 845.540**

(b)(1) The CCR surface impoundment must be inspected on an annual basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR surface impoundment is consistent with recognized and generally accepted engineering standards. The inspection must, at a minimum, include:

A) A review of available information regarding the status and condition of the CCR surface impoundment, including files available in the operating record (e.g., CCR surface impoundment design and construction information required by Sections 845.220(a)(1) and 845.230(d)(2)(A), previous structural stability assessments required under Section 845.450, the results of inspections by a qualified person, and results of previous annual inspections);

B) A visual inspection of the CCR surface impoundment to identify signs of distress or malfunction of the CCR surface impoundment and appurtenant structures;

C) A visual inspection of any hydraulic structures underlying the base of the CCR surface impoundment or passing through the dike of the CCR surface impoundment for structural integrity and continued safe and reliable operation;

D) The annual hazard potential classification certification, if applicable (see Section 845.440);

E) The annual structural stability assessment certification, if applicable (see Section 845.450);

F) The annual safety factor assessment certification, if applicable (see Section 845.460); and

G) The inflow design flood control system plan certification (see Section 845.510(c)).

**SITE INFORMATION**

Site Name / Address / Date of Inspection	Electric Energy, Inc. Massac County, Illinois 62017 10/19/2023
Operator Name / Address	Luminant Generation Company LLC 6555 Sierra Drive, Irving, TX 75039
CCR unit	East Ash Pond

**INSPECTION REPORT 35 IAC § 845.540**

(b)(1)(D) The annual hazard potential classification certification, if applicable (see Section 845.440).	Based on a review of the CCR unit's annual hazard potential classification, the unit is classified as a Class I CCR surface impoundment.
(b)(2)(A) Any changes in geometry of the structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no changes in geometry of the structure have taken place since the previous annual inspection.
(b)(2)(B) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection	See the attached.
b)(2)(C) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;	See the attached.
b)(2)(D) The storage capacity of the impounding structure at the time of the inspection	Approximately 6400 acre-feet
(b)(2)(E) The approximate volume of the impounded water and CCR contained in the unit at the time of the inspection.	Approximately 4015 acre-feet
(b)(2)(F) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit	Based on a review of the CCR unit's records and visual observation during the on-site inspection, there was no appearance of an actual or potential structural weakness of the CCR unit, nor an existing condition that is disrupting or would disrupt the operation and safety of the unit.

(b)(2)(G) Any other changes that may have affected the stability or operation of the impounding structure since the previous annual inspection.	Based on a review of the CCR unit's records and visual observation during the on-site inspection, no other changes which may have affected the stability or operation of the CCR unit have taken place since the previous annual inspection.
(b)(1)(G) The inflow design flood control system plan certification (see Section 845.510(c))	Based on a review of the CCR unit's records, the CCR unit is designed, operated, and maintained to adequately manage the flow from the CCR impoundment and control the peak discharge from the inflow design flood.

**35 IAC § 845.540 - Annual inspection by a qualified professional engineer.**

I, James Knutelski, P.E., certify under penalty of law that the information submitted in this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Illinois. The information submitted, is to the best of my knowledge and belief, true, accurate and complete. Based on the annual inspection, the design, construction, operation, and maintenance of the CCR Unit is consistent with recognized and generally accepted good engineering standards. Based on a review of the records for the CCR unit and a visual inspection of the unit to document no material changes to the unit, the hazard potential classification was conducted in accordance with the requirements of Section 845.440, the structural stability assessment was conducted in accordance with the requirements of Section 845.450, the safety factor assessment was conducted in accordance with the requirements of Section 845.460, and the inflow design flood control system plan assessment was conducted in accordance with the requirements of Section 845.510.



James Knutelski, PE  
 Illinois PE No. 062-054206, Expires: 11/30/2025  
 Date: 01/07/2024

Site Name: Electric Energy, Inc.

CCR Unit: East Ash Pond

35 IAC § 845.540 (b)(2)(B)		
Instrument ID #	Type	Maximum recorded reading since previous annual inspection (ft)
JOP-P004	Piezometer	348.5'
JOP-P005	Piezometer	355.7'
JOP-P007	Piezometer	320.3'
JOP-P008	Piezometer	351.6'
JOP-P009	Piezometer	361.5'
JOP-P011	Piezometer	330.2'
JOP-P012	Piezometer	346.1'
JOP-P014	Piezometer	327.4'
JOP-P015	Piezometer	abandoned
JOP-P016	Piezometer	350.0'
JOP-P020	Piezometer	352.7'
JOP-P023	Piezometer	363.7'

35 IAC § 845.540 (b)(2)(C)						
Since previous inspection:	Approximate Depth / Elevation					
	Elevation (ft)			Depth (ft)		
	Minimum	Present	Maximum	Minimum	Present	Maximum
Impounded Water		364			19	
CCR	375		385	66		76

### **Section 3**

Annual Groundwater Monitoring and Corrective Action Report (Section 845.610(e))

Prepared for  
**Electric Energy, Inc.**

Date  
**January 31, 2024**

Project No.  
**1940103649-011**

**2023 35 I.A.C. § 845 ANNUAL  
GROUNDWATER MONITORING AND  
CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS  
IEPA ID NO. W1270100004-02**



**2023 35 I.A.C. § 845 ANNUAL GROUNDWATER  
MONITORING AND CORRECTIVE ACTION REPORT  
JOPPA POWER PLANT EAST ASH POND**

Project name **Joppa Power Plant East Ash Pond**  
Project no. **1940103649-011**  
Recipient **Electric Energy, Inc.**  
Document type **Annual Groundwater Monitoring and Corrective Action Report**  
Version **FINAL**  
Date **January 31, 2024**  
Prepared by **Melanie K. Conklin**  
Checked by **Lauren D. Cook**  
Approved by **Brian G. Hennings, PG**  
Description **Annual Report required by 35 I.A.C. § 845**

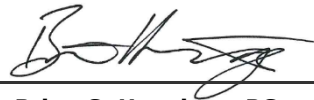
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**Melanie K. Conklin**  
Senior Project Engineer



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**Brian G. Hennings, PG**  
Project Officer, Hydrogeology

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### TABLES (IN TEXT)

Table A	35 I.A.C. § 845 Monitoring Program Summary for 2023
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### TABLES (ATTACHED)

Table 1	Field Parameters and Analytical Results - Quarter 2, 2023 Field Parameters and Analytical Results - Quarter 3, 2023 Field Parameters and Analytical Results - Quarter 4, 2023
Table 2	Comparison of Statistical Results to GWPS - Quarter 2, 2023 Comparison of Statistical Results to GWPS - Quarter 3, 2023 Comparison of Statistical Results to GWPS - Quarter 4, 2023

### FIGURES (ATTACHED)

Figure 1	Monitoring Well Location Map
Figure 2	GWPS Exceedance Map Uppermost Aquifer Quarters 2-4, 2023
Figure 3	Potentiometric Surface Map, April 1, 2023
Figure 4	Potentiometric Surface Map, May 1, 2023
Figure 5	Potentiometric Surface Map, June 10, 2023
Figure 6	Potentiometric Surface Map, July 10, 2023
Figure 7	Potentiometric Surface Map, August 25, 2023
Figure 8	Potentiometric Surface Map, September 25, 2023
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Figure 10	Potentiometric Surface Map, November 7-8, 2023
Figure 11	Potentiometric Surface Map, December 12, 2023

### ATTACHMENTS

Attachment A	Groundwater Elevation Data
Attachment B	Alternative Source Demonstration and IEPA Denial Letter
Attachment C	Corrective Measures Assessment Extension Request and IEPA Approval Letter
Attachment D	Comparison of Statistical Results to Background- Quarter 2, 2023 Comparison of Statistical Results to Background- Quarter 3, 2023 Comparison of Statistical Results to Background- Quarter 4, 2023

## ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
ASD	Alternative Source Demonstration
CCA	compliance commitment agreement
CCR	coal combustion residuals
CMA	assessment of corrective measures
E001	Quarter 2, 2023 sampling event
E002	Quarter 3, 2023 sampling event
E003	Quarter 4, 2023 sampling event
EAP	East Ash Pond
EEI	Electric Energy, Inc.
GWPS	groundwater protection standard
ID	identification
IEPA	Illinois Environmental Protection Agency
JPP	Joppa Power Plant
NID	National Inventory of Dams
No.	number
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	surface impoundment
SSI	statistically significant increase

## EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.610(e) (*Annual Groundwater Monitoring and Corrective Action Report*) for East Ash Pond (EAP) located at Joppa Power Plant (JPP) near Joppa, Illinois. The EAP is recognized by coal combustion residuals (CCR) unit identification (ID) number (No.) 401, Illinois Environmental Protection Agency (IEPA) ID No. W1270100004-02, and National Inventory of Dams (NID) No. IL50714.

As required by 35 I.A.C. § 845, an operating permit application for the EAP was submitted by Electric Energy, Inc. (EEI) to IEPA by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d) and is pending approval. The 35 I.A.C. § 845 groundwater monitoring in accordance with the proposed groundwater monitoring plan and sampling methodologies provided in the operating permit application for the EAP commenced in the second quarter of 2023. All available groundwater monitoring data collected in 2023 is summarized in **Table 1** (field parameters and analytical results) and **Attachment A** (groundwater elevation data). After the EAP has been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit.

In accordance with 35 I.A.C. § 845.610(b)(3)(C) and the statistical analysis plan submitted with the operating permit application (Appendix A of the Groundwater Monitoring Plan [Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021]), statistically derived values for constituent concentrations observed at compliance monitoring wells were compared with the groundwater protection standards (GWPSs) described in 35 I.A.C. § 845.600 to determine exceedances of the GWPS (**Table 2**). The following GWPS exceedances were determined:

- Boron in G06, G07, G08, G09, and G10
- Cobalt in G05
- pH in G11 and G51D

An Alternative Source Demonstration (ASD) was submitted on October 21, 2023 for the cobalt and pH GWPS exceedances detected during the Quarter 2, 2023 sampling event (**Attachment B**). Additional data to support the ASD, based on communication between EEI and IEPA, were submitted to IEPA on November 6, 2023. The IEPA provided a written response on November 16, 2023 that did not concur with the ASD. Therefore, the cobalt and pH GWPS exceedances, as well as the boron GWPS exceedances, will be addressed within an assessment of corrective measures (CMA) that was initiated on November 20, 2023. A CMA extension request was submitted to IEPA on November 21, 2023 and an addendum to the CMA extension request incorporating the cobalt and pH GWPS exceedances was submitted to IEPA on November 30, 2023. The CMA extension request and addendum were approved on December 11, 2023 (**Attachment C**). Because the CMA is in progress, a remedy has not yet been selected under 35 I.A.C. § 845.670 and remedial activities have not been initiated under 35 I.A.C. § 845.780 in 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(B), statistically derived values for constituent concentrations observed at compliance monitoring wells were also evaluated for statistical exceedances over background levels (**Attachment D**).

## 1. INTRODUCTION

This report has been prepared by Ramboll on behalf of EEI, to provide the information required by 35 I.A.C. § 845.610(e) for the EAP located at JPP near Joppa, Illinois. The owner or operator of a CCR surface impoundment (SI) must prepare and submit to IEPA by January 31<sup>st</sup> of each year an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year as part of the Annual Consolidated Report required by 35 I.A.C. § 845.550. The Annual Groundwater Monitoring and Corrective Action Report shall document the status of the groundwater monitoring and corrective action plan for the CCR SI (**Section 2**), summarize key actions completed, including the status of permit applications and Agency approvals (**Section 3**), describe any problems encountered and actions to resolve the problems (**Section 4**), and project key activities for the upcoming year (**Section 5**).

At a minimum, the annual report must contain the following information, to the extent available:

- A. A map, aerial image, or diagram showing the CCR SI and all background (or upgradient) and [downgradient] compliance monitoring wells, including the well identification numbers, that are part of the groundwater monitoring program for the CCR SI (**Figure 1**) and a visual delineation of any exceedances of the GWPS (**Figure 2**).
- B. 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 (**Section 3**, paragraph 1).
- C. A potentiometric surface map for each groundwater elevation sampling event required by 35 I.A.C. § 845.650(b)(2) (**Figures 3 through 11**).
- D. In addition to all the monitoring data obtained under 35 I.A.C. §§ 845.600-680, a summary including the number of groundwater samples that were collected for analysis for each background and [downgradient] compliance well, and the dates the samples were collected (**Section 3.1** and **Table A**).
- E. A narrative discussion of any statistically significant increases (SSIs) over background levels for the constituents listed in 35 I.A.C. § 845.600 (**Section 3.3** and **Attachment D**).
- F. Other information required to be included in the annual report as specified in 35 I.A.C. §§ 845.600-680.

A section at the beginning of the annual report that provides an overview of the current status of the groundwater monitoring program and corrective action plan for the CCR SI (see **Executive Summary**). At a minimum, the summary must:

- A. Specify whether groundwater monitoring data shows an SSI over background concentrations for one or more constituents listed in 35 I.A.C. § 845.600.
- B. Identify those constituents having an SSI over background concentrations and the names of the monitoring wells associated with the SSI(s).
- C. Specify whether there have been any exceedances of the GWPS for one or more constituents listed in 35 I.A.C. § 845.600.
- D. Identify those constituents with exceedances of the GWPS in 35 I.A.C. § 845.600 and the names of the monitoring wells associated with the exceedance.

- E. Provide the date when the CMA was initiated for the CCR SI.
- F. Provide the date when the CMA was completed for the CCR SI.
- G. Specify whether a remedy was selected under 35 I.A.C. § 845.670 during the current annual reporting period, and if so, the date of remedy selection.
- H. Specify whether remedial activities were initiated or are ongoing under 35 I.A.C. § 845.780 during the current annual reporting period.

This report provides the required information for the EAP for calendar year 2023.

## 2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

An operating permit application for the EAP was submitted by EEI to IEPA by October 31, 2021 in accordance with the requirements specified in 35 I.A.C. § 845.230(d) and is pending approval. The 35 I.A.C. § 845 groundwater monitoring in accordance with the proposed groundwater monitoring plan and sampling methodologies provided in the operating permit application for the EAP commenced in the second quarter of 2023. After the EAP has been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit.

A construction permit application for the EAP was also submitted by EEI to IEPA on July 28, 2022 in accordance with the requirements specified in 35 I.A.C. § 845.220(a) and (d) and is pending approval.

As noted in the **Executive Summary** and **Section 3.2**, GWPS exceedances were determined for the EAP in 2023. An ASD was submitted and denied for the GWPS exceedances of cobalt and pH (**Attachment B**). Therefore, the cobalt and pH exceedance and the remaining GWPS exceedances will be addressed in accordance with 35 I.A.C. § 845.660. The CMA was initiated on November 20, 2023. A CMA extension request was submitted to IEPA on November 21, 2023 and an addendum to the CMA extension request incorporating the cobalt and pH GWPS exceedances was submitted to IEPA on November 30, 2023. The CMA extension request and addendum were approved on December 11, 2023 (**Attachment C**). Because the CMA is in progress, a remedy has not yet been selected under 35 I.A.C. § 845.670 and remedial activities have not been initiated under 35 I.A.C. § 845.780 in 2023.

### 3. KEY ACTIONS COMPLETED IN 2023

The proposed 35 I.A.C. § 845 monitoring system is presented in **Figure 1**. No wells were installed or decommissioned in 2023.

Monitoring well inspections and redevelopment of the monitoring wells that were not sampled in 2022 were also completed prior to initiating groundwater monitoring in the second quarter of 2023.

Pressure transducers equipped with data loggers were deployed in monitoring system monitoring wells for measurement of monthly water level elevations as required by 35 I.A.C. § 845.650(b)(2). **Attachment A** summarizes the groundwater elevation data collected in 2023<sup>1</sup>. Potentiometric surfaces for April through December 2023 are included in **Figures 3 through 11**.

A summary of the samples collected in 2023 is included in **Section 3.1**. Narrative discussions of exceedances of GWPSs and background are included in **Section 3.2** and **Section 3.3**, respectively. Statistical procedures used to evaluate groundwater results are provided in Appendix A of the Groundwater Monitoring Plan provided in the operating permit application (Ramboll, 2021).

#### 3.1 Sample and Analysis Summary

One groundwater sample was collected from each background and compliance well during each quarterly monitoring event beginning in the second quarter of 2023. All samples were collected and analyzed in accordance with the Groundwater Monitoring Plan provided in the operating permit application (Ramboll, 2021). A summary of the samples collected from background and compliance monitoring wells in 2023 is included in **Table A** on the following page. **Table 1** is a summary of the field parameters and analytical results from the 2023 sampling events. Laboratory analytical reports and field data sheets are attached to the quarterly Groundwater Monitoring Data and Detected Exceedances Reports for Quarter 2, Quarter 3, and Quarter 4 (Ramboll, 2023; Ramboll, 2024a; Ramboll, 2024b); therefore, these reports are not attached to this annual report to avoid reproduction of lengthy data transmittals that have been previously provided in hardcopy.

<sup>1</sup> During the 2023 monitoring events, groundwater elevation could not be measured at monitoring location SG02. With exception of the May 2023 monitoring event, groundwater elevation data was not available at monitoring location XSG01 due to insufficient water.



**Table A. 35 I.A.C. § 845 Monitoring Program Summary for 2023**

<b>Event ID</b>	<b>Sampling Dates <sup>1, 2, 3</sup></b>	<b>Analytical Data Receipt Date</b>	<b>Exceedance Determination Date</b>	<b>ASD Completion Date</b>	<b>Required CMA Initiation Date <sup>4</sup></b>
E001	May 2 - 3, 2023	June 23, 2023	August 22, 2023	October 21, 2023	November 20, 2023
E002	September 25 - 27, 2023	November 16, 2023	January 15, 2024	NA	NA
E003	October 23 and 25, 2023	December 1, 2023	January 30, 2024	NA	NA

**Notes:**

NA: not applicable

<sup>1</sup> All samples were analyzed for the parameters listed in 35 I.A.C. § 845.600, calcium, and turbidity.

<sup>2</sup> The following background wells were sampled for each event: G01D and G02D.

<sup>3</sup> The following compliance wells were sampled for each event: G03, G05, G06, G07, G08, G09, G10, G11, G51D, G52D, G53D, and G54D.

<sup>5</sup> Exceedances for events E002 and E003 may be incorporated into the CMA initiated after event E001 on a case by case basis, as opposed to generating a new CMA.

### 3.2 Exceedances of GWPS

In accordance with 35 I.A.C. § 845.610(b)(3)(C), the statistically derived values identified as Statistical Results in **Table 2** were compared with the GWPSs described in 35 I.A.C. § 845.600 to determine exceedances of the GWPS. The following statistical exceedances of the GWPSs were determined and are shown on **Figure 2**:

- Boron in G06, G07, G08, G09, and G10
- Cobalt in G05
- pH in G11 and G51D

As allowed in 35 I.A.C. § 845.650(e), an ASD was submitted on October 21, 2023 for the cobalt and pH GWPS exceedances detected during the Quarter 2, 2023 sampling event. Additional data to support the ASD, based on communication between EEI and IEPA, were submitted to IEPA on November 6, 2023 (**Attachment B**). The ASD was denied by the IEPA on November 16, 2023. Therefore, the cobalt and pH GWPS exceedances, as well as the boron GWPS exceedances, will be addressed within the CMA that was initiated on November 20, 2023. A CMA extension request was submitted to IEPA on November 21, 2023 and an addendum to the CMA extension request incorporating the cobalt and pH GWPS exceedances was submitted to IEPA on November 30, 2023. The CMA extension request and addendum were approved on December 11, 2023 (**Attachment C**). Because the CMA is in progress, a remedy was not selected under 35 I.A.C. § 845.670 and remedial activities have not been initiated under 35 I.A.C. § 845.780 in 2023.

### 3.3 Exceedances of Background

In accordance with 35 I.A.C. § 845.610(b)(3)(B), groundwater monitoring data were evaluated quarterly for statistical exceedances over background levels for the constituents listed in 35 I.A.C. § 845.600. **Attachment D** shows the statistically derived values compared to background levels.

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

Groundwater monitoring commenced in the second quarter of 2023. Groundwater samples were collected and analyzed in accordance with the Groundwater Monitoring Plan provided in the operating permit application (Ramboll, 2021) and all data were accepted. After the EAP has been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit.

Due to malfunctioning pressure transducers, data gaps exist in monthly water level elevations prior to the fourth quarter. Monthly depth to water measurements were collected manually in the fourth quarter. Pressure transducers were refurbished and were redeployed in January 2024.

## 5. KEY ACTIVITIES PLANNED FOR 2024

The following key activities are planned for 2024:

- Continuation of groundwater monitoring in accordance with the proposed groundwater monitoring plan and sampling methodologies provided in the operating permit application for the EAP. After the EAP has been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit. Groundwater monitoring will include:
  - Monthly groundwater elevations
  - Quarterly groundwater sampling
- Complete evaluation of analytical data from the compliance wells to determine whether exceedances above GWPSs have occurred.
  - If a GWPS exceedance is identified, potential alternative sources (*i.e.*, a source other than the CCR unit caused the GWPS exceedance or that the exceedance resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated.
  - If an alternative source is identified to be the cause of the GWPS exceedance, a written demonstration will be completed within 60 days of determination and included in the 2024 Annual Groundwater Monitoring and Corrective Action Report.
  - If an alternative source(s) is not identified to be the cause of the GWPS exceedance, the applicable requirements of 35 I.A.C. § 845.660 (*i.e.*, CMA) will be met.
- The CMA process will continue in accordance with 35 I.A.C. § 845.660 in 2024. A CMA extension request was submitted to IEPA on November 21, 2023 and an addendum to the CMA extension request incorporating the cobalt and pH GWPS exceedances was submitted to IEPA on November 30, 2023. The CMA extension request and addendum were approved on December 11, 2023. The CMA will be submitted to IEPA on or before April 18, 2024.

## 6. REFERENCES

Illinois Administrative Code, Title 35, Subtitle G, Chapter I, Subchapter J, Part 845: Standards for The Disposal Of Coal Combustion Residuals In Surface Impoundments, effective April 21, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. *Groundwater Monitoring Plan*. Joppa Power Plant, East Ash Pond, Joppa, Illinois. Electric Energy, Inc. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2023. *35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2*, East Ash Pond, Joppa Power Plant, Joppa, Illinois. August 22, 2023.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2024a. *35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 3*, East Ash Pond, Joppa Power Plant, Joppa, Illinois. January 15, 2024.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2024b. *35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 4*, East Ash Pond, Joppa Power Plant, Joppa, Illinois. January 30, 2024.

## **TABLES**

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G01D	Background	E001	05/02/2023	Antimony, total	0.0009 J	mg/L
G01D	Background	E001	05/02/2023	Arsenic, total	0.0087 U	mg/L
G01D	Background	E001	05/02/2023	Barium, total	0.213	mg/L
G01D	Background	E001	05/02/2023	Beryllium, total	0.0002 J	mg/L
G01D	Background	E001	05/02/2023	Boron, total	0.0210	mg/L
G01D	Background	E001	05/02/2023	Cadmium, total	0.0005 U	mg/L
G01D	Background	E001	05/02/2023	Calcium, total	28.8	mg/L
G01D	Background	E001	05/02/2023	Chloride, total	10.0	mg/L
G01D	Background	E001	05/02/2023	Chromium, total	0.00500	mg/L
G01D	Background	E001	05/02/2023	Cobalt, total	0.00580	mg/L
G01D	Background	E001	05/02/2023	Dissolved Oxygen	8.50	mg/L
G01D	Background	E001	05/02/2023	Fluoride, total	0.220	mg/L
G01D	Background	E001	05/02/2023	Lead, total	0.004 U	mg/L
G01D	Background	E001	05/02/2023	Lithium, total	0.019 U	mg/L
G01D	Background	E001	05/02/2023	Mercury, total	0.00006 U	mg/L
G01D	Background	E001	05/02/2023	Molybdenum, total	0.0037 U	mg/L
G01D	Background	E001	05/02/2023	Oxidation Reduction Potential	145	mV
G01D	Background	E001	05/02/2023	Selenium, total	0.00150	mg/L
G01D	Background	E001	05/02/2023	Specific Conductance @ 25C (field)	682	micromhos/cm
G01D	Background	E001	05/02/2023	Sulfate, total	26.0	mg/L
G01D	Background	E001	05/02/2023	Temperature	15.5	degrees C
G01D	Background	E001	05/02/2023	Thallium, total	0.001 U	mg/L
G01D	Background	E001	05/02/2023	Total Dissolved Solids	336	mg/L
G01D	Background	E001	05/02/2023	Turbidity, field	23.0	NTU
G01D	Background	E001	05/02/2023	pH (field)	6.3	SU
G02D	Background	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G02D	Background	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G02D	Background	E001	05/03/2023	Barium, total	0.210	mg/L
G02D	Background	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G02D	Background	E001	05/03/2023	Boron, total	0.0412	mg/L
G02D	Background	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G02D	Background	E001	05/03/2023	Calcium, total	38.7	mg/L
G02D	Background	E001	05/03/2023	Chloride, total	21.0	mg/L
G02D	Background	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G02D	Background	E001	05/03/2023	Cobalt, total	0.0001 U	mg/L
G02D	Background	E001	05/03/2023	Dissolved Oxygen	20.2	mg/L
G02D	Background	E001	05/03/2023	Fluoride, total	0.220	mg/L
G02D	Background	E001	05/03/2023	Lead, total	0.004 U	mg/L
G02D	Background	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G02D	Background	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G02D	Background	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G02D	Background	E001	05/03/2023	Oxidation Reduction Potential	182	mV
G02D	Background	E001	05/03/2023	Selenium, total	0.00160	mg/L
G02D	Background	E001	05/03/2023	Specific Conductance @ 25C (field)	494	micromhos/cm
G02D	Background	E001	05/03/2023	Sulfate, total	13.0	mg/L
G02D	Background	E001	05/03/2023	Temperature	14.3	degrees C

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G02D	Background	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G02D	Background	E001	05/03/2023	Total Dissolved Solids	230	mg/L
G02D	Background	E001	05/03/2023	Turbidity, field	1.30	NTU
G02D	Background	E001	05/03/2023	pH (field)	6.5	SU
G03	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G03	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G03	Compliance	E001	05/03/2023	Barium, total	0.100	mg/L
G03	Compliance	E001	05/03/2023	Beryllium, total	0.00100	mg/L
G03	Compliance	E001	05/03/2023	Boron, total	0.380	mg/L
G03	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G03	Compliance	E001	05/03/2023	Calcium, total	52.6	mg/L
G03	Compliance	E001	05/03/2023	Chloride, total	28.0	mg/L
G03	Compliance	E001	05/03/2023	Chromium, total	0.0235	mg/L
G03	Compliance	E001	05/03/2023	Cobalt, total	0.0146	mg/L
G03	Compliance	E001	05/03/2023	Dissolved Oxygen	37.8	mg/L
G03	Compliance	E001	05/03/2023	Fluoride, total	0.200	mg/L
G03	Compliance	E001	05/03/2023	Lead, total	0.0058 J	mg/L
G03	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G03	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G03	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G03	Compliance	E001	05/03/2023	Oxidation Reduction Potential	226	mV
G03	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G03	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	674	micromhos/cm
G03	Compliance	E001	05/03/2023	Sulfate, total	97.0 J-	mg/L
G03	Compliance	E001	05/03/2023	Temperature	15.3	degrees C
G03	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G03	Compliance	E001	05/03/2023	Total Dissolved Solids	350	mg/L
G03	Compliance	E001	05/03/2023	Turbidity, field	130	NTU
G03	Compliance	E001	05/03/2023	pH (field)	6.2	SU
G05	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G05	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G05	Compliance	E001	05/03/2023	Barium, total	0.212	mg/L
G05	Compliance	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G05	Compliance	E001	05/03/2023	Boron, total	0.0478	mg/L
G05	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G05	Compliance	E001	05/03/2023	Calcium, total	54.4	mg/L
G05	Compliance	E001	05/03/2023	Chloride, total	24.0	mg/L
G05	Compliance	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G05	Compliance	E001	05/03/2023	Cobalt, total	0.0103	mg/L
G05	Compliance	E001	05/03/2023	Dissolved Oxygen	24.8	mg/L
G05	Compliance	E001	05/03/2023	Fluoride, total	0.380	mg/L
G05	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G05	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G05	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G05	Compliance	E001	05/03/2023	Molybdenum, total	0.0051 J	mg/L
G05	Compliance	E001	05/03/2023	Oxidation Reduction Potential	128	mV



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G05	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G05	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	754	micromhos/cm
G05	Compliance	E001	05/03/2023	Sulfate, total	112	mg/L
G05	Compliance	E001	05/03/2023	Temperature	17.1	degrees C
G05	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G05	Compliance	E001	05/03/2023	Total Dissolved Solids	388	mg/L
G05	Compliance	E001	05/03/2023	Turbidity, field	7.00	NTU
G05	Compliance	E001	05/03/2023	pH (field)	6.5	SU
G06	Compliance	E001	05/03/2023	Antimony, total	0.00150	mg/L
G06	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G06	Compliance	E001	05/03/2023	Barium, total	0.0454	mg/L
G06	Compliance	E001	05/03/2023	Beryllium, total	0.0003 J	mg/L
G06	Compliance	E001	05/03/2023	Boron, total	3.28	mg/L
G06	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G06	Compliance	E001	05/03/2023	Calcium, total	92.5	mg/L
G06	Compliance	E001	05/03/2023	Chloride, total	22.0	mg/L
G06	Compliance	E001	05/03/2023	Chromium, total	0.00840	mg/L
G06	Compliance	E001	05/03/2023	Cobalt, total	0.00400	mg/L
G06	Compliance	E001	05/03/2023	Dissolved Oxygen	16.4	mg/L
G06	Compliance	E001	05/03/2023	Fluoride, total	0.260	mg/L
G06	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G06	Compliance	E001	05/03/2023	Lithium, total	0.0095 U	mg/L
G06	Compliance	E001	05/03/2023	Mercury, total	0.0001 J	mg/L
G06	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G06	Compliance	E001	05/03/2023	Oxidation Reduction Potential	141	mV
G06	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G06	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,010	micromhos/cm
G06	Compliance	E001	05/03/2023	Sulfate, total	208	mg/L
G06	Compliance	E001	05/03/2023	Temperature	15.7	degrees C
G06	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G06	Compliance	E001	05/03/2023	Total Dissolved Solids	525	mg/L
G06	Compliance	E001	05/03/2023	Turbidity, field	54.0	NTU
G06	Compliance	E001	05/03/2023	pH (field)	6.6	SU
G07	Compliance	E001	05/03/2023	Antimony, total	0.0006 J	mg/L
G07	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G07	Compliance	E001	05/03/2023	Barium, total	0.215	mg/L
G07	Compliance	E001	05/03/2023	Beryllium, total	0.00140	mg/L
G07	Compliance	E001	05/03/2023	Boron, total	4.27	mg/L
G07	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G07	Compliance	E001	05/03/2023	Calcium, total	97.3	mg/L
G07	Compliance	E001	05/03/2023	Chloride, total	22.0	mg/L
G07	Compliance	E001	05/03/2023	Chromium, total	0.0365	mg/L
G07	Compliance	E001	05/03/2023	Cobalt, total	0.00780	mg/L
G07	Compliance	E001	05/03/2023	Dissolved Oxygen	11.4	mg/L
G07	Compliance	E001	05/03/2023	Fluoride, total	0.400	mg/L
G07	Compliance	E001	05/03/2023	Lead, total	0.006 J	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G07	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G07	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G07	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G07	Compliance	E001	05/03/2023	Oxidation Reduction Potential	161	mV
G07	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G07	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,050	micromhos/cm
G07	Compliance	E001	05/03/2023	Sulfate, total	260	mg/L
G07	Compliance	E001	05/03/2023	Temperature	15.6	degrees C
G07	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G07	Compliance	E001	05/03/2023	Total Dissolved Solids	590	mg/L
G07	Compliance	E001	05/03/2023	Turbidity, field	170	NTU
G07	Compliance	E001	05/03/2023	pH (field)	6.4	SU
G08	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G08	Compliance	E001	05/03/2023	Arsenic, total	0.0112	mg/L
G08	Compliance	E001	05/03/2023	Barium, total	0.0974	mg/L
G08	Compliance	E001	05/03/2023	Beryllium, total	0.000500	mg/L
G08	Compliance	E001	05/03/2023	Boron, total	5.43	mg/L
G08	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G08	Compliance	E001	05/03/2023	Calcium, total	140	mg/L
G08	Compliance	E001	05/03/2023	Chloride, total	16.0	mg/L
G08	Compliance	E001	05/03/2023	Chromium, total	0.00930	mg/L
G08	Compliance	E001	05/03/2023	Cobalt, total	0.0113	mg/L
G08	Compliance	E001	05/03/2023	Dissolved Oxygen	35.4	mg/L
G08	Compliance	E001	05/03/2023	Fluoride, total	0.290	mg/L
G08	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G08	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G08	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G08	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G08	Compliance	E001	05/03/2023	Oxidation Reduction Potential	130	mV
G08	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G08	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,230	micromhos/cm
G08	Compliance	E001	05/03/2023	Sulfate, total	363	mg/L
G08	Compliance	E001	05/03/2023	Temperature	17.3	degrees C
G08	Compliance	E001	05/03/2023	Thallium, total	0.0013 J	mg/L
G08	Compliance	E001	05/03/2023	Total Dissolved Solids	714	mg/L
G08	Compliance	E001	05/03/2023	Turbidity, field	36.0	NTU
G08	Compliance	E001	05/03/2023	pH (field)	6.9	SU
G09	Compliance	E001	05/03/2023	Antimony, total	0.00370	mg/L
G09	Compliance	E001	05/03/2023	Arsenic, total	0.0091 J	mg/L
G09	Compliance	E001	05/03/2023	Barium, total	0.0560	mg/L
G09	Compliance	E001	05/03/2023	Beryllium, total	0.000800	mg/L
G09	Compliance	E001	05/03/2023	Boron, total	3.87	mg/L
G09	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G09	Compliance	E001	05/03/2023	Calcium, total	67.2	mg/L
G09	Compliance	E001	05/03/2023	Chloride, total	20.0	mg/L
G09	Compliance	E001	05/03/2023	Chromium, total	0.00840	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G09	Compliance	E001	05/03/2023	Cobalt, total	0.00710	mg/L
G09	Compliance	E001	05/03/2023	Dissolved Oxygen	9.10	mg/L
G09	Compliance	E001	05/03/2023	Fluoride, total	0.340	mg/L
G09	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G09	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G09	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G09	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G09	Compliance	E001	05/03/2023	Oxidation Reduction Potential	13.0	mV
G09	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G09	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	946	micromhos/cm
G09	Compliance	E001	05/03/2023	Sulfate, total	241	mg/L
G09	Compliance	E001	05/03/2023	Temperature	16.9	degrees C
G09	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G09	Compliance	E001	05/03/2023	Total Dissolved Solids	534 J	mg/L
G09	Compliance	E001	05/03/2023	Turbidity, field	58.0	NTU
G09	Compliance	E001	05/03/2023	pH (field)	6.4	SU
G10	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G10	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G10	Compliance	E001	05/03/2023	Barium, total	0.0624	mg/L
G10	Compliance	E001	05/03/2023	Beryllium, total	0.000700	mg/L
G10	Compliance	E001	05/03/2023	Boron, total	3.08	mg/L
G10	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G10	Compliance	E001	05/03/2023	Calcium, total	124	mg/L
G10	Compliance	E001	05/03/2023	Chloride, total	27.0	mg/L
G10	Compliance	E001	05/03/2023	Chromium, total	0.0158	mg/L
G10	Compliance	E001	05/03/2023	Cobalt, total	0.00580	mg/L
G10	Compliance	E001	05/03/2023	Dissolved Oxygen	28.0	mg/L
G10	Compliance	E001	05/03/2023	Fluoride, total	0.300	mg/L
G10	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G10	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G10	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G10	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G10	Compliance	E001	05/03/2023	Oxidation Reduction Potential	135	mV
G10	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G10	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,450	micromhos/cm
G10	Compliance	E001	05/03/2023	Sulfate, total	365	mg/L
G10	Compliance	E001	05/03/2023	Temperature	17.1	degrees C
G10	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G10	Compliance	E001	05/03/2023	Total Dissolved Solids	760	mg/L
G10	Compliance	E001	05/03/2023	Turbidity, field	59.0	NTU
G10	Compliance	E001	05/03/2023	pH (field)	6.6	SU
G11	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G11	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G11	Compliance	E001	05/03/2023	Barium, total	0.0770	mg/L
G11	Compliance	E001	05/03/2023	Beryllium, total	0.000500	mg/L
G11	Compliance	E001	05/03/2023	Boron, total	0.373	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G11	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G11	Compliance	E001	05/03/2023	Calcium, total	122	mg/L
G11	Compliance	E001	05/03/2023	Chloride, total	37.0	mg/L
G11	Compliance	E001	05/03/2023	Chromium, total	0.00630	mg/L
G11	Compliance	E001	05/03/2023	Cobalt, total	0.0185	mg/L
G11	Compliance	E001	05/03/2023	Dissolved Oxygen	16.3	mg/L
G11	Compliance	E001	05/03/2023	Fluoride, total	0.200	mg/L
G11	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G11	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G11	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G11	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G11	Compliance	E001	05/03/2023	Oxidation Reduction Potential	207	mV
G11	Compliance	E001	05/03/2023	Selenium, total	0.00980	mg/L
G11	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,520	micromhos/cm
G11	Compliance	E001	05/03/2023	Sulfate, total	416	mg/L
G11	Compliance	E001	05/03/2023	Temperature	16.5	degrees C
G11	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G11	Compliance	E001	05/03/2023	Total Dissolved Solids	808	mg/L
G11	Compliance	E001	05/03/2023	Turbidity, field	21.0	NTU
G11	Compliance	E001	05/03/2023	pH (field)	5.8	SU
G51D	Compliance	E001	05/03/2023	Antimony, total	0.0005 J	mg/L
G51D	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G51D	Compliance	E001	05/03/2023	Barium, total	0.273	mg/L
G51D	Compliance	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G51D	Compliance	E001	05/03/2023	Boron, total	0.0297	mg/L
G51D	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G51D	Compliance	E001	05/03/2023	Calcium, total	48.2	mg/L
G51D	Compliance	E001	05/03/2023	Chloride, total	11.0	mg/L
G51D	Compliance	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G51D	Compliance	E001	05/03/2023	Cobalt, total	0.00930	mg/L
G51D	Compliance	E001	05/03/2023	Dissolved Oxygen	18.3	mg/L
G51D	Compliance	E001	05/03/2023	Fluoride, total	0.270	mg/L
G51D	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G51D	Compliance	E001	05/03/2023	Lithium, total	0.019 U	mg/L
G51D	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G51D	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G51D	Compliance	E001	05/03/2023	Oxidation Reduction Potential	214	mV
G51D	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G51D	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	514	micromhos/cm
G51D	Compliance	E001	05/03/2023	Sulfate, total	59.0	mg/L
G51D	Compliance	E001	05/03/2023	Temperature	16.3	degrees C
G51D	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G51D	Compliance	E001	05/03/2023	Total Dissolved Solids	310	mg/L
G51D	Compliance	E001	05/03/2023	Turbidity, field	31.0	NTU
G51D	Compliance	E001	05/03/2023	pH (field)	5.6	SU
G52D	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G52D	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G52D	Compliance	E001	05/03/2023	Barium, total	0.0461	mg/L
G52D	Compliance	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G52D	Compliance	E001	05/03/2023	Boron, total	0.682	mg/L
G52D	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G52D	Compliance	E001	05/03/2023	Calcium, total	28.8	mg/L
G52D	Compliance	E001	05/03/2023	Chloride, total	5.00	mg/L
G52D	Compliance	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G52D	Compliance	E001	05/03/2023	Cobalt, total	0.00240	mg/L
G52D	Compliance	E001	05/03/2023	Dissolved Oxygen	13.9	mg/L
G52D	Compliance	E001	05/03/2023	Fluoride, total	0.100 J	mg/L
G52D	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G52D	Compliance	E001	05/03/2023	Lithium, total	0.0019 U	mg/L
G52D	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G52D	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G52D	Compliance	E001	05/03/2023	Oxidation Reduction Potential	68.0	mV
G52D	Compliance	E001	05/03/2023	Selenium, total	0.00750	mg/L
G52D	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	572	micromhos/cm
G52D	Compliance	E001	05/03/2023	Sulfate, total	129	mg/L
G52D	Compliance	E001	05/03/2023	Temperature	16.7	degrees C
G52D	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G52D	Compliance	E001	05/03/2023	Total Dissolved Solids	296	mg/L
G52D	Compliance	E001	05/03/2023	Turbidity, field	1 U	NTU
G52D	Compliance	E001	05/03/2023	pH (field)	6.3	SU
G53D	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G53D	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G53D	Compliance	E001	05/03/2023	Barium, total	0.102	mg/L
G53D	Compliance	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G53D	Compliance	E001	05/03/2023	Boron, total	0.367	mg/L
G53D	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G53D	Compliance	E001	05/03/2023	Calcium, total	34.3	mg/L
G53D	Compliance	E001	05/03/2023	Chloride, total	18.0	mg/L
G53D	Compliance	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G53D	Compliance	E001	05/03/2023	Cobalt, total	0.00180	mg/L
G53D	Compliance	E001	05/03/2023	Dissolved Oxygen	8.60	mg/L
G53D	Compliance	E001	05/03/2023	Fluoride, total	0.710	mg/L
G53D	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G53D	Compliance	E001	05/03/2023	Lithium, total	0.0019 U	mg/L
G53D	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G53D	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G53D	Compliance	E001	05/03/2023	Oxidation Reduction Potential	137	mV
G53D	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G53D	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	645	micromhos/cm
G53D	Compliance	E001	05/03/2023	Sulfate, total	68.0	mg/L
G53D	Compliance	E001	05/03/2023	Temperature	16.7	degrees C
G53D	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G53D	Compliance	E001	05/03/2023	Total Dissolved Solids	314	mg/L
G53D	Compliance	E001	05/03/2023	Turbidity, field	1 U	NTU
G53D	Compliance	E001	05/03/2023	pH (field)	6.5	SU
G54D	Compliance	E001	05/03/2023	Antimony, total	0.0004 U	mg/L
G54D	Compliance	E001	05/03/2023	Arsenic, total	0.0087 U	mg/L
G54D	Compliance	E001	05/03/2023	Barium, total	0.0794	mg/L
G54D	Compliance	E001	05/03/2023	Beryllium, total	0.0002 U	mg/L
G54D	Compliance	E001	05/03/2023	Boron, total	0.555	mg/L
G54D	Compliance	E001	05/03/2023	Cadmium, total	0.0005 U	mg/L
G54D	Compliance	E001	05/03/2023	Calcium, total	81.5	mg/L
G54D	Compliance	E001	05/03/2023	Chloride, total	22.0	mg/L
G54D	Compliance	E001	05/03/2023	Chromium, total	0.0028 U	mg/L
G54D	Compliance	E001	05/03/2023	Cobalt, total	0.0106	mg/L
G54D	Compliance	E001	05/03/2023	Dissolved Oxygen	17.2	mg/L
G54D	Compliance	E001	05/03/2023	Fluoride, total	0.300	mg/L
G54D	Compliance	E001	05/03/2023	Lead, total	0.004 U	mg/L
G54D	Compliance	E001	05/03/2023	Lithium, total	0.0019 U	mg/L
G54D	Compliance	E001	05/03/2023	Mercury, total	0.00006 U	mg/L
G54D	Compliance	E001	05/03/2023	Molybdenum, total	0.0037 U	mg/L
G54D	Compliance	E001	05/03/2023	Oxidation Reduction Potential	42.0	mV
G54D	Compliance	E001	05/03/2023	Selenium, total	0.0006 U	mg/L
G54D	Compliance	E001	05/03/2023	Specific Conductance @ 25C (field)	1,030	micromhos/cm
G54D	Compliance	E001	05/03/2023	Sulfate, total	194	mg/L
G54D	Compliance	E001	05/03/2023	Temperature	16.4	degrees C
G54D	Compliance	E001	05/03/2023	Thallium, total	0.001 U	mg/L
G54D	Compliance	E001	05/03/2023	Total Dissolved Solids	544	mg/L
G54D	Compliance	E001	05/03/2023	Turbidity, field	4.10	NTU
G54D	Compliance	E001	05/03/2023	pH (field)	6.8	SU

**Notes:**

C = Celsius

cm = centimeter

mg/L = milligrams per liter

mV = millivolts

NTU = Nephelometric Turbidity Units

pCi/L = picocuries per liter

SU = Standard Units

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J- = The result is an estimated quantity, but the result may be biased low.

U = The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G01D	Background	E002	09/25/2023	Antimony, total	0.0004 U	mg/L
G01D	Background	E002	09/25/2023	Arsenic, total	0.0007 J	mg/L
G01D	Background	E002	09/25/2023	Barium, total	0.193	mg/L
G01D	Background	E002	09/25/2023	Beryllium, total	0.0002 U	mg/L
G01D	Background	E002	09/25/2023	Boron, total	0.03 UJ	mg/L
G01D	Background	E002	09/25/2023	Cadmium, total	0.0002 U	mg/L
G01D	Background	E002	09/25/2023	Calcium, total	31.1	mg/L
G01D	Background	E002	09/25/2023	Chloride, total	11.0	mg/L
G01D	Background	E002	09/25/2023	Chromium, total	0.00380	mg/L
G01D	Background	E002	09/25/2023	Cobalt, total	0.0008 J	mg/L
G01D	Background	E002	09/25/2023	Dissolved Oxygen	0.650	mg/L
G01D	Background	E002	09/25/2023	Fluoride, total	0.210	mg/L
G01D	Background	E002	09/25/2023	Lead, total	0.0008 J	mg/L
G01D	Background	E002	09/25/2023	Lithium, total	0.0015 U	mg/L
G01D	Background	E002	09/25/2023	Mercury, total	0.00006 U	mg/L
G01D	Background	E002	09/25/2023	Molybdenum, total	0.0007 J	mg/L
G01D	Background	E002	09/25/2023	Oxidation Reduction Potential	30.0	mV
G01D	Background	E002	09/25/2023	pH (field)	6.5	SU
G01D	Background	E002	09/25/2023	Radium 226 + Radium 228, total	3.77	pCi/L
G01D	Background	E002	09/25/2023	Selenium, total	0.00160	mg/L
G01D	Background	E002	09/25/2023	Specific Conductance @ 25C (field)	533	micromhos/cm
G01D	Background	E002	09/25/2023	Sulfate, total	28.0	mg/L
G01D	Background	E002	09/25/2023	Temperature	18.1	degrees C
G01D	Background	E002	09/25/2023	Thallium, total	0.001 U	mg/L
G01D	Background	E002	09/25/2023	Total Dissolved Solids	350	mg/L
G01D	Background	E002	09/25/2023	Turbidity, field	9.90	NTU
G02D	Background	E002	09/25/2023	Antimony, total	0.0004 U	mg/L
G02D	Background	E002	09/25/2023	Arsenic, total	0.0004 U	mg/L
G02D	Background	E002	09/25/2023	Barium, total	0.229	mg/L
G02D	Background	E002	09/25/2023	Beryllium, total	0.0002 U	mg/L
G02D	Background	E002	09/25/2023	Boron, total	0.0401	mg/L
G02D	Background	E002	09/25/2023	Cadmium, total	0.0002 U	mg/L
G02D	Background	E002	09/25/2023	Calcium, total	33.7	mg/L
G02D	Background	E002	09/25/2023	Chloride, total	21.0	mg/L
G02D	Background	E002	09/25/2023	Chromium, total	0.001 J	mg/L
G02D	Background	E002	09/25/2023	Cobalt, total	0.0004 J	mg/L
G02D	Background	E002	09/25/2023	Dissolved Oxygen	1.51	mg/L
G02D	Background	E002	09/25/2023	Fluoride, total	0.210	mg/L
G02D	Background	E002	09/25/2023	Lead, total	0.00190	mg/L
G02D	Background	E002	09/25/2023	Lithium, total	0.0015 U	mg/L
G02D	Background	E002	09/25/2023	Mercury, total	0.00006 U	mg/L
G02D	Background	E002	09/25/2023	Molybdenum, total	0.0006 U	mg/L
G02D	Background	E002	09/25/2023	Oxidation Reduction Potential	68.0	mV
G02D	Background	E002	09/25/2023	pH (field)	6.4	SU
G02D	Background	E002	09/25/2023	Radium 226 + Radium 228, total	2.5	pCi/L
G02D	Background	E002	09/25/2023	Selenium, total	0.00120	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G02D	Background	E002	09/25/2023	Specific Conductance @ 25C (field)	412	micromhos/cm
G02D	Background	E002	09/25/2023	Sulfate, total	15.0	mg/L
G02D	Background	E002	09/25/2023	Temperature	16.1	degrees C
G02D	Background	E002	09/25/2023	Thallium, total	0.001 U	mg/L
G02D	Background	E002	09/25/2023	Total Dissolved Solids	226	mg/L
G02D	Background	E002	09/25/2023	Turbidity, field	12.0	NTU
G03	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G03	Compliance	E002	09/26/2023	Arsenic, total	0.0005 J	mg/L
G03	Compliance	E002	09/26/2023	Barium, total	0.0748	mg/L
G03	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G03	Compliance	E002	09/26/2023	Boron, total	0.267	mg/L
G03	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G03	Compliance	E002	09/26/2023	Calcium, total	41.8	mg/L
G03	Compliance	E002	09/26/2023	Chloride, total	19.0	mg/L
G03	Compliance	E002	09/26/2023	Chromium, total	0.00260	mg/L
G03	Compliance	E002	09/26/2023	Cobalt, total	0.00140	mg/L
G03	Compliance	E002	09/26/2023	Dissolved Oxygen	3.89	mg/L
G03	Compliance	E002	09/26/2023	Fluoride, total	0.210	mg/L
G03	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G03	Compliance	E002	09/26/2023	Lithium, total	0.0018 J	mg/L
G03	Compliance	E002	09/26/2023	Mercury, total	0.00006 U	mg/L
G03	Compliance	E002	09/26/2023	Molybdenum, total	0.0006 U	mg/L
G03	Compliance	E002	09/26/2023	Oxidation Reduction Potential	40.0	mV
G03	Compliance	E002	09/26/2023	pH (field)	6.4	SU
G03	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	2.24	pCi/L
G03	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G03	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	445	micromhos/cm
G03	Compliance	E002	09/26/2023	Sulfate, total	67.0	mg/L
G03	Compliance	E002	09/26/2023	Temperature	17.8	degrees C
G03	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G03	Compliance	E002	09/26/2023	Total Dissolved Solids	295	mg/L
G03	Compliance	E002	09/26/2023	Turbidity, field	35.0	NTU
G05	Compliance	E002	09/27/2023	Antimony, total	0.0004 U	mg/L
G05	Compliance	E002	09/27/2023	Arsenic, total	0.00120	mg/L
G05	Compliance	E002	09/27/2023	Barium, total	0.169	mg/L
G05	Compliance	E002	09/27/2023	Beryllium, total	0.0002 U	mg/L
G05	Compliance	E002	09/27/2023	Boron, total	0.0436	mg/L
G05	Compliance	E002	09/27/2023	Cadmium, total	0.0002 U	mg/L
G05	Compliance	E002	09/27/2023	Calcium, total	52.2	mg/L
G05	Compliance	E002	09/27/2023	Chloride, total	20.0	mg/L
G05	Compliance	E002	09/27/2023	Chromium, total	0.00230	mg/L
G05	Compliance	E002	09/27/2023	Cobalt, total	0.00230	mg/L
G05	Compliance	E002	09/27/2023	Dissolved Oxygen	0.940	mg/L
G05	Compliance	E002	09/27/2023	Fluoride, total	0.410	mg/L
G05	Compliance	E002	09/27/2023	Lead, total	0.0006 U	mg/L
G05	Compliance	E002	09/27/2023	Lithium, total	0.00300 J	mg/L



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G05	Compliance	E002	09/27/2023	Mercury, total	0.00006 U	mg/L
G05	Compliance	E002	09/27/2023	Molybdenum, total	0.00460	mg/L
G05	Compliance	E002	09/27/2023	Oxidation Reduction Potential	-17.0	mV
G05	Compliance	E002	09/27/2023	pH (field)	6.4	SU
G05	Compliance	E002	09/27/2023	Radium 226 + Radium 228, total	6.29	pCi/L
G05	Compliance	E002	09/27/2023	Selenium, total	0.00110	mg/L
G05	Compliance	E002	09/27/2023	Specific Conductance @ 25C (field)	565	micromhos/cm
G05	Compliance	E002	09/27/2023	Sulfate, total	82.0	mg/L
G05	Compliance	E002	09/27/2023	Temperature	17.4	degrees C
G05	Compliance	E002	09/27/2023	Thallium, total	0.001 U	mg/L
G05	Compliance	E002	09/27/2023	Total Dissolved Solids	360	mg/L
G05	Compliance	E002	09/27/2023	Turbidity, field	20.0	NTU
G06	Compliance	E002	09/27/2023	Antimony, total	0.0004 U	mg/L
G06	Compliance	E002	09/27/2023	Arsenic, total	0.00100 J	mg/L
G06	Compliance	E002	09/27/2023	Barium, total	0.0251	mg/L
G06	Compliance	E002	09/27/2023	Beryllium, total	0.0002 U	mg/L
G06	Compliance	E002	09/27/2023	Boron, total	3.29	mg/L
G06	Compliance	E002	09/27/2023	Cadmium, total	0.0002 U	mg/L
G06	Compliance	E002	09/27/2023	Calcium, total	84.9	mg/L
G06	Compliance	E002	09/27/2023	Chloride, total	21.0	mg/L
G06	Compliance	E002	09/27/2023	Chromium, total	0.00280	mg/L
G06	Compliance	E002	09/27/2023	Cobalt, total	0.0008 J	mg/L
G06	Compliance	E002	09/27/2023	Dissolved Oxygen	0.880	mg/L
G06	Compliance	E002	09/27/2023	Fluoride, total	0.270	mg/L
G06	Compliance	E002	09/27/2023	Lead, total	0.0006 U	mg/L
G06	Compliance	E002	09/27/2023	Lithium, total	0.00350	mg/L
G06	Compliance	E002	09/27/2023	Mercury, total	0.00012 J	mg/L
G06	Compliance	E002	09/27/2023	Molybdenum, total	0.0006 U	mg/L
G06	Compliance	E002	09/27/2023	Oxidation Reduction Potential	14.0	mV
G06	Compliance	E002	09/27/2023	pH (field)	6.6	SU
G06	Compliance	E002	09/27/2023	Radium 226 + Radium 228, total	3.04	pCi/L
G06	Compliance	E002	09/27/2023	Selenium, total	0.0006 U	mg/L
G06	Compliance	E002	09/27/2023	Specific Conductance @ 25C (field)	716	micromhos/cm
G06	Compliance	E002	09/27/2023	Sulfate, total	187	mg/L
G06	Compliance	E002	09/27/2023	Temperature	16.2	degrees C
G06	Compliance	E002	09/27/2023	Thallium, total	0.001 U	mg/L
G06	Compliance	E002	09/27/2023	Total Dissolved Solids	486	mg/L
G06	Compliance	E002	09/27/2023	Turbidity, field	43.0	NTU
G07	Compliance	E002	09/27/2023	Antimony, total	0.0004 U	mg/L
G07	Compliance	E002	09/27/2023	Arsenic, total	0.0007 J	mg/L
G07	Compliance	E002	09/27/2023	Barium, total	0.0366	mg/L
G07	Compliance	E002	09/27/2023	Beryllium, total	0.0002 U	mg/L
G07	Compliance	E002	09/27/2023	Boron, total	5.80	mg/L
G07	Compliance	E002	09/27/2023	Cadmium, total	0.0002 U	mg/L
G07	Compliance	E002	09/27/2023	Calcium, total	97.1	mg/L
G07	Compliance	E002	09/27/2023	Chloride, total	21.0	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G07	Compliance	E002	09/27/2023	Chromium, total	0.00270	mg/L
G07	Compliance	E002	09/27/2023	Cobalt, total	0.00110	mg/L
G07	Compliance	E002	09/27/2023	Dissolved Oxygen	0.720	mg/L
G07	Compliance	E002	09/27/2023	Fluoride, total	0.430	mg/L
G07	Compliance	E002	09/27/2023	Lead, total	0.0006 U	mg/L
G07	Compliance	E002	09/27/2023	Lithium, total	0.0025 J	mg/L
G07	Compliance	E002	09/27/2023	Mercury, total	0.00006 J	mg/L
G07	Compliance	E002	09/27/2023	Molybdenum, total	0.0007 J	mg/L
G07	Compliance	E002	09/27/2023	Oxidation Reduction Potential	31.0	mV
G07	Compliance	E002	09/27/2023	pH (field)	6.4	SU
G07	Compliance	E002	09/27/2023	Radium 226 + Radium 228, total	2.53	pCi/L
G07	Compliance	E002	09/27/2023	Selenium, total	0.0006 U	mg/L
G07	Compliance	E002	09/27/2023	Specific Conductance @ 25C (field)	847	micromhos/cm
G07	Compliance	E002	09/27/2023	Sulfate, total	268	mg/L
G07	Compliance	E002	09/27/2023	Temperature	16.0	degrees C
G07	Compliance	E002	09/27/2023	Thallium, total	0.001 U	mg/L
G07	Compliance	E002	09/27/2023	Total Dissolved Solids	612	mg/L
G07	Compliance	E002	09/27/2023	Turbidity, field	13.0	NTU
G08	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G08	Compliance	E002	09/26/2023	Arsenic, total	0.00860	mg/L
G08	Compliance	E002	09/26/2023	Barium, total	0.0333	mg/L
G08	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G08	Compliance	E002	09/26/2023	Boron, total	6.30	mg/L
G08	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G08	Compliance	E002	09/26/2023	Calcium, total	132	mg/L
G08	Compliance	E002	09/26/2023	Chloride, total	14.0	mg/L
G08	Compliance	E002	09/26/2023	Chromium, total	0.00200	mg/L
G08	Compliance	E002	09/26/2023	Cobalt, total	0.00370	mg/L
G08	Compliance	E002	09/26/2023	Dissolved Oxygen	0.650	mg/L
G08	Compliance	E002	09/26/2023	Fluoride, total	0.310	mg/L
G08	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G08	Compliance	E002	09/26/2023	Lithium, total	0.0021 J	mg/L
G08	Compliance	E002	09/26/2023	Mercury, total	0.00006 U	mg/L
G08	Compliance	E002	09/26/2023	Molybdenum, total	0.00230	mg/L
G08	Compliance	E002	09/26/2023	Oxidation Reduction Potential	-92.0	mV
G08	Compliance	E002	09/26/2023	pH (field)	7.0	SU
G08	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	1.67	pCi/L
G08	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G08	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	912	micromhos/cm
G08	Compliance	E002	09/26/2023	Sulfate, total	320	mg/L
G08	Compliance	E002	09/26/2023	Temperature	17.3	degrees C
G08	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G08	Compliance	E002	09/26/2023	Total Dissolved Solids	680	mg/L
G08	Compliance	E002	09/26/2023	Turbidity, field	40.0	NTU
G09	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G09	Compliance	E002	09/26/2023	Arsenic, total	0.00430	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G09	Compliance	E002	09/26/2023	Barium, total	0.0271	mg/L
G09	Compliance	E002	09/26/2023	Beryllium, total	0.0003 J	mg/L
G09	Compliance	E002	09/26/2023	Boron, total	4.57	mg/L
G09	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G09	Compliance	E002	09/26/2023	Calcium, total	64.8	mg/L
G09	Compliance	E002	09/26/2023	Chloride, total	17.0	mg/L
G09	Compliance	E002	09/26/2023	Chromium, total	0.00210	mg/L
G09	Compliance	E002	09/26/2023	Cobalt, total	0.00500	mg/L
G09	Compliance	E002	09/26/2023	Dissolved Oxygen	0.810	mg/L
G09	Compliance	E002	09/26/2023	Fluoride, total	0.310	mg/L
G09	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G09	Compliance	E002	09/26/2023	Lithium, total	0.00320	mg/L
G09	Compliance	E002	09/26/2023	Mercury, total	0.00006 J	mg/L
G09	Compliance	E002	09/26/2023	Molybdenum, total	0.0006 U	mg/L
G09	Compliance	E002	09/26/2023	Oxidation Reduction Potential	33.0	mV
G09	Compliance	E002	09/26/2023	pH (field)	6.2	SU
G09	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	2.14	pCi/L
G09	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G09	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	789	micromhos/cm
G09	Compliance	E002	09/26/2023	Sulfate, total	229	mg/L
G09	Compliance	E002	09/26/2023	Temperature	17.7	degrees C
G09	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G09	Compliance	E002	09/26/2023	Total Dissolved Solids	500	mg/L
G09	Compliance	E002	09/26/2023	Turbidity, field	17.0	NTU
G10	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G10	Compliance	E002	09/26/2023	Arsenic, total	0.00370	mg/L
G10	Compliance	E002	09/26/2023	Barium, total	0.0336	mg/L
G10	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G10	Compliance	E002	09/26/2023	Boron, total	3.41	mg/L
G10	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G10	Compliance	E002	09/26/2023	Calcium, total	120	mg/L
G10	Compliance	E002	09/26/2023	Chloride, total	24.0	mg/L
G10	Compliance	E002	09/26/2023	Chromium, total	0.001 J	mg/L
G10	Compliance	E002	09/26/2023	Cobalt, total	0.00210	mg/L
G10	Compliance	E002	09/26/2023	Dissolved Oxygen	0.470	mg/L
G10	Compliance	E002	09/26/2023	Fluoride, total	0.370	mg/L
G10	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G10	Compliance	E002	09/26/2023	Lithium, total	0.00410	mg/L
G10	Compliance	E002	09/26/2023	Mercury, total	0.00007 J	mg/L
G10	Compliance	E002	09/26/2023	Molybdenum, total	0.00160	mg/L
G10	Compliance	E002	09/26/2023	Oxidation Reduction Potential	65.0	mV
G10	Compliance	E002	09/26/2023	pH (field)	6.7	SU
G10	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	1.32	pCi/L
G10	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G10	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	1,250	micromhos/cm
G10	Compliance	E002	09/26/2023	Sulfate, total	356	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G10	Compliance	E002	09/26/2023	Temperature	17.5	degrees C
G10	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G10	Compliance	E002	09/26/2023	Total Dissolved Solids	705	mg/L
G10	Compliance	E002	09/26/2023	Turbidity, field	16.0	NTU
G11	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G11	Compliance	E002	09/26/2023	Arsenic, total	0.0004 U	mg/L
G11	Compliance	E002	09/26/2023	Barium, total	0.0231	mg/L
G11	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G11	Compliance	E002	09/26/2023	Boron, total	0.308	mg/L
G11	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G11	Compliance	E002	09/26/2023	Calcium, total	59.9	mg/L
G11	Compliance	E002	09/26/2023	Chloride, total	29.0	mg/L
G11	Compliance	E002	09/26/2023	Chromium, total	0.0007 J	mg/L
G11	Compliance	E002	09/26/2023	Cobalt, total	0.0006 J	mg/L
G11	Compliance	E002	09/26/2023	Dissolved Oxygen	0.760	mg/L
G11	Compliance	E002	09/26/2023	Fluoride, total	0.160	mg/L
G11	Compliance	E002	09/26/2023	Lead, total	0.00270	mg/L
G11	Compliance	E002	09/26/2023	Lithium, total	0.00350	mg/L
G11	Compliance	E002	09/26/2023	Mercury, total	0.00006 U	mg/L
G11	Compliance	E002	09/26/2023	Molybdenum, total	0.0007 J	mg/L
G11	Compliance	E002	09/26/2023	Oxidation Reduction Potential	98.0	mV
G11	Compliance	E002	09/26/2023	pH (field)	6.0	SU
G11	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	2.44	pCi/L
G11	Compliance	E002	09/26/2023	Selenium, total	0.00190	mg/L
G11	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	748	micromhos/cm
G11	Compliance	E002	09/26/2023	Sulfate, total	192	mg/L
G11	Compliance	E002	09/26/2023	Temperature	17.8	degrees C
G11	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G11	Compliance	E002	09/26/2023	Total Dissolved Solids	428	mg/L
G11	Compliance	E002	09/26/2023	Turbidity, field	8.90	NTU
G51D	Compliance	E002	09/25/2023	Antimony, total	0.0004 U	mg/L
G51D	Compliance	E002	09/25/2023	Arsenic, total	0.0004 U	mg/L
G51D	Compliance	E002	09/25/2023	Barium, total	0.0349	mg/L
G51D	Compliance	E002	09/25/2023	Beryllium, total	0.0002 U	mg/L
G51D	Compliance	E002	09/25/2023	Boron, total	0.899 J-	mg/L
G51D	Compliance	E002	09/25/2023	Cadmium, total	0.0002 U	mg/L
G51D	Compliance	E002	09/25/2023	Calcium, total	28.7	mg/L
G51D	Compliance	E002	09/25/2023	Chloride, total	4.00 J	mg/L
G51D	Compliance	E002	09/25/2023	Chromium, total	0.00170	mg/L
G51D	Compliance	E002	09/25/2023	Cobalt, total	0.0008 J	mg/L
G51D	Compliance	E002	09/25/2023	Dissolved Oxygen	1.75	mg/L
G51D	Compliance	E002	09/25/2023	Fluoride, total	0.08 J	mg/L
G51D	Compliance	E002	09/25/2023	Lead, total	0.0006 U	mg/L
G51D	Compliance	E002	09/25/2023	Lithium, total	0.00580	mg/L
G51D	Compliance	E002	09/25/2023	Mercury, total	0.00006 U	mg/L
G51D	Compliance	E002	09/25/2023	Molybdenum, total	0.0006 U	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G51D	Compliance	E002	09/25/2023	Oxidation Reduction Potential	139	mV
G51D	Compliance	E002	09/25/2023	pH (field)	5.4	SU
G51D	Compliance	E002	09/25/2023	Radium 226 + Radium 228, total	1.57	pCi/L
G51D	Compliance	E002	09/25/2023	Selenium, total	0.00510	mg/L
G51D	Compliance	E002	09/25/2023	Specific Conductance @ 25C (field)	426	micromhos/cm
G51D	Compliance	E002	09/25/2023	Sulfate, total	127 J	mg/L
G51D	Compliance	E002	09/25/2023	Temperature	18.4	degrees C
G51D	Compliance	E002	09/25/2023	Thallium, total	0.001 U	mg/L
G51D	Compliance	E002	09/25/2023	Total Dissolved Solids	292	mg/L
G51D	Compliance	E002	09/25/2023	Turbidity, field	17.0	NTU
G52D	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G52D	Compliance	E002	09/26/2023	Arsenic, total	0.00150	mg/L
G52D	Compliance	E002	09/26/2023	Barium, total	0.250	mg/L
G52D	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G52D	Compliance	E002	09/26/2023	Boron, total	0.03 UJ	mg/L
G52D	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G52D	Compliance	E002	09/26/2023	Calcium, total	44.8	mg/L
G52D	Compliance	E002	09/26/2023	Chloride, total	11.0	mg/L
G52D	Compliance	E002	09/26/2023	Chromium, total	0.0007 U	mg/L
G52D	Compliance	E002	09/26/2023	Cobalt, total	0.00420 J	mg/L
G52D	Compliance	E002	09/26/2023	Dissolved Oxygen	0.560	mg/L
G52D	Compliance	E002	09/26/2023	Fluoride, total	0.280	mg/L
G52D	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G52D	Compliance	E002	09/26/2023	Lithium, total	0.0023 J	mg/L
G52D	Compliance	E002	09/26/2023	Mercury, total	0.00006 U	mg/L
G52D	Compliance	E002	09/26/2023	Molybdenum, total	0.0009 J	mg/L
G52D	Compliance	E002	09/26/2023	Oxidation Reduction Potential	55.0	mV
G52D	Compliance	E002	09/26/2023	pH (field)	6.3	SU
G52D	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	1.7	pCi/L
G52D	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G52D	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	462	micromhos/cm
G52D	Compliance	E002	09/26/2023	Sulfate, total	52.0	mg/L
G52D	Compliance	E002	09/26/2023	Temperature	15.9	degrees C
G52D	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G52D	Compliance	E002	09/26/2023	Total Dissolved Solids	282	mg/L
G52D	Compliance	E002	09/26/2023	Turbidity, field	3.40	NTU
G53D	Compliance	E002	09/27/2023	Antimony, total	0.0004 U	mg/L
G53D	Compliance	E002	09/27/2023	Arsenic, total	0.0004 U	mg/L
G53D	Compliance	E002	09/27/2023	Barium, total	0.0910	mg/L
G53D	Compliance	E002	09/27/2023	Beryllium, total	0.0002 U	mg/L
G53D	Compliance	E002	09/27/2023	Boron, total	0.371	mg/L
G53D	Compliance	E002	09/27/2023	Cadmium, total	0.0002 U	mg/L
G53D	Compliance	E002	09/27/2023	Calcium, total	35.9	mg/L
G53D	Compliance	E002	09/27/2023	Chloride, total	17.0	mg/L
G53D	Compliance	E002	09/27/2023	Chromium, total	0.0007 U	mg/L
G53D	Compliance	E002	09/27/2023	Cobalt, total	0.00130	mg/L



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G53D	Compliance	E002	09/27/2023	Dissolved Oxygen	0.600	mg/L
G53D	Compliance	E002	09/27/2023	Fluoride, total	0.760	mg/L
G53D	Compliance	E002	09/27/2023	Lead, total	0.0006 U	mg/L
G53D	Compliance	E002	09/27/2023	Lithium, total	0.0015 U	mg/L
G53D	Compliance	E002	09/27/2023	Mercury, total	0.00006 U	mg/L
G53D	Compliance	E002	09/27/2023	Molybdenum, total	0.0006 U	mg/L
G53D	Compliance	E002	09/27/2023	Oxidation Reduction Potential	-23.0	mV
G53D	Compliance	E002	09/27/2023	pH (field)	6.5	SU
G53D	Compliance	E002	09/27/2023	Radium 226 + Radium 228, total	1.14	pCi/L
G53D	Compliance	E002	09/27/2023	Selenium, total	0.0006 U	mg/L
G53D	Compliance	E002	09/27/2023	Specific Conductance @ 25C (field)	489	micromhos/cm
G53D	Compliance	E002	09/27/2023	Sulfate, total	73.0	mg/L
G53D	Compliance	E002	09/27/2023	Temperature	17.0	degrees C
G53D	Compliance	E002	09/27/2023	Thallium, total	0.001 U	mg/L
G53D	Compliance	E002	09/27/2023	Total Dissolved Solids	330	mg/L
G53D	Compliance	E002	09/27/2023	Turbidity, field	10.0	NTU
G54D	Compliance	E002	09/26/2023	Antimony, total	0.0004 U	mg/L
G54D	Compliance	E002	09/26/2023	Arsenic, total	0.0005 J	mg/L
G54D	Compliance	E002	09/26/2023	Barium, total	0.0739	mg/L
G54D	Compliance	E002	09/26/2023	Beryllium, total	0.0002 U	mg/L
G54D	Compliance	E002	09/26/2023	Boron, total	0.404	mg/L
G54D	Compliance	E002	09/26/2023	Cadmium, total	0.0002 U	mg/L
G54D	Compliance	E002	09/26/2023	Calcium, total	81.2	mg/L
G54D	Compliance	E002	09/26/2023	Chloride, total	20.0	mg/L
G54D	Compliance	E002	09/26/2023	Chromium, total	0.0007 U	mg/L
G54D	Compliance	E002	09/26/2023	Cobalt, total	0.0102	mg/L
G54D	Compliance	E002	09/26/2023	Dissolved Oxygen	3.04	mg/L
G54D	Compliance	E002	09/26/2023	Fluoride, total	0.300	mg/L
G54D	Compliance	E002	09/26/2023	Lead, total	0.0006 U	mg/L
G54D	Compliance	E002	09/26/2023	Lithium, total	0.0028 J	mg/L
G54D	Compliance	E002	09/26/2023	Mercury, total	0.00006 U	mg/L
G54D	Compliance	E002	09/26/2023	Molybdenum, total	0.0006 U	mg/L
G54D	Compliance	E002	09/26/2023	Oxidation Reduction Potential	38.0	mV
G54D	Compliance	E002	09/26/2023	pH (field)	6.6	SU
G54D	Compliance	E002	09/26/2023	Radium 226 + Radium 228, total	1.2	pCi/L
G54D	Compliance	E002	09/26/2023	Selenium, total	0.0006 U	mg/L
G54D	Compliance	E002	09/26/2023	Specific Conductance @ 25C (field)	846	micromhos/cm
G54D	Compliance	E002	09/26/2023	Sulfate, total	180	mg/L
G54D	Compliance	E002	09/26/2023	Temperature	17.2	degrees C
G54D	Compliance	E002	09/26/2023	Thallium, total	0.001 U	mg/L
G54D	Compliance	E002	09/26/2023	Total Dissolved Solids	508	mg/L
G54D	Compliance	E002	09/26/2023	Turbidity, field	7.80	NTU

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

C = Celsius

cm = centimeter

mg/L = milligrams per liter

mV = millivolts

NTU = Nephelometric Turbidity Units

pCi/L = picocuries per liter

SU = Standard Units

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J- = The result is an estimated quantity, but the result may be biased low.

U = The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G01D	Background	E003	10/23/2023	Antimony, total	0.0004 U	mg/L
G01D	Background	E003	10/23/2023	Arsenic, total	0.0004 U	mg/L
G01D	Background	E003	10/23/2023	Barium, total	0.188	mg/L
G01D	Background	E003	10/23/2023	Beryllium, total	0.0002 U	mg/L
G01D	Background	E003	10/23/2023	Boron, total	0.014 J	mg/L
G01D	Background	E003	10/23/2023	Cadmium, total	0.0002 U	mg/L
G01D	Background	E003	10/23/2023	Calcium, total	33.0	mg/L
G01D	Background	E003	10/23/2023	Chloride, total	13.0	mg/L
G01D	Background	E003	10/23/2023	Chromium, total	0.00200	mg/L
G01D	Background	E003	10/23/2023	Cobalt, total	0.001 UJ	mg/L
G01D	Background	E003	10/23/2023	Dissolved Oxygen	1.83	mg/L
G01D	Background	E003	10/23/2023	Fluoride, total	0.200 J+	mg/L
G01D	Background	E003	10/23/2023	Lead, total	0.0006 U	mg/L
G01D	Background	E003	10/23/2023	Lithium, total	0.0015 U	mg/L
G01D	Background	E003	10/23/2023	Mercury, total	0.00006 U	mg/L
G01D	Background	E003	10/23/2023	Molybdenum, total	0.0006 U	mg/L
G01D	Background	E003	10/23/2023	Oxidation Reduction Potential	103	mV
G01D	Background	E003	10/23/2023	pH (field)	6.4	SU
G01D	Background	E003	10/23/2023	Radium 226 + Radium 228, total	1.09	pCi/L
G01D	Background	E003	10/23/2023	Selenium, total	0.00140 J+	mg/L
G01D	Background	E003	10/23/2023	Specific Conductance @ 25C (field)	484	micromhos/cm
G01D	Background	E003	10/23/2023	Sulfate, total	30.0	mg/L
G01D	Background	E003	10/23/2023	Temperature	16.9	degrees C
G01D	Background	E003	10/23/2023	Thallium, total	0.001 U	mg/L
G01D	Background	E003	10/23/2023	Total Dissolved Solids	308	mg/L
G01D	Background	E003	10/23/2023	Turbidity, field	180	NTU
G02D	Background	E003	10/23/2023	Antimony, total	0.0004 U	mg/L
G02D	Background	E003	10/23/2023	Arsenic, total	0.0004 U	mg/L
G02D	Background	E003	10/23/2023	Barium, total	0.170	mg/L
G02D	Background	E003	10/23/2023	Beryllium, total	0.0002 U	mg/L
G02D	Background	E003	10/23/2023	Boron, total	0.0276	mg/L
G02D	Background	E003	10/23/2023	Cadmium, total	0.0002 U	mg/L
G02D	Background	E003	10/23/2023	Calcium, total	34.0	mg/L
G02D	Background	E003	10/23/2023	Chloride, total	22.0	mg/L
G02D	Background	E003	10/23/2023	Chromium, total	0.0009 J	mg/L
G02D	Background	E003	10/23/2023	Cobalt, total	0.001 UJ	mg/L
G02D	Background	E003	10/23/2023	Dissolved Oxygen	2.90	mg/L
G02D	Background	E003	10/23/2023	Fluoride, total	0.190 J+	mg/L
G02D	Background	E003	10/23/2023	Lead, total	0.0006 U	mg/L
G02D	Background	E003	10/23/2023	Lithium, total	0.0015 U	mg/L
G02D	Background	E003	10/23/2023	Mercury, total	0.00006 U	mg/L
G02D	Background	E003	10/23/2023	Molybdenum, total	0.0006 U	mg/L
G02D	Background	E003	10/23/2023	Oxidation Reduction Potential	108	mV
G02D	Background	E003	10/23/2023	pH (field)	6.4	SU
G02D	Background	E003	10/23/2023	Radium 226 + Radium 228, total	1.03	pCi/L
G02D	Background	E003	10/23/2023	Selenium, total	0.00120 J+	mg/L



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G02D	Background	E003	10/23/2023	Specific Conductance @ 25C (field)	341	micromhos/cm
G02D	Background	E003	10/23/2023	Sulfate, total	15.0	mg/L
G02D	Background	E003	10/23/2023	Temperature	15.4	degrees C
G02D	Background	E003	10/23/2023	Thallium, total	0.001 U	mg/L
G02D	Background	E003	10/23/2023	Total Dissolved Solids	204	mg/L
G02D	Background	E003	10/23/2023	Turbidity, field	91.0	NTU
G03	Compliance	E003	10/23/2023	Antimony, total	0.0004 U	mg/L
G03	Compliance	E003	10/23/2023	Arsenic, total	0.001 UJ	mg/L
G03	Compliance	E003	10/23/2023	Barium, total	0.0652	mg/L
G03	Compliance	E003	10/23/2023	Beryllium, total	0.0002 U	mg/L
G03	Compliance	E003	10/23/2023	Boron, total	0.269	mg/L
G03	Compliance	E003	10/23/2023	Cadmium, total	0.0002 U	mg/L
G03	Compliance	E003	10/23/2023	Calcium, total	42.8	mg/L
G03	Compliance	E003	10/23/2023	Chloride, total	20.0	mg/L
G03	Compliance	E003	10/23/2023	Chromium, total	0.00230	mg/L
G03	Compliance	E003	10/23/2023	Cobalt, total	0.001 UJ	mg/L
G03	Compliance	E003	10/23/2023	Dissolved Oxygen	3.66	mg/L
G03	Compliance	E003	10/23/2023	Fluoride, total	0.200 J+	mg/L
G03	Compliance	E003	10/23/2023	Lead, total	0.001 UJ	mg/L
G03	Compliance	E003	10/23/2023	Lithium, total	0.003 UJ	mg/L
G03	Compliance	E003	10/23/2023	Mercury, total	0.00006 U	mg/L
G03	Compliance	E003	10/23/2023	Molybdenum, total	0.0006 U	mg/L
G03	Compliance	E003	10/23/2023	Oxidation Reduction Potential	130	mV
G03	Compliance	E003	10/23/2023	pH (field)	6.4	SU
G03	Compliance	E003	10/23/2023	Radium 226 + Radium 228, total	1.23	pCi/L
G03	Compliance	E003	10/23/2023	Selenium, total	0.0006 U	mg/L
G03	Compliance	E003	10/23/2023	Specific Conductance @ 25C (field)	411	micromhos/cm
G03	Compliance	E003	10/23/2023	Sulfate, total	61.0	mg/L
G03	Compliance	E003	10/23/2023	Temperature	16.4	degrees C
G03	Compliance	E003	10/23/2023	Thallium, total	0.001 U	mg/L
G03	Compliance	E003	10/23/2023	Total Dissolved Solids	254	mg/L
G03	Compliance	E003	10/23/2023	Turbidity, field	110	NTU
G05	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G05	Compliance	E003	10/24/2023	Arsenic, total	0.001 UJ	mg/L
G05	Compliance	E003	10/24/2023	Barium, total	0.177	mg/L
G05	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G05	Compliance	E003	10/24/2023	Boron, total	0.0485	mg/L
G05	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G05	Compliance	E003	10/24/2023	Calcium, total	50.4	mg/L
G05	Compliance	E003	10/24/2023	Chloride, total	22.0	mg/L
G05	Compliance	E003	10/24/2023	Chromium, total	0.0008 U	mg/L
G05	Compliance	E003	10/24/2023	Cobalt, total	0.00200 J+	mg/L
G05	Compliance	E003	10/24/2023	Dissolved Oxygen	1.21	mg/L
G05	Compliance	E003	10/24/2023	Fluoride, total	0.440	mg/L
G05	Compliance	E003	10/24/2023	Lead, total	0.0006 U	mg/L
G05	Compliance	E003	10/24/2023	Lithium, total	0.003 UJ	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G05	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G05	Compliance	E003	10/24/2023	Molybdenum, total	0.00250 J+	mg/L
G05	Compliance	E003	10/24/2023	Oxidation Reduction Potential	45.0	mV
G05	Compliance	E003	10/24/2023	pH (field)	6.4	SU
G05	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	0.82	pCi/L
G05	Compliance	E003	10/24/2023	Selenium, total	0.001 UJ	mg/L
G05	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	460	micromhos/cm
G05	Compliance	E003	10/24/2023	Sulfate, total	92.0	mg/L
G05	Compliance	E003	10/24/2023	Temperature	17.7	degrees C
G05	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G05	Compliance	E003	10/24/2023	Total Dissolved Solids	358	mg/L
G05	Compliance	E003	10/24/2023	Turbidity, field	7.30	NTU
G06	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G06	Compliance	E003	10/24/2023	Arsenic, total	0.0004 U	mg/L
G06	Compliance	E003	10/24/2023	Barium, total	0.0363 J+	mg/L
G06	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G06	Compliance	E003	10/24/2023	Boron, total	3.73	mg/L
G06	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G06	Compliance	E003	10/24/2023	Calcium, total	82.5	mg/L
G06	Compliance	E003	10/24/2023	Chloride, total	22.0	mg/L
G06	Compliance	E003	10/24/2023	Chromium, total	0.00190	mg/L
G06	Compliance	E003	10/24/2023	Cobalt, total	0.001 UJ	mg/L
G06	Compliance	E003	10/24/2023	Dissolved Oxygen	0.760	mg/L
G06	Compliance	E003	10/24/2023	Fluoride, total	0.290 J+	mg/L
G06	Compliance	E003	10/24/2023	Lead, total	0.001 UJ	mg/L
G06	Compliance	E003	10/24/2023	Lithium, total	0.00470 J+	mg/L
G06	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G06	Compliance	E003	10/24/2023	Molybdenum, total	0.0006 U	mg/L
G06	Compliance	E003	10/24/2023	Oxidation Reduction Potential	116	mV
G06	Compliance	E003	10/24/2023	pH (field)	6.6	SU
G06	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	1.29	pCi/L
G06	Compliance	E003	10/24/2023	Selenium, total	0.0006 U	mg/L
G06	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	593	micromhos/cm
G06	Compliance	E003	10/24/2023	Sulfate, total	196	mg/L
G06	Compliance	E003	10/24/2023	Temperature	15.7	degrees C
G06	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G06	Compliance	E003	10/24/2023	Total Dissolved Solids	474	mg/L
G06	Compliance	E003	10/24/2023	Turbidity, field	18.0	NTU
G07	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G07	Compliance	E003	10/24/2023	Arsenic, total	0.0004 U	mg/L
G07	Compliance	E003	10/24/2023	Barium, total	0.0429	mg/L
G07	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G07	Compliance	E003	10/24/2023	Boron, total	5.05	mg/L
G07	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G07	Compliance	E003	10/24/2023	Calcium, total	95.7	mg/L
G07	Compliance	E003	10/24/2023	Chloride, total	21.0	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G07	Compliance	E003	10/24/2023	Chromium, total	0.0008 U	mg/L
G07	Compliance	E003	10/24/2023	Cobalt, total	0.001 UJ	mg/L
G07	Compliance	E003	10/24/2023	Dissolved Oxygen	0.880	mg/L
G07	Compliance	E003	10/24/2023	Fluoride, total	0.410	mg/L
G07	Compliance	E003	10/24/2023	Lead, total	0.0006 U	mg/L
G07	Compliance	E003	10/24/2023	Lithium, total	0.00310 J+	mg/L
G07	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G07	Compliance	E003	10/24/2023	Molybdenum, total	0.0006 U	mg/L
G07	Compliance	E003	10/24/2023	Oxidation Reduction Potential	131	mV
G07	Compliance	E003	10/24/2023	pH (field)	6.4	SU
G07	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	0.737	pCi/L
G07	Compliance	E003	10/24/2023	Selenium, total	0.0006 U	mg/L
G07	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	709	micromhos/cm
G07	Compliance	E003	10/24/2023	Sulfate, total	285	mg/L
G07	Compliance	E003	10/24/2023	Temperature	15.8	degrees C
G07	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G07	Compliance	E003	10/24/2023	Total Dissolved Solids	618	mg/L
G07	Compliance	E003	10/24/2023	Turbidity, field	10.0	NTU
G08	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G08	Compliance	E003	10/24/2023	Arsenic, total	0.0145	mg/L
G08	Compliance	E003	10/24/2023	Barium, total	0.105	mg/L
G08	Compliance	E003	10/24/2023	Beryllium, total	0.0004 J	mg/L
G08	Compliance	E003	10/24/2023	Boron, total	5.28	mg/L
G08	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G08	Compliance	E003	10/24/2023	Calcium, total	140	mg/L
G08	Compliance	E003	10/24/2023	Chloride, total	17.0	mg/L
G08	Compliance	E003	10/24/2023	Chromium, total	0.00650	mg/L
G08	Compliance	E003	10/24/2023	Cobalt, total	0.00660 J+	mg/L
G08	Compliance	E003	10/24/2023	Dissolved Oxygen	3.34	mg/L
G08	Compliance	E003	10/24/2023	Fluoride, total	0.290 J+	mg/L
G08	Compliance	E003	10/24/2023	Lead, total	0.00320 J+	mg/L
G08	Compliance	E003	10/24/2023	Lithium, total	0.00320 J+	mg/L
G08	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G08	Compliance	E003	10/24/2023	Molybdenum, total	0.00300 J+	mg/L
G08	Compliance	E003	10/24/2023	Oxidation Reduction Potential	29.0	mV
G08	Compliance	E003	10/24/2023	pH (field)	7.0	SU
G08	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	5.61	pCi/L
G08	Compliance	E003	10/24/2023	Selenium, total	0.0006 U	mg/L
G08	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	910	micromhos/cm
G08	Compliance	E003	10/24/2023	Sulfate, total	389	mg/L
G08	Compliance	E003	10/24/2023	Temperature	18.2	degrees C
G08	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G08	Compliance	E003	10/24/2023	Total Dissolved Solids	660	mg/L
G08	Compliance	E003	10/24/2023	Turbidity, field	24.0	NTU
G09	Compliance	E003	10/25/2023	Antimony, total	0.0004 U	mg/L
G09	Compliance	E003	10/25/2023	Arsenic, total	0.00270 J+	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G09	Compliance	E003	10/25/2023	Barium, total	0.0312 J+	mg/L
G09	Compliance	E003	10/25/2023	Beryllium, total	0.0002 U	mg/L
G09	Compliance	E003	10/25/2023	Boron, total	3.50	mg/L
G09	Compliance	E003	10/25/2023	Cadmium, total	0.0002 U	mg/L
G09	Compliance	E003	10/25/2023	Calcium, total	62.3	mg/L
G09	Compliance	E003	10/25/2023	Chloride, total	17.0	mg/L
G09	Compliance	E003	10/25/2023	Chromium, total	0.00150	mg/L
G09	Compliance	E003	10/25/2023	Cobalt, total	0.00270 J+	mg/L
G09	Compliance	E003	10/25/2023	Dissolved Oxygen	0.900	mg/L
G09	Compliance	E003	10/25/2023	Fluoride, total	0.310 J+	mg/L
G09	Compliance	E003	10/25/2023	Lead, total	0.0006 U	mg/L
G09	Compliance	E003	10/25/2023	Lithium, total	0.00340 J+	mg/L
G09	Compliance	E003	10/25/2023	Mercury, total	0.00006 U	mg/L
G09	Compliance	E003	10/25/2023	Molybdenum, total	0.002 UJ	mg/L
G09	Compliance	E003	10/25/2023	Oxidation Reduction Potential	-3.00	mV
G09	Compliance	E003	10/25/2023	pH (field)	6.2	SU
G09	Compliance	E003	10/25/2023	Radium 226 + Radium 228, total	1.09	pCi/L
G09	Compliance	E003	10/25/2023	Selenium, total	0.0006 U	mg/L
G09	Compliance	E003	10/25/2023	Specific Conductance @ 25C (field)	601	micromhos/cm
G09	Compliance	E003	10/25/2023	Sulfate, total	245	mg/L
G09	Compliance	E003	10/25/2023	Temperature	18.1	degrees C
G09	Compliance	E003	10/25/2023	Thallium, total	0.001 U	mg/L
G09	Compliance	E003	10/25/2023	Total Dissolved Solids	472	mg/L
G09	Compliance	E003	10/25/2023	Turbidity, field	8.10	NTU
G10	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G10	Compliance	E003	10/24/2023	Arsenic, total	0.00260 J+	mg/L
G10	Compliance	E003	10/24/2023	Barium, total	0.0385 J+	mg/L
G10	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G10	Compliance	E003	10/24/2023	Boron, total	2.35	mg/L
G10	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G10	Compliance	E003	10/24/2023	Calcium, total	117	mg/L
G10	Compliance	E003	10/24/2023	Chloride, total	26.0	mg/L
G10	Compliance	E003	10/24/2023	Chromium, total	0.00360	mg/L
G10	Compliance	E003	10/24/2023	Cobalt, total	0.00220 J+	mg/L
G10	Compliance	E003	10/24/2023	Dissolved Oxygen	1.49	mg/L
G10	Compliance	E003	10/24/2023	Fluoride, total	0.350 J+	mg/L
G10	Compliance	E003	10/24/2023	Lead, total	0.0006 U	mg/L
G10	Compliance	E003	10/24/2023	Lithium, total	0.00470 J+	mg/L
G10	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G10	Compliance	E003	10/24/2023	Molybdenum, total	0.002 UJ	mg/L
G10	Compliance	E003	10/24/2023	Oxidation Reduction Potential	23.0	mV
G10	Compliance	E003	10/24/2023	pH (field)	6.6	SU
G10	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	1.5	pCi/L
G10	Compliance	E003	10/24/2023	Selenium, total	0.0006 U	mg/L
G10	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	1,100	micromhos/cm
G10	Compliance	E003	10/24/2023	Sulfate, total	375	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G10	Compliance	E003	10/24/2023	Temperature	17.4	degrees C
G10	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G10	Compliance	E003	10/24/2023	Total Dissolved Solids	800	mg/L
G10	Compliance	E003	10/24/2023	Turbidity, field	46.0	NTU
G11	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G11	Compliance	E003	10/24/2023	Arsenic, total	0.0004 U	mg/L
G11	Compliance	E003	10/24/2023	Barium, total	0.0217 J+	mg/L
G11	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G11	Compliance	E003	10/24/2023	Boron, total	0.282	mg/L
G11	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G11	Compliance	E003	10/24/2023	Calcium, total	54.4	mg/L
G11	Compliance	E003	10/24/2023	Chloride, total	30.0	mg/L
G11	Compliance	E003	10/24/2023	Chromium, total	0.0009 J	mg/L
G11	Compliance	E003	10/24/2023	Cobalt, total	0.001 UJ	mg/L
G11	Compliance	E003	10/24/2023	Dissolved Oxygen	2.23	mg/L
G11	Compliance	E003	10/24/2023	Fluoride, total	0.140 J+	mg/L
G11	Compliance	E003	10/24/2023	Lead, total	0.0006 U	mg/L
G11	Compliance	E003	10/24/2023	Lithium, total	0.00350 J+	mg/L
G11	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G11	Compliance	E003	10/24/2023	Molybdenum, total	0.0006 U	mg/L
G11	Compliance	E003	10/24/2023	Oxidation Reduction Potential	124	mV
G11	Compliance	E003	10/24/2023	pH (field)	5.9	SU
G11	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	1.51	pCi/L
G11	Compliance	E003	10/24/2023	Selenium, total	0.00150 J+	mg/L
G11	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	600	micromhos/cm
G11	Compliance	E003	10/24/2023	Sulfate, total	180	mg/L
G11	Compliance	E003	10/24/2023	Temperature	18.0	degrees C
G11	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G11	Compliance	E003	10/24/2023	Total Dissolved Solids	402	mg/L
G11	Compliance	E003	10/24/2023	Turbidity, field	9.00	NTU
G51D	Compliance	E003	10/25/2023	Antimony, total	0.0004 U	mg/L
G51D	Compliance	E003	10/25/2023	Arsenic, total	0.0004 U	mg/L
G51D	Compliance	E003	10/25/2023	Barium, total	0.0433	mg/L
G51D	Compliance	E003	10/25/2023	Beryllium, total	0.0002 U	mg/L
G51D	Compliance	E003	10/25/2023	Boron, total	0.603	mg/L
G51D	Compliance	E003	10/25/2023	Cadmium, total	0.0002 U	mg/L
G51D	Compliance	E003	10/25/2023	Calcium, total	31.5	mg/L
G51D	Compliance	E003	10/25/2023	Chloride, total	4.00	mg/L
G51D	Compliance	E003	10/25/2023	Chromium, total	0.001 J	mg/L
G51D	Compliance	E003	10/25/2023	Cobalt, total	0.001 UJ	mg/L
G51D	Compliance	E003	10/25/2023	Dissolved Oxygen	1.89	mg/L
G51D	Compliance	E003	10/25/2023	Fluoride, total	0.100 J+	mg/L
G51D	Compliance	E003	10/25/2023	Lead, total	0.0006 U	mg/L
G51D	Compliance	E003	10/25/2023	Lithium, total	0.00530 J+	mg/L
G51D	Compliance	E003	10/25/2023	Mercury, total	0.00006 U	mg/L
G51D	Compliance	E003	10/25/2023	Molybdenum, total	0.00150 J+	mg/L



**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G51D	Compliance	E003	10/25/2023	Oxidation Reduction Potential	170	mV
G51D	Compliance	E003	10/25/2023	pH (field)	5.3	SU
G51D	Compliance	E003	10/25/2023	Radium 226 + Radium 228, total	0.82	pCi/L
G51D	Compliance	E003	10/25/2023	Selenium, total	0.00410 J+	mg/L
G51D	Compliance	E003	10/25/2023	Specific Conductance @ 25C (field)	332	micromhos/cm
G51D	Compliance	E003	10/25/2023	Sulfate, total	120	mg/L
G51D	Compliance	E003	10/25/2023	Temperature	17.1	degrees C
G51D	Compliance	E003	10/25/2023	Thallium, total	0.001 U	mg/L
G51D	Compliance	E003	10/25/2023	Total Dissolved Solids	270	mg/L
G51D	Compliance	E003	10/25/2023	Turbidity, field	4.00	NTU
G52D	Compliance	E003	10/24/2023	Antimony, total	0.0004 U	mg/L
G52D	Compliance	E003	10/24/2023	Arsenic, total	0.00130 J+	mg/L
G52D	Compliance	E003	10/24/2023	Barium, total	0.354	mg/L
G52D	Compliance	E003	10/24/2023	Beryllium, total	0.0002 U	mg/L
G52D	Compliance	E003	10/24/2023	Boron, total	0.021 J	mg/L
G52D	Compliance	E003	10/24/2023	Cadmium, total	0.0002 U	mg/L
G52D	Compliance	E003	10/24/2023	Calcium, total	47.9	mg/L
G52D	Compliance	E003	10/24/2023	Chloride, total	12.0	mg/L
G52D	Compliance	E003	10/24/2023	Chromium, total	0.0008 U	mg/L
G52D	Compliance	E003	10/24/2023	Cobalt, total	0.00340 J+	mg/L
G52D	Compliance	E003	10/24/2023	Dissolved Oxygen	1.51	mg/L
G52D	Compliance	E003	10/24/2023	Fluoride, total	0.290 J+	mg/L
G52D	Compliance	E003	10/24/2023	Lead, total	0.0006 U	mg/L
G52D	Compliance	E003	10/24/2023	Lithium, total	0.003 UJ	mg/L
G52D	Compliance	E003	10/24/2023	Mercury, total	0.00006 U	mg/L
G52D	Compliance	E003	10/24/2023	Molybdenum, total	0.0006 U	mg/L
G52D	Compliance	E003	10/24/2023	Oxidation Reduction Potential	0	mV
G52D	Compliance	E003	10/24/2023	pH (field)	6.3	SU
G52D	Compliance	E003	10/24/2023	Radium 226 + Radium 228, total	1.38 J	pCi/L
G52D	Compliance	E003	10/24/2023	Selenium, total	0.0006 U	mg/L
G52D	Compliance	E003	10/24/2023	Specific Conductance @ 25C (field)	393	micromhos/cm
G52D	Compliance	E003	10/24/2023	Sulfate, total	52.0	mg/L
G52D	Compliance	E003	10/24/2023	Temperature	16.6	degrees C
G52D	Compliance	E003	10/24/2023	Thallium, total	0.001 U	mg/L
G52D	Compliance	E003	10/24/2023	Total Dissolved Solids	296	mg/L
G52D	Compliance	E003	10/24/2023	Turbidity, field	1.60	NTU
G53D	Compliance	E003	10/25/2023	Antimony, total	0.0004 U	mg/L
G53D	Compliance	E003	10/25/2023	Arsenic, total	0.0004 U	mg/L
G53D	Compliance	E003	10/25/2023	Barium, total	0.107	mg/L
G53D	Compliance	E003	10/25/2023	Beryllium, total	0.0002 U	mg/L
G53D	Compliance	E003	10/25/2023	Boron, total	0.349	mg/L
G53D	Compliance	E003	10/25/2023	Cadmium, total	0.0002 U	mg/L
G53D	Compliance	E003	10/25/2023	Calcium, total	38.6	mg/L
G53D	Compliance	E003	10/25/2023	Chloride, total	18.0	mg/L
G53D	Compliance	E003	10/25/2023	Chromium, total	0.0011 J	mg/L
G53D	Compliance	E003	10/25/2023	Cobalt, total	0.00120 J+	mg/L

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Event	Date	Parameter	Result	Unit
G53D	Compliance	E003	10/25/2023	Dissolved Oxygen	0.680	mg/L
G53D	Compliance	E003	10/25/2023	Fluoride, total	0.740	mg/L
G53D	Compliance	E003	10/25/2023	Lead, total	0.0006 U	mg/L
G53D	Compliance	E003	10/25/2023	Lithium, total	0.0015 U	mg/L
G53D	Compliance	E003	10/25/2023	Mercury, total	0.00006 U	mg/L
G53D	Compliance	E003	10/25/2023	Molybdenum, total	0.002 UJ	mg/L
G53D	Compliance	E003	10/25/2023	Oxidation Reduction Potential	49.0	mV
G53D	Compliance	E003	10/25/2023	pH (field)	6.5	SU
G53D	Compliance	E003	10/25/2023	Radium 226 + Radium 228, total	0.601	pCi/L
G53D	Compliance	E003	10/25/2023	Selenium, total	0.0006 U	mg/L
G53D	Compliance	E003	10/25/2023	Specific Conductance @ 25C (field)	412	micromhos/cm
G53D	Compliance	E003	10/25/2023	Sulfate, total	69.0	mg/L
G53D	Compliance	E003	10/25/2023	Temperature	17.7	degrees C
G53D	Compliance	E003	10/25/2023	Thallium, total	0.001 U	mg/L
G53D	Compliance	E003	10/25/2023	Total Dissolved Solids	312	mg/L
G53D	Compliance	E003	10/25/2023	Turbidity, field	4.60	NTU
G54D	Compliance	E003	10/25/2023	Antimony, total	0.0004 U	mg/L
G54D	Compliance	E003	10/25/2023	Arsenic, total	0.00130 J+	mg/L
G54D	Compliance	E003	10/25/2023	Barium, total	0.121	mg/L
G54D	Compliance	E003	10/25/2023	Beryllium, total	0.0003 J	mg/L
G54D	Compliance	E003	10/25/2023	Boron, total	0.396	mg/L
G54D	Compliance	E003	10/25/2023	Cadmium, total	0.0002 U	mg/L
G54D	Compliance	E003	10/25/2023	Calcium, total	87.5	mg/L
G54D	Compliance	E003	10/25/2023	Chloride, total	23.0	mg/L
G54D	Compliance	E003	10/25/2023	Chromium, total	0.00580	mg/L
G54D	Compliance	E003	10/25/2023	Cobalt, total	0.00880 J+	mg/L
G54D	Compliance	E003	10/25/2023	Dissolved Oxygen	0.530	mg/L
G54D	Compliance	E003	10/25/2023	Fluoride, total	0.310 J+	mg/L
G54D	Compliance	E003	10/25/2023	Lead, total	0.00150 J+	mg/L
G54D	Compliance	E003	10/25/2023	Lithium, total	0.00320 J+	mg/L
G54D	Compliance	E003	10/25/2023	Mercury, total	0.00006 U	mg/L
G54D	Compliance	E003	10/25/2023	Molybdenum, total	0.002 UJ	mg/L
G54D	Compliance	E003	10/25/2023	Oxidation Reduction Potential	-32.0	mV
G54D	Compliance	E003	10/25/2023	pH (field)	6.6	SU
G54D	Compliance	E003	10/25/2023	Radium 226 + Radium 228, total	1.41	pCi/L
G54D	Compliance	E003	10/25/2023	Selenium, total	0.001 UJ	mg/L
G54D	Compliance	E003	10/25/2023	Specific Conductance @ 25C (field)	643	micromhos/cm
G54D	Compliance	E003	10/25/2023	Sulfate, total	192	mg/L
G54D	Compliance	E003	10/25/2023	Temperature	17.2	degrees C
G54D	Compliance	E003	10/25/2023	Thallium, total	0.001 U	mg/L
G54D	Compliance	E003	10/25/2023	Total Dissolved Solids	502	mg/L
G54D	Compliance	E003	10/25/2023	Turbidity, field	190	NTU

**TABLE 1.**  
**FIELD PARAMETERS AND ANALYTICAL RESULTS - QUARTER 4, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

C = Celsius

cm = centimeter

mg/L = milligrams per liter

mV = millivolts

NTU = Nephelometric Turbidity Units

pCi/L = picocuries per liter

SU = Standard Units

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

U = The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G03	UA	E001	Antimony, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G03	UA	E001	Arsenic, total	mg/L	03/05/21 - 05/03/23	11	36	CI around geomean	0.00113	0.01	Standard	No Exceedance
G03	UA	E001	Barium, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.0572	2	Standard	No Exceedance
G03	UA	E001	Beryllium, total	mg/L	03/05/21 - 05/03/23	11	91	CI around median	0.001	0.004	Standard	No Exceedance
G03	UA	E001	Boron, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.224	2	Standard	No Exceedance
G03	UA	E001	Cadmium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G03	UA	E001	Chloride, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	20.9	200	Standard	No Exceedance
G03	UA	E001	Chromium, total	mg/L	03/05/21 - 05/03/23	11	9	CI around mean	0.00303	0.1	Standard	No Exceedance
G03	UA	E001	Cobalt, total	mg/L	03/05/21 - 05/03/23	11	27	CI around geomean	0.00141	0.006	Standard	No Exceedance
G03	UA	E001	Fluoride, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.189	4	Standard	No Exceedance
G03	UA	E001	Lead, total	mg/L	03/05/21 - 05/03/23	11	27	CI around geomean	0.00117	0.0075	Standard	No Exceedance
G03	UA	E001	Lithium, total	mg/L	03/05/21 - 05/03/23	11	64	CI around median	0.003	0.04	Standard	No Exceedance
G03	UA	E001	Mercury, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G03	UA	E001	Molybdenum, total	mg/L	03/05/21 - 05/03/23	11	82	CI around median	0.0015	0.1	Standard	No Exceedance
G03	UA	E001	Selenium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G03	UA	E001	Sulfate, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	72.3	400	Standard	No Exceedance
G03	UA	E001	Thallium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G03	UA	E001	Total Dissolved Solids	mg/L	03/05/21 - 05/03/23	11	0	CI around geomean	286	1,200	Standard	No Exceedance
G03	UA	E001	pH (field)	SU	03/05/21 - 05/03/23	11	0	CI around mean	6.2/6.4	6/9	Background/Standard	No Exceedance
G05	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G05	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.01	Standard	No Exceedance
G05	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.161	2	Standard	No Exceedance
G05	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G05	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.000444	2	Standard	No Exceedance
G05	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G05	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	16.2	200	Standard	No Exceedance
G05	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.0015	0.1	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
 845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G05	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.007	0.006	Standard	Determined
G05	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.312	4	Standard	No Exceedance
G05	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G05	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.003	0.04	Standard	No Exceedance
G05	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G05	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00402	0.1	Standard	No Exceedance
G05	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	27	CB around linear reg	-0.000273	0.05	Standard	No Exceedance
G05	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	82.1	400	Standard	No Exceedance
G05	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.002	0.002	Standard	No Exceedance
G05	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	351	1,200	Standard	No Exceedance
G05	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.4/6.5	6/9	Background/Standard	No Exceedance
G06	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.001	0.01	Standard	No Exceedance
G06	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0273	2	Standard	No Exceedance
G06	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G06	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	3.05	2	Standard	Determined
G06	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G06	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	21	200	Standard	No Exceedance
G06	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	36	CI around mean	0.00119	0.1	Standard	No Exceedance
G06	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	54	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.252	4	Standard	No Exceedance
G06	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0075	Standard	No Exceedance
G06	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around median	0.0031	0.04	Standard	No Exceedance
G06	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G06	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.1	Standard	No Exceedance
G06	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G06	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	212	400	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
 845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G06	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G06	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	511	1,200	Standard	No Exceedance
G06	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	10	0	CI around mean	6.4/6.6	6/9	Background/Standard	No Exceedance
G07	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G07	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.01	Standard	No Exceedance
G07	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	0.0426	2	Standard	No Exceedance
G07	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.004	Standard	No Exceedance
G07	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	4.26	2	Standard	Determined
G07	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G07	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	20.1	200	Standard	No Exceedance
G07	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	36	CI around geomean	0.00187	0.1	Standard	No Exceedance
G07	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.00142	0.006	Standard	No Exceedance
G07	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	0.35	4	Standard	No Exceedance
G07	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.0075	Standard	No Exceedance
G07	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.003	0.04	Standard	No Exceedance
G07	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G07	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.0015	0.1	Standard	No Exceedance
G07	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G07	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	247	400	Standard	No Exceedance
G07	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G07	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	568	1,200	Standard	No Exceedance
G07	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.1/6.6	6/9	Background/Standard	No Exceedance
G08	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G08	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00569	0.01	Standard	No Exceedance
G08	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0467	2	Standard	No Exceedance
G08	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.004	Standard	No Exceedance
G08	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	4.08	2	Standard	Determined

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G08	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G08	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	14	200	Standard	No Exceedance
G08	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around geomean	0.00164	0.1	Standard	No Exceedance
G08	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00287	0.006	Standard	No Exceedance
G08	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.195	4	Standard	No Exceedance
G08	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0075	Standard	No Exceedance
G08	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.003	0.04	Standard	No Exceedance
G08	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G08	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0017	0.1	Standard	No Exceedance
G08	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G08	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	211	400	Standard	No Exceedance
G08	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G08	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	541	1,200	Standard	No Exceedance
G08	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	6.8/7.0	6/9	Background/Standard	No Exceedance
G09	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.006	Standard	No Exceedance
G09	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	18	CI around mean	0.00215	0.01	Standard	No Exceedance
G09	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0371	2	Standard	No Exceedance
G09	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.004	Standard	No Exceedance
G09	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	3.15	2	Standard	Determined
G09	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G09	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	14.6	200	Standard	No Exceedance
G09	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around mean	0.00177	0.1	Standard	No Exceedance
G09	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	-0.00203	0.006	Standard	No Exceedance
G09	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.275	4	Standard	No Exceedance
G09	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.001	0.0075	Standard	No Exceedance
G09	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0034	0.04	Standard	No Exceedance
G09	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G09	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.1	Standard	No Exceedance
G09	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.05	Standard	No Exceedance
G09	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	267	400	Standard	No Exceedance
G09	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G09	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	477	1,200	Standard	No Exceedance
G09	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	6.0/6.4	6/9	Background/Standard	No Exceedance
G10	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G10	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	36	CI around median	0.001	0.01	Standard	No Exceedance
G10	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0401	2	Standard	No Exceedance
G10	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.004	Standard	No Exceedance
G10	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	3.65	2	Standard	Determined
G10	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G10	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	26	200	Standard	No Exceedance
G10	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around mean	0.00138	0.1	Standard	No Exceedance
G10	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	-0.00146	0.006	Standard	No Exceedance
G10	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.275	4	Standard	No Exceedance
G10	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0075	Standard	No Exceedance
G10	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	46	CI around median	0.003	0.04	Standard	No Exceedance
G10	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G10	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.0015	0.1	Standard	No Exceedance
G10	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G10	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	375	400	Standard	No Exceedance
G10	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G10	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	753	1,200	Standard	No Exceedance
G10	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.5/6.7	6/9	Background/Standard	No Exceedance
G11	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G11	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.01	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G11	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	0.0122	2	Standard	No Exceedance
G11	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.004	Standard	No Exceedance
G11	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.286	2	Standard	No Exceedance
G11	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G11	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	33.6	200	Standard	No Exceedance
G11	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	27	CI around geomean	0.000965	0.006	Standard	No Exceedance
G11	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.174	4	Standard	No Exceedance
G11	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G11	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0036	0.04	Standard	No Exceedance
G11	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G11	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.00444	0.05	Standard	No Exceedance
G11	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	392	400	Standard	No Exceedance
G11	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.002	0.002	Standard	No Exceedance
G11	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	755	1,200	Standard	No Exceedance
G11	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	5.8/5.9	6/9	Background/Standard	Determined
G51D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G51D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.01	0.01	Standard	No Exceedance
G51D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CI around median	0.0417	2	Standard	No Exceedance
G51D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G51D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	0.465	2	Standard	No Exceedance
G51D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G51D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	2.81	200	Standard	No Exceedance
G51D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	76	CB around T-S line	0.00144	0.1	Standard	No Exceedance
G51D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	10	CB around T-S line	-0.0129	0.006	Standard	No Exceedance
G51D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	86	CI around median	0.1	4	Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G51D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G51D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	5	CB around T-S line	0.00567	0.04	Standard	No Exceedance
G51D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G51D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	100	All ND - Last	0.01	0.1	Standard	No Exceedance
G51D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	5	CB around T-S line	0.00426	0.05	Standard	No Exceedance
G51D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	121	400	Standard	No Exceedance
G51D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G51D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	313	1,200	Standard	No Exceedance
G51D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CB around T-S line	5.2/5.5	6/9	Background/Standard	Determined
G52D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G52D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	20	10	CI around mean	0.00205	0.01	Standard	No Exceedance
G52D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	20	0	CB around linear reg	0.108	2	Standard	No Exceedance
G52D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G52D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	21	90	CI around median	0.025	2	Standard	No Exceedance
G52D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G52D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	6.86	200	Standard	No Exceedance
G52D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	20	100	All ND - Last	0.005	0.1	Standard	No Exceedance
G52D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	20	0	CI around mean	0.0028	0.006	Standard	No Exceedance
G52D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	21	0	CI around median	0.24	4	Standard	No Exceedance
G52D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	20	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G52D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	20	40	CI around geomean	0.0025	0.04	Standard	No Exceedance
G52D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G52D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	16	75	CI around median	0.001	0.1	Standard	No Exceedance
G52D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	20	95	CI around median	0.001	0.05	Standard	No Exceedance
G52D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	21	0	CI around mean	80.1	400	Standard	No Exceedance
G52D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G52D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	21	0	CI around mean	336	1,200	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G52D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	21	0	CI around mean	6.2/6.4	6/9	Background/Standard	No Exceedance
G53D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G53D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.01	0.01	Standard	No Exceedance
G53D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	0.0193	2	Standard	No Exceedance
G53D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G53D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	0.334	2	Standard	No Exceedance
G53D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G53D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	18	200	Standard	No Exceedance
G53D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	86	CB around T-S line	0.00144	0.1	Standard	No Exceedance
G53D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	19	CI around geomean	0.0014	0.006	Standard	No Exceedance
G53D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	0.636	4	Standard	No Exceedance
G53D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G53D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	52	CB around T-S line	0.00266	0.04	Standard	No Exceedance
G53D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G53D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	88	CB around T-S line	0.001	0.1	Standard	No Exceedance
G53D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G53D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	37.7	400	Standard	No Exceedance
G53D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G53D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	255	1,200	Standard	No Exceedance
G53D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CI around median	6.5/6.8	6/9	Background/Standard	No Exceedance
G54D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G54D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	48	CB around T-S line	-0.000438	0.01	Standard	No Exceedance
G54D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CB around T-S line	0.0631	2	Standard	No Exceedance
G54D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.004	Standard	No Exceedance
G54D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	0.469	2	Standard	No Exceedance
G54D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.005	Standard	No Exceedance
G54D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	4	CB around T-S line	9.56	200	Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**  
 845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance Type
G54D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	67	CI around median	0.0015	0.1	Standard	No Exceedance
G54D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	0.0031	0.006	Standard	No Exceedance
G54D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	0	CB around linear reg	0.257	4	Standard	No Exceedance
G54D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0075	Standard	No Exceedance
G54D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	14	CB around linear reg	0.00109	0.04	Standard	No Exceedance
G54D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G54D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	94	CB around T-S line	0.001	0.1	Standard	No Exceedance
G54D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G54D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CB around linear reg	175	400	Standard	No Exceedance
G54D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G54D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	490	1,200	Standard	No Exceedance
G54D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CI around mean	6.6/6.8	6/9	Background/Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 2, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Determined: An exceedance was determined without resampling

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range

For pH, the values presented are the lower / upper limits

GWPS = Groundwater Protection Standard

GWPS Source:

Standard = standard specified in 35 I.A.C. § 845.600(a)(1)

Background = background concentration (see cover page for additional information)

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G03	UA	E002	Antimony, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G03	UA	E002	Arsenic, total	mg/L	03/05/21 - 09/26/23	12	42	CI around geomean	0.0011	0.010	Standard	No Exceedance
G03	UA	E002	Barium, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.059	2.0	Standard	No Exceedance
G03	UA	E002	Beryllium, total	mg/L	03/05/21 - 09/26/23	12	92	CI around median	0.001	0.004	Standard	No Exceedance
G03	UA	E002	Boron, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.228	2	Standard	No Exceedance
G03	UA	E002	Cadmium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G03	UA	E002	Chloride, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	20.6	200	Standard	No Exceedance
G03	UA	E002	Chromium, total	mg/L	03/05/21 - 09/26/23	12	8	CI around mean	0.00291	0.1	Standard	No Exceedance
G03	UA	E002	Cobalt, total	mg/L	03/05/21 - 09/26/23	12	25	CI around geomean	0.0014	0.006	Standard	No Exceedance
G03	UA	E002	Fluoride, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.191	4.0	Standard	No Exceedance
G03	UA	E002	Lead, total	mg/L	03/05/21 - 09/26/23	12	33	CI around geomean	0.00113	0.0075	Standard	No Exceedance
G03	UA	E002	Lithium, total	mg/L	03/05/21 - 09/26/23	12	67	CI around median	0.003	0.04	Standard	No Exceedance
G03	UA	E002	Mercury, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G03	UA	E002	Molybdenum, total	mg/L	03/05/21 - 09/26/23	12	83	CI around median	0.0015	0.1	Standard	No Exceedance
G03	UA	E002	pH (field)	SU	03/05/21 - 09/26/23	12	0	CI around mean	6.2/6.4	6.0/9.0	Background/Standard	No Exceedance
G03	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/05/21 - 09/26/23	12	0	CI around mean	0.307	5	Standard	No Exceedance
G03	UA	E002	Selenium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G03	UA	E002	Sulfate, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	71.2	400	Standard	No Exceedance
G03	UA	E002	Thallium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G03	UA	E002	Total Dissolved Solids	mg/L	03/05/21 - 09/26/23	12	0	CI around median	284	1,200	Standard	No Exceedance
G05	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G05	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.010	Standard	No Exceedance
G05	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CB around linear reg	0.159	2.0	Standard	No Exceedance
G05	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G05	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CB around linear reg	-0.0117	2	Standard	No Exceedance
G05	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G05	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	16.6	200	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G05	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.0015	0.1	Standard	No Exceedance
G05	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.00601	0.006	Standard	Exceedance
G05	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.314	4.0	Standard	No Exceedance
G05	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G05	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.003	0.04	Standard	No Exceedance
G05	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G05	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	8	CI around mean	0.00408	0.1	Standard	No Exceedance
G05	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	12	0	CI around mean	6.4/6.5	6.0/9.0	Background/Standard	No Exceedance
G05	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.344	5	Standard	No Exceedance
G05	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	25	CB around linear reg	-0.000179	0.05	Standard	No Exceedance
G05	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	82	400	Standard	No Exceedance
G05	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.002	0.002	Standard	No Exceedance
G05	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	352	1,200	Standard	No Exceedance
G06	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	58	CI around median	0.001	0.010	Standard	No Exceedance
G06	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.0269	2.0	Standard	No Exceedance
G06	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G06	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	3.08	2	Standard	Exceedance
G06	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G06	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around median	21	200	Standard	No Exceedance
G06	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	33	CI around mean	0.00143	0.1	Standard	No Exceedance
G06	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	58	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.253	4.0	Standard	No Exceedance
G06	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	83	CI around median	0.001	0.0075	Standard	No Exceedance
G06	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	25	CI around median	0.0031	0.04	Standard	No Exceedance
G06	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G06	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0015	0.1	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G06	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	11	0	CI around mean	6.4/6.6	6.0/9.0	Background/Standard	No Exceedance
G06	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.48	5	Standard	No Exceedance
G06	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G06	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	207	400	Standard	No Exceedance
G06	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G06	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	506	1,200	Standard	No Exceedance
G07	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G07	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.001	0.010	Standard	No Exceedance
G07	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.0415	2.0	Standard	No Exceedance
G07	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.004	Standard	No Exceedance
G07	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	4.29	2	Standard	Exceedance
G07	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G07	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	20.2	200	Standard	No Exceedance
G07	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	33	CI around geomean	0.00196	0.1	Standard	No Exceedance
G07	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.00136	0.006	Standard	No Exceedance
G07	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around median	0.35	4.0	Standard	No Exceedance
G07	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.001	0.0075	Standard	No Exceedance
G07	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	67	CI around median	0.003	0.04	Standard	No Exceedance
G07	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G07	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.0015	0.1	Standard	No Exceedance
G07	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	12	0	CI around mean	6.2/6.6	6.0/9.0	Background/Standard	No Exceedance
G07	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CB around linear reg	1.09	5	Standard	No Exceedance
G07	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G07	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	249	400	Standard	No Exceedance
G07	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G07	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	572	1,200	Standard	No Exceedance
G08	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G08	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	8	CI around mean	0.00595	0.010	Standard	No Exceedance
G08	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CB around T-S line	-0.398	2.0	Standard	No Exceedance
G08	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.004	Standard	No Exceedance
G08	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	4.1	2	Standard	Exceedance
G08	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G08	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around median	14	200	Standard	No Exceedance
G08	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around geomean	0.00162	0.1	Standard	No Exceedance
G08	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	8	CI around geomean	0.00319	0.006	Standard	No Exceedance
G08	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	0.202	4.0	Standard	No Exceedance
G08	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.001	0.0075	Standard	No Exceedance
G08	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.003	0.04	Standard	No Exceedance
G08	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G08	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0017	0.1	Standard	No Exceedance
G08	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	6.8/7.0	6.0/9.0	Background/Standard	No Exceedance
G08	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around mean	0.372	5	Standard	No Exceedance
G08	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G08	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	214	400	Standard	No Exceedance
G08	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G08	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	548	1,200	Standard	No Exceedance
G09	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.006	Standard	No Exceedance
G09	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	17	CI around mean	0.00235	0.010	Standard	No Exceedance
G09	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00515	2.0	Standard	No Exceedance
G09	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	75	CI around median	0.001	0.004	Standard	No Exceedance
G09	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CB around T-S line	3.64	2	Standard	Exceedance
G09	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G09	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	13.6	200	Standard	No Exceedance
G09	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	25	CI around mean	0.00178	0.1	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G09	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00188	0.006	Standard	No Exceedance
G09	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.279	4.0	Standard	No Exceedance
G09	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	67	CI around median	0.001	0.0075	Standard	No Exceedance
G09	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0034	0.04	Standard	No Exceedance
G09	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G09	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0015	0.1	Standard	No Exceedance
G09	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	6.0/6.4	6.0/9.0	Background/Standard	No Exceedance
G09	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.249	5	Standard	No Exceedance
G09	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.05	Standard	No Exceedance
G09	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	260	400	Standard	No Exceedance
G09	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G09	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	453	1,200	Standard	No Exceedance
G10	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G10	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	33	CI around geomean	0.00111	0.010	Standard	No Exceedance
G10	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.039	2.0	Standard	No Exceedance
G10	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.004	Standard	No Exceedance
G10	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	3.61	2	Standard	Exceedance
G10	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G10	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	25.7	200	Standard	No Exceedance
G10	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	33	CI around mean	0.0013	0.1	Standard	No Exceedance
G10	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00202	0.006	Standard	No Exceedance
G10	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.272	4.0	Standard	No Exceedance
G10	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.001	0.0075	Standard	No Exceedance
G10	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	42	CI around median	0.003	0.04	Standard	No Exceedance
G10	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G10	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	58	CI around median	0.0015	0.1	Standard	No Exceedance
G10	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around mean	6.5/6.7	6.0/9.0	Background/Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G10	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around mean	0.503	5	Standard	No Exceedance
G10	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G10	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	372	400	Standard	No Exceedance
G10	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G10	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	743	1,200	Standard	No Exceedance
G11	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G11	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.010	Standard	No Exceedance
G11	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.0129	2.0	Standard	No Exceedance
G11	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.004	Standard	No Exceedance
G11	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.288	2	Standard	No Exceedance
G11	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G11	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	32.8	200	Standard	No Exceedance
G11	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	33	CI around geomean	0.000945	0.006	Standard	No Exceedance
G11	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.172	4.0	Standard	No Exceedance
G11	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.0075	Standard	No Exceedance
G11	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0035	0.04	Standard	No Exceedance
G11	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G11	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	5.8/6.0	6.0/9.0	Background/Standard	No Exceedance
G11	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.199	5	Standard	No Exceedance
G11	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.00401	0.05	Standard	No Exceedance
G11	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	2.87	400	Standard	No Exceedance
G11	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.002	0.002	Standard	No Exceedance
G11	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	693	1,200	Standard	No Exceedance
G51D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G51D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/25/23	22	100	All ND - Last	0.001	0.010	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G51D	UA	E002	Barium, total	mg/L	12/03/15 - 09/25/23	22	0	CB around T-S line	-0.00761	2.0	Standard	No Exceedance
G51D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G51D	UA	E002	Boron, total	mg/L	12/03/15 - 09/25/23	23	0	CB around T-S line	0.534	2	Standard	No Exceedance
G51D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G51D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/25/23	23	0	CB around T-S line	2.5	200	Standard	No Exceedance
G51D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/25/23	22	73	CB around T-S line	0.00116	0.1	Standard	No Exceedance
G51D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/25/23	22	14	CB around T-S line	-0.0152	0.006	Standard	No Exceedance
G51D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/25/23	23	87	CI around median	0.1	4.0	Standard	No Exceedance
G51D	UA	E002	Lead, total	mg/L	12/03/15 - 09/25/23	22	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G51D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/25/23	22	4	CB around T-S line	0.00579	0.04	Standard	No Exceedance
G51D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G51D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/25/23	18	100	All ND - Last	0.0015	0.1	Standard	No Exceedance
G51D	UA	E002	pH (field)	SU	12/03/15 - 09/25/23	23	0	CB around T-S line	5.2/5.4	6.0/9.0	Background/Standard	Exceedance
G51D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/25/23	22	0	CI around mean	0.452	5	Standard	No Exceedance
G51D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/25/23	22	4	CB around T-S line	0.00454	0.05	Standard	No Exceedance
G51D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/25/23	23	0	CI around median	121	400	Standard	No Exceedance
G51D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G51D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/25/23	23	0	CB around linear reg	284	1,200	Standard	No Exceedance
G52D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G52D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/26/23	21	10	CB around linear reg	-0.000734	0.010	Standard	No Exceedance
G52D	UA	E002	Barium, total	mg/L	12/03/15 - 09/26/23	21	0	CB around linear reg	0.113	2.0	Standard	No Exceedance
G52D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G52D	UA	E002	Boron, total	mg/L	12/03/15 - 09/26/23	22	91	CI around median	0.025	2	Standard	No Exceedance
G52D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G52D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	6.76	200	Standard	No Exceedance
G52D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/26/23	21	100	All ND - Last	0.0015	0.1	Standard	No Exceedance
G52D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/26/23	21	0	CI around mean	0.00287	0.006	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G52D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/26/23	22	0	CI around median	0.24	4.0	Standard	No Exceedance
G52D	UA	E002	Lead, total	mg/L	12/03/15 - 09/26/23	21	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G52D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/26/23	21	43	CI around geomean	0.0025	0.04	Standard	No Exceedance
G52D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G52D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/26/23	17	76	CI around median	0.001	0.1	Standard	No Exceedance
G52D	UA	E002	pH (field)	SU	12/03/15 - 09/26/23	22	0	CI around mean	6.2/6.4	6.0/9.0	Background/Standard	No Exceedance
G52D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/26/23	21	0	CI around mean	0.824	5	Standard	No Exceedance
G52D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/26/23	21	95	CI around median	0.001	0.05	Standard	No Exceedance
G52D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/26/23	22	0	CI around mean	77.9	400	Standard	No Exceedance
G52D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G52D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	278	1,200	Standard	No Exceedance
G53D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G53D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.010	Standard	No Exceedance
G53D	UA	E002	Barium, total	mg/L	12/03/15 - 09/27/23	22	0	CB around linear reg	0.0177	2.0	Standard	No Exceedance
G53D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G53D	UA	E002	Boron, total	mg/L	12/03/15 - 09/27/23	23	0	CI around median	0.334	2	Standard	No Exceedance
G53D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G53D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/27/23	23	0	CI around median	17	200	Standard	No Exceedance
G53D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/27/23	22	86	CI around median	0.001	0.1	Standard	No Exceedance
G53D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/27/23	22	18	CI around median	0.0013	0.006	Standard	No Exceedance
G53D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/27/23	23	0	CI around mean	0.641	4.0	Standard	No Exceedance
G53D	UA	E002	Lead, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G53D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/27/23	22	54	CB around T-S line	0.00266	0.04	Standard	No Exceedance
G53D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G53D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/27/23	18	89	CB around T-S line	0.001	0.1	Standard	No Exceedance
G53D	UA	E002	pH (field)	SU	12/03/15 - 09/27/23	23	0	CB around T-S line	6.3/6.5	6.0/9.0	Background/Standard	No Exceedance
G53D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/27/23	22	0	CI around mean	0.351	5	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G53D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G53D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/27/23	23	0	CB around T-S line	46.6	400	Standard	No Exceedance
G53D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G53D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/27/23	23	0	CB around T-S line	268	1,200	Standard	No Exceedance
G54D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G54D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/26/23	22	50	CB around T-S line	-0.000236	0.010	Standard	No Exceedance
G54D	UA	E002	Barium, total	mg/L	12/03/15 - 09/26/23	22	0	CB around T-S line	0.0612	2.0	Standard	No Exceedance
G54D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G54D	UA	E002	Boron, total	mg/L	12/03/15 - 09/26/23	23	0	CI around mean	0.464	2	Standard	No Exceedance
G54D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G54D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/26/23	23	4	CB around T-S line	13.6	200	Standard	No Exceedance
G54D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/26/23	22	68	CI around median	0.0015	0.1	Standard	No Exceedance
G54D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	0.00315	0.006	Standard	No Exceedance
G54D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/26/23	23	0	CB around linear reg	0.258	4.0	Standard	No Exceedance
G54D	UA	E002	Lead, total	mg/L	12/03/15 - 09/26/23	22	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G54D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/26/23	22	18	CB around linear reg	0.00175	0.04	Standard	No Exceedance
G54D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G54D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/26/23	18	94	CB around T-S line	0.001	0.1	Standard	No Exceedance
G54D	UA	E002	pH (field)	SU	12/03/15 - 09/26/23	23	0	CI around mean	6.6/6.8	6.0/9.0	Background/Standard	No Exceedance
G54D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/26/23	22	0	CI around geomean	0.493	5	Standard	No Exceedance
G54D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/26/23	22	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G54D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/26/23	23	0	CB around linear reg	175	400	Standard	No Exceedance
G54D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G54D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/26/23	23	0	CI around mean	491	1,200	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 3, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Compliance Result:

No Exceedance: the statistical result did not exceed the GWPS.

Exceedance: The statistical result exceeded the GWPS.

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with the Statistical Analysis Plan using constituent concentrations observed at each monitoring well during all sampling events within the specified date range

For pH, the values presented are the lower / upper limits

GWPS = Groundwater Protection Standard

GWPS Source:

Standard = standard specified in 35 I.A.C. § 845.600(a)(1)

Background = background concentration (see cover page for additional information)

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G03	UA	E003	Antimony, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G03	UA	E003	Arsenic, total	mg/L	03/05/21 - 10/23/23	13	46	CI around geomean	0.00108	0.010	Standard	No Exceedance
G03	UA	E003	Barium, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	0.0596	2.0	Standard	No Exceedance
G03	UA	E003	Beryllium, total	mg/L	03/05/21 - 10/23/23	13	92	CI around median	0.001	0.004	Standard	No Exceedance
G03	UA	E003	Boron, total	mg/L	03/05/21 - 10/23/23	13	0	CI around geomean	0.24	2	Standard	No Exceedance
G03	UA	E003	Cadmium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G03	UA	E003	Chloride, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	20.5	200	Standard	No Exceedance
G03	UA	E003	Chromium, total	mg/L	03/05/21 - 10/23/23	13	8	CI around mean	0.00279	0.1	Standard	No Exceedance
G03	UA	E003	Cobalt, total	mg/L	03/05/21 - 10/23/23	13	31	CI around geomean	0.00133	0.006	Standard	No Exceedance
G03	UA	E003	Fluoride, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	0.192	4.0	Standard	No Exceedance
G03	UA	E003	Lead, total	mg/L	03/05/21 - 10/23/23	13	38	CI around geomean	0.0011	0.0075	Standard	No Exceedance
G03	UA	E003	Lithium, total	mg/L	03/05/21 - 10/23/23	13	69	CI around median	0.003	0.04	Standard	No Exceedance
G03	UA	E003	Mercury, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G03	UA	E003	Molybdenum, total	mg/L	03/05/21 - 10/23/23	13	85	CI around median	0.0015	0.1	Standard	No Exceedance
G03	UA	E003	pH (field)	SU	03/05/21 - 10/23/23	13	0	CI around mean	6.3/6.4	6.0/9.0	Background/Standard	No Exceedance
G03	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/05/21 - 10/23/23	13	0	CI around mean	0.387	5	Standard	No Exceedance
G03	UA	E003	Selenium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G03	UA	E003	Sulfate, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	69.7	400	Standard	No Exceedance
G03	UA	E003	Thallium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G03	UA	E003	Total Dissolved Solids	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	279	1,200	Standard	No Exceedance
G05	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G05	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.010	Standard	No Exceedance
G05	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.162	2.0	Standard	No Exceedance
G05	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G05	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.00317	2	Standard	No Exceedance
G05	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G05	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	16.9	200	Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
 845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G05	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.0015	0.1	Standard	No Exceedance
G05	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.000824	0.006	Standard	No Exceedance
G05	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.358	4.0	Standard	No Exceedance
G05	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G05	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.003	0.04	Standard	No Exceedance
G05	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G05	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00381	0.1	Standard	No Exceedance
G05	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.4/6.5	6.0/9.0	Background/Standard	No Exceedance
G05	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.372	5	Standard	No Exceedance
G05	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	31	CB around linear reg	3.89e-05	0.05	Standard	No Exceedance
G05	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	82.9	400	Standard	No Exceedance
G05	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.002	0.002	Standard	No Exceedance
G05	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	352	1,200	Standard	No Exceedance
G06	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.001	0.010	Standard	No Exceedance
G06	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0277	2.0	Standard	No Exceedance
G06	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G06	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	3.11	2	Standard	Exceedance
G06	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G06	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around median	21	200	Standard	No Exceedance
G06	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	31	CI around mean	0.00148	0.1	Standard	No Exceedance
G06	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.001	0.006	Standard	No Exceedance
G06	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.256	4.0	Standard	No Exceedance
G06	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.001	0.0075	Standard	No Exceedance
G06	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	23	CI around median	0.0035	0.04	Standard	No Exceedance
G06	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G06	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0015	0.1	Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G06	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	12	0	CI around mean	6.5/6.6	6.0/9.0	Background/Standard	No Exceedance
G06	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.518	5	Standard	No Exceedance
G06	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G06	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	180	400	Standard	No Exceedance
G06	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G06	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	501	1,200	Standard	No Exceedance
G07	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G07	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.010	Standard	No Exceedance
G07	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.0415	2.0	Standard	No Exceedance
G07	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.004	Standard	No Exceedance
G07	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	4.34	2	Standard	Exceedance
G07	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G07	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	20.3	200	Standard	No Exceedance
G07	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	38	CI around geomean	0.00187	0.1	Standard	No Exceedance
G07	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00123	0.006	Standard	No Exceedance
G07	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around median	0.4	4.0	Standard	No Exceedance
G07	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.0075	Standard	No Exceedance
G07	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.003	0.04	Standard	No Exceedance
G07	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G07	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.0015	0.1	Standard	No Exceedance
G07	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.2/6.6	6.0/9.0	Background/Standard	No Exceedance
G07	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.744	5	Standard	No Exceedance
G07	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G07	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	251	400	Standard	No Exceedance
G07	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G07	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	575	1,200	Standard	No Exceedance
G08	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G08	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00609	0.010	Standard	No Exceedance
G08	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0486	2.0	Standard	No Exceedance
G08	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.004	Standard	No Exceedance
G08	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	4.18	2	Standard	Exceedance
G08	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G08	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	14.2	200	Standard	No Exceedance
G08	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	15	CI around geomean	0.00174	0.1	Standard	No Exceedance
G08	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00325	0.006	Standard	No Exceedance
G08	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.218	4.0	Standard	No Exceedance
G08	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.0075	Standard	No Exceedance
G08	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.003	0.04	Standard	No Exceedance
G08	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G08	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	15	CI around median	0.0017	0.1	Standard	No Exceedance
G08	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around median	6.8/7.0	6.0/9.0	Background/Standard	No Exceedance
G08	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.284	5	Standard	No Exceedance
G08	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G08	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	289	400	Standard	No Exceedance
G08	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G08	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	555	1,200	Standard	No Exceedance
G09	UA	E003	Antimony, total	mg/L	03/04/21 - 10/25/23	13	92	CI around median	0.001	0.006	Standard	No Exceedance
G09	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/25/23	13	15	CI around mean	0.00238	0.010	Standard	No Exceedance
G09	UA	E003	Barium, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	0.000628	2.0	Standard	No Exceedance
G09	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/25/23	13	77	CI around median	0.001	0.004	Standard	No Exceedance
G09	UA	E003	Boron, total	mg/L	03/04/21 - 10/25/23	13	0	CI around median	3.19	2	Standard	Exceedance
G09	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G09	UA	E003	Chloride, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	14	200	Standard	No Exceedance
G09	UA	E003	Chromium, total	mg/L	03/04/21 - 10/25/23	13	23	CI around geomean	0.00154	0.1	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G09	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	-0.00147	0.006	Standard	No Exceedance
G09	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/25/23	13	0	CI around mean	0.282	4.0	Standard	No Exceedance
G09	UA	E003	Lead, total	mg/L	03/04/21 - 10/25/23	13	69	CI around median	0.001	0.0075	Standard	No Exceedance
G09	UA	E003	Lithium, total	mg/L	03/04/21 - 10/25/23	13	15	CI around median	0.0034	0.04	Standard	No Exceedance
G09	UA	E003	Mercury, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G09	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.0015	0.1	Standard	No Exceedance
G09	UA	E003	pH (field)	SU	03/04/21 - 10/25/23	13	0	CI around median	6.1/6.4	6.0/9.0	Background/Standard	No Exceedance
G09	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/25/23	13	0	CI around mean	0.257	5	Standard	No Exceedance
G09	UA	E003	Selenium, total	mg/L	03/04/21 - 10/25/23	13	92	CI around median	0.001	0.05	Standard	No Exceedance
G09	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/25/23	13	0	CI around mean	258	400	Standard	No Exceedance
G09	UA	E003	Thallium, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G09	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	447	1,200	Standard	No Exceedance
G10	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G10	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	31	CI around geomean	0.00118	0.010	Standard	No Exceedance
G10	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0388	2.0	Standard	No Exceedance
G10	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.004	Standard	No Exceedance
G10	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	2.17	2	Standard	Exceedance
G10	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G10	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	25.7	200	Standard	No Exceedance
G10	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	31	CI around geomean	0.00156	0.1	Standard	No Exceedance
G10	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.0014	0.006	Standard	No Exceedance
G10	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.276	4.0	Standard	No Exceedance
G10	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.001	0.0075	Standard	No Exceedance
G10	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	38	CI around median	0.003	0.04	Standard	No Exceedance
G10	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G10	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.0015	0.1	Standard	No Exceedance
G10	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.5/6.7	6.0/9.0	Background/Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G10	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around mean	0.561	5	Standard	No Exceedance
G10	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G10	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	372	400	Standard	No Exceedance
G10	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G10	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	747	1,200	Standard	No Exceedance
G11	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G11	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.010	Standard	No Exceedance
G11	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.0135	2.0	Standard	No Exceedance
G11	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.004	Standard	No Exceedance
G11	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.287	2	Standard	No Exceedance
G11	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G11	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	32.4	200	Standard	No Exceedance
G11	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	38	CI around geomean	0.000934	0.006	Standard	No Exceedance
G11	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.167	4.0	Standard	No Exceedance
G11	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.0075	Standard	No Exceedance
G11	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	15	CI around median	0.0035	0.04	Standard	No Exceedance
G11	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G11	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.0015	0.1	Standard	No Exceedance
G11	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around median	5.8/5.9	6.0/9.0	Background/Standard	Exceedance
G11	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around mean	0.238	5	Standard	No Exceedance
G11	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.0023	0.05	Standard	No Exceedance
G11	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	20.9	400	Standard	No Exceedance
G11	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.002	0.002	Standard	No Exceedance
G11	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	237	1,200	Standard	No Exceedance
G51D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G51D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.010	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G51D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	0.00372	2.0	Standard	No Exceedance
G51D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G51D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	0.509	2	Standard	No Exceedance
G51D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G51D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	2.77	200	Standard	No Exceedance
G51D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	74	CB around T-S line	0.00149	0.1	Standard	No Exceedance
G51D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	17	CB around T-S line	-0.0109	0.006	Standard	No Exceedance
G51D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	83	CI around median	0.1	4.0	Standard	No Exceedance
G51D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G51D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	4	CB around T-S line	0.00554	0.04	Standard	No Exceedance
G51D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G51D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	95	CB around T-S line	0.001	0.1	Standard	No Exceedance
G51D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CB around T-S line	5.1/5.4	6.0/9.0	Background/Standard	Exceedance
G51D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around mean	0.469	5	Standard	No Exceedance
G51D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	4	CB around T-S line	0.00412	0.05	Standard	No Exceedance
G51D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	121	400	Standard	No Exceedance
G51D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G51D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	279	1,200	Standard	No Exceedance
G52D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G52D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/24/23	22	9	CB around linear reg	-0.000569	0.010	Standard	No Exceedance
G52D	UA	E003	Barium, total	mg/L	12/03/15 - 10/24/23	22	0	CB around linear reg	0.134	2.0	Standard	No Exceedance
G52D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G52D	UA	E003	Boron, total	mg/L	12/03/15 - 10/24/23	23	91	CI around median	0.025	2	Standard	No Exceedance
G52D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G52D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	7.24	200	Standard	No Exceedance
G52D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/24/23	22	100	All ND - Last	0.0015	0.1	Standard	No Exceedance
G52D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/24/23	22	0	CI around mean	0.0029	0.006	Standard	No Exceedance



**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G52D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/24/23	23	0	CI around median	0.24	4.0	Standard	No Exceedance
G52D	UA	E003	Lead, total	mg/L	12/03/15 - 10/24/23	22	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G52D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/24/23	22	46	CI around geomean	0.0025	0.04	Standard	No Exceedance
G52D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G52D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/24/23	18	78	CI around median	0.0011	0.1	Standard	No Exceedance
G52D	UA	E003	pH (field)	SU	12/03/15 - 10/24/23	23	0	CI around mean	6.2/6.4	6.0/9.0	Background/Standard	No Exceedance
G52D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/24/23	22	0	CI around mean	0.849	5	Standard	No Exceedance
G52D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/24/23	22	96	CI around median	0.001	0.05	Standard	No Exceedance
G52D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	53.8	400	Standard	No Exceedance
G52D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G52D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	277	1,200	Standard	No Exceedance
G53D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G53D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.010	Standard	No Exceedance
G53D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	-0.0271	2.0	Standard	No Exceedance
G53D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G53D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	0.334	2	Standard	No Exceedance
G53D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G53D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	18	200	Standard	No Exceedance
G53D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	87	CI around median	0.001	0.1	Standard	No Exceedance
G53D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	17	CI around median	0.0012	0.006	Standard	No Exceedance
G53D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	0.644	4.0	Standard	No Exceedance
G53D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.0075	Standard	No Exceedance
G53D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	56	CB around T-S line	0.00267	0.04	Standard	No Exceedance
G53D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G53D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	90	CB around T-S line	0.001	0.1	Standard	No Exceedance
G53D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CB around T-S line	6.3/6.5	6.0/9.0	Background/Standard	No Exceedance
G53D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around mean	0.363	5	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Compliance Result
G53D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G53D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	44.8	400	Standard	No Exceedance
G53D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G53D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	258	1,200	Standard	No Exceedance
G54D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.006	Standard	No Exceedance
G54D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	48	CB around T-S line	-0.000139	0.010	Standard	No Exceedance
G54D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	0.0624	2.0	Standard	No Exceedance
G54D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.004	Standard	No Exceedance
G54D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	0.46	2	Standard	No Exceedance
G54D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.005	Standard	No Exceedance
G54D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	4	CB around T-S line	15.5	200	Standard	No Exceedance
G54D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	65	CI around median	0.0015	0.1	Standard	No Exceedance
G54D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	0	CB around linear reg	0.00362	0.006	Standard	No Exceedance
G54D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	0.262	4.0	Standard	No Exceedance
G54D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	96	CI around median	0.001	0.0075	Standard	No Exceedance
G54D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	17	CB around linear reg	0.00186	0.04	Standard	No Exceedance
G54D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.002	Standard	No Exceedance
G54D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	95	CB around T-S line	0.001	0.1	Standard	No Exceedance
G54D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CI around mean	6.6/6.8	6.0/9.0	Background/Standard	No Exceedance
G54D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around geomean	0.513	5	Standard	No Exceedance
G54D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.05	Standard	No Exceedance
G54D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	176	400	Standard	No Exceedance
G54D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.002	Standard	No Exceedance
G54D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	492	1,200	Standard	No Exceedance

**TABLE 2.**  
**COMPARISON OF STATISTICAL RESULTS TO GWPS - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Compliance Result:

No Exceedance: the statistical result did not exceed the GWPS.

Exceedance: The statistical result exceeded the GWPS.

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with the Statistical Analysis Plan using constituent concentrations observed at each monitoring well during all sampling events within the specified date range

For pH, the values presented are the lower / upper limits

GWPS = Groundwater Protection Standard

GWPS Source:

Standard = standard specified in 35 I.A.C. § 845.600(a)(1)

Background = background concentration (see cover page for additional information)

## FIGURES





- COMPLIANCE WELL
- BACKGROUND WELL
- STAFF GAUGE
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

0 200 400  
Feet

### MONITORING WELL LOCATION MAP

FIGURE 1

#### 2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT EAST ASH POND

JOPPA POWER PLANT  
JOPPA, ILLINOIS

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- TOTAL BORON EXCEEDANCE
- TOTAL COBALT EXCEEDANCE
- pH EXCEEDANCE
- COMPLIANCE WELL WITHOUT EXCEEDANCE
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

0 275 550  
 Feet

**GWPS EXCEEDANCE MAP  
 UPPERMOST AQUIFER  
 QUARTERS 2-4, 2023**

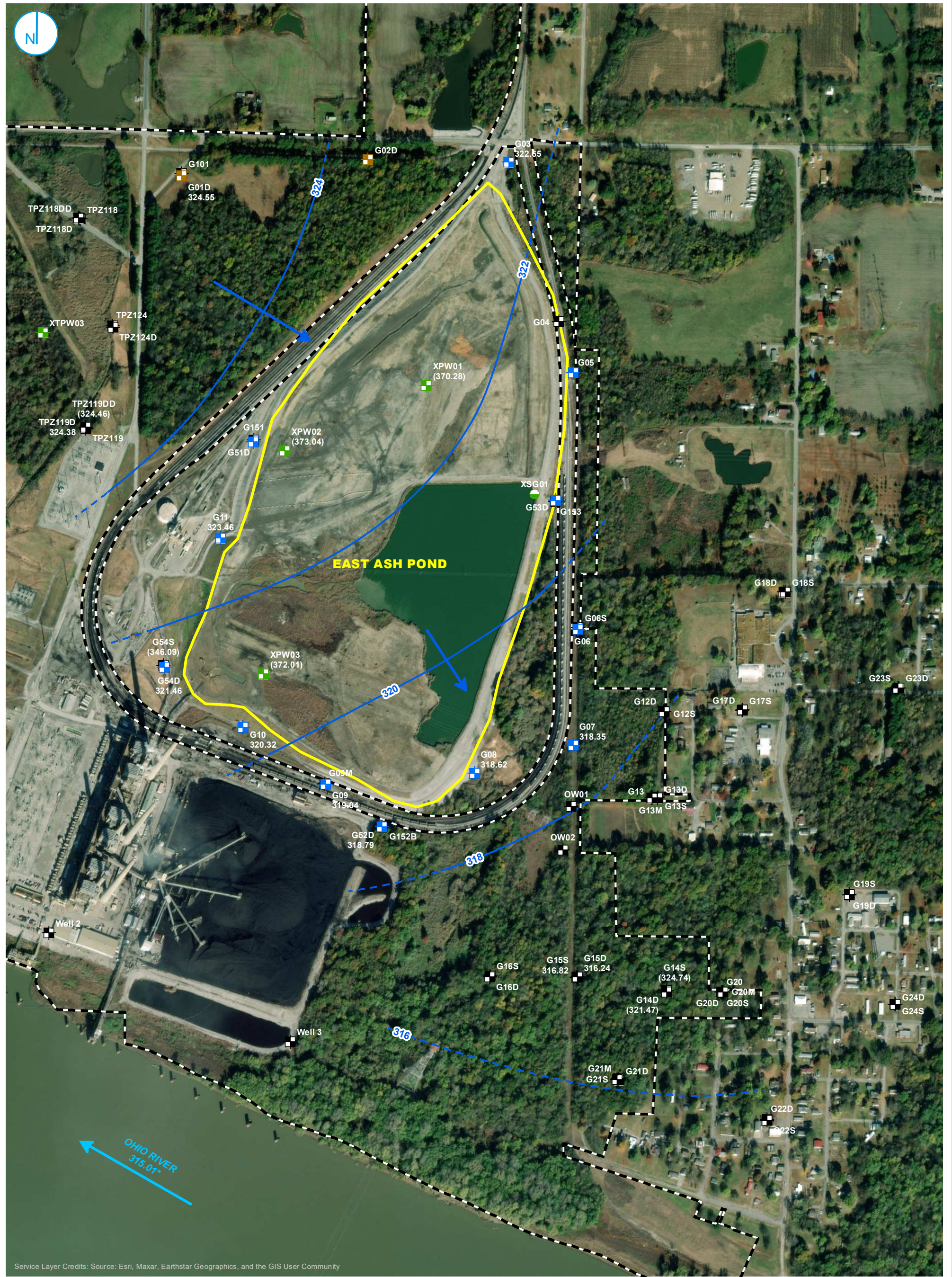
**2023 ANNUAL GROUNDWATER MONITORING  
 AND CORRECTIVE ACTION REPORT  
 EAST ASH POND  
 JOPPA POWER PLANT  
 JOPPA, ILLINOIS**

**FIGURE 2**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

**NOTES**

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
APRIL 1, 2023**

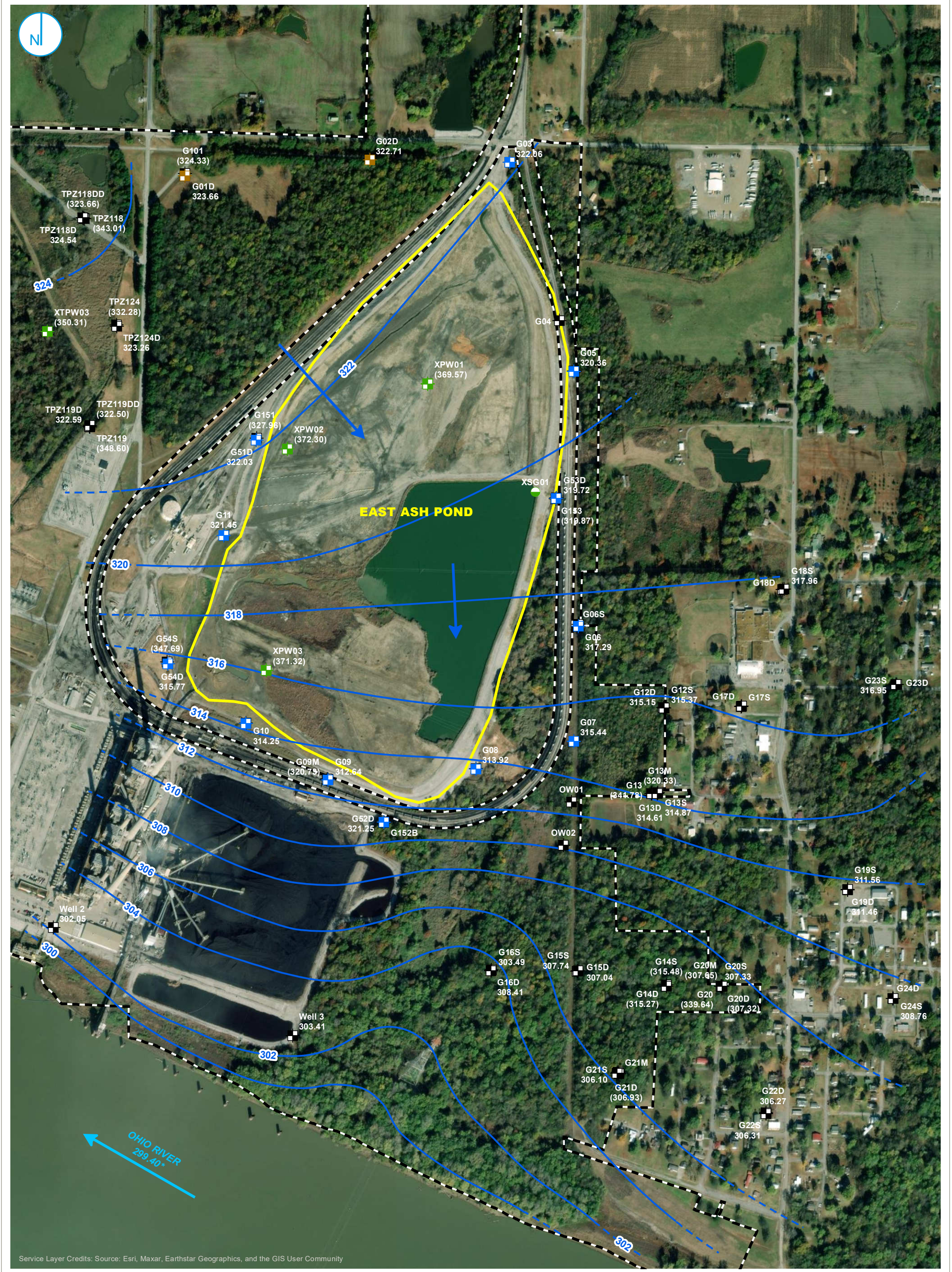
**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

**FIGURE 3**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

**NOTES**

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
MAY 1, 2023**

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

**FIGURE 4**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.











Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
  2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
JULY 10, 2023**

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

**FIGURE 6**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
AUGUST 25, 2023**

**FIGURE 7**

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
SEPTEMBER 25, 2023**

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

**FIGURE 8**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES  
 1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.  
 2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)  
 \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



### POTENTIOMETRIC SURFACE MAP OCTOBER 23, 2023

2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS

FIGURE 9

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES  
 1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.  
 2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)  
 \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



### POTENTIOMETRIC SURFACE MAP NOVEMBER 7-8, 2023

2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS

FIGURE 10

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, RIVER
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

NOTES

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
  2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, IL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.



**POTENTIOMETRIC SURFACE MAP  
DECEMBER 12, 2023**

**2023 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS**

**FIGURE 11**

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.





## **ATTACHMENTS**

**ATTACHMENT A  
GROUNDWATER ELEVATION DATA**

**ATTACHMENT A  
GROUNDWATER ELEVATION DATA**

2023 35 I.A.C. § 845 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
G01D	Background	UA	04/01/2023	39.63	324.55
G01D	Background	UA	05/01/2023	40.52	323.66
G01D	Background	UA	06/10/2023	43.20	320.98
G01D	Background	UA	07/10/2023	44.34	319.85
G01D	Background	UA	08/25/2023	43.55	320.64
G01D	Background	UA	09/25/2023	44.38	319.81
G01D	Background	UA	10/23/2023	44.88	319.31
G01D	Background	UA	11/08/2023	44.45	319.74
G01D	Background	UA	12/12/2023	45.42	318.77
G02D	Background	UA	05/01/2023	40.94	322.71
G02D	Background	UA	07/11/2023	43.93	319.72
G02D	Background	UA	09/25/2023	44.46	319.19
G02D	Background	UA	10/23/2023	45.10	318.55
G02D	Background	UA	11/08/2023	44.74	318.91
G02D	Background	UA	12/12/2023	45.61	318.04
G03	Compliance	UA	04/01/2023	35.21	322.65
G03	Compliance	UA	05/01/2023	35.80	322.06
G03	Compliance	UA	06/10/2023	37.52	320.35
G03	Compliance	UA	07/10/2023	38.81	319.06
G03	Compliance	UA	08/25/2023	38.42	319.45
G03	Compliance	UA	09/25/2023	39.40	318.47
G03	Compliance	UA	10/23/2023	39.98	317.89
G03	Compliance	UA	11/08/2023	39.64	318.23
G03	Compliance	UA	12/12/2023	40.56	317.31
G05	Compliance	UA	04/01/2023	39.23	321.97
G05	Compliance	UA	05/01/2023	40.85	320.36
G05	Compliance	UA	07/10/2023	43.38	317.83
G05	Compliance	UA	09/25/2023	44.31	316.90
G05	Compliance	UA	10/23/2023	44.92	316.29
G05	Compliance	UA	11/07/2023	44.72	316.49
G05	Compliance	UA	12/12/2023	45.52	315.69
G06	Compliance	UA	05/01/2023	37.95	317.29
G06	Compliance	UA	07/10/2023	40.89	314.35
G06	Compliance	UA	09/25/2023	41.10	314.14
G06	Compliance	UA	10/23/2023	41.93	313.31
G06	Compliance	UA	11/07/2023	41.72	313.52
G06	Compliance	UA	12/12/2023	42.43	312.81
G07	Compliance	UA	04/01/2023	35.17	318.35
G07	Compliance	UA	05/01/2023	38.08	315.44
G07	Compliance	UA	06/10/2023	39.99	313.54
G07	Compliance	UA	07/10/2023	40.98	312.55
G07	Compliance	UA	08/25/2023	40.86	312.66
G07	Compliance	UA	09/25/2023	41.52	312.01
G07	Compliance	UA	10/23/2023	42.00	311.53
G07	Compliance	UA	11/07/2023	41.83	311.70
G07	Compliance	UA	12/12/2023	42.46	311.07

**ATTACHMENT A  
GROUNDWATER ELEVATION DATA**

2023 35 I.A.C. § 845 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
G08	Compliance	UA	04/01/2023	24.91	318.62
G08	Compliance	UA	05/01/2023	29.61	313.92
G08	Compliance	UA	07/10/2023	32.22	311.32
G08	Compliance	UA	09/25/2023	32.69	310.85
G08	Compliance	UA	10/23/2023	33.15	310.39
G08	Compliance	UA	11/07/2023	32.96	310.58
G08	Compliance	UA	12/12/2023	33.49	310.05
G09	Compliance	UA	04/01/2023	52.53	319.04
G09	Compliance	UA	05/01/2023	58.93	312.64
G09	Compliance	UA	06/10/2023	40.41	311.29
G09	Compliance	UA	07/10/2023	41.10	310.60
G09	Compliance	UA	08/25/2023	40.91	310.79
G09	Compliance	UA	09/25/2023	41.48	310.22
G09	Compliance	UA	10/23/2023	41.92	309.78
G09	Compliance	UA	11/07/2023	41.72	309.98
G09	Compliance	UA	12/12/2023	42.24	309.46
G10	Compliance	UA	04/01/2023	33.16	320.32
G10	Compliance	UA	05/01/2023	39.23	314.25
G10	Compliance	UA	06/10/2023	40.54	312.95
G10	Compliance	UA	07/10/2023	41.40	312.09
G10	Compliance	UA	08/25/2023	40.94	312.55
G10	Compliance	UA	09/25/2023	41.80	311.69
G10	Compliance	UA	10/23/2023	42.30	311.19
G10	Compliance	UA	11/07/2023	42.04	311.45
G10	Compliance	UA	12/12/2023	42.62	310.87
G11	Compliance	UA	04/01/2023	44.15	323.46
G11	Compliance	UA	05/01/2023	46.16	321.45
G11	Compliance	UA	06/10/2023	48.17	318.38
G11	Compliance	UA	07/10/2023	48.80	317.75
G11	Compliance	UA	08/25/2023	48.21	318.34
G11	Compliance	UA	09/25/2023	48.69	317.86
G11	Compliance	UA	10/23/2023	49.30	317.25
G11	Compliance	UA	11/08/2023	49.00	317.55
G11	Compliance	UA	12/12/2023	49.80	316.75
G51D	Compliance	UA	05/01/2023	41.82	322.03
G51D	Compliance	UA	06/10/2023	43.85	320.00
G51D	Compliance	UA	07/10/2023	44.91	318.94
G51D	Compliance	UA	08/25/2023	46.98	316.87
G51D	Compliance	UA	09/25/2023	45.40	318.45
G51D	Compliance	UA	10/23/2023	46.04	317.81
G51D	Compliance	UA	11/08/2023	45.64	318.21
G51D	Compliance	UA	12/12/2023	46.53	317.32
G52D	Compliance	UA	04/01/2023	29.03	318.79
G52D	Compliance	UA	05/01/2023	26.57	321.25
G52D	Compliance	UA	05/02/2023	27.12	321.29
G52D	Compliance	UA	06/10/2023	26.90	321.51

**ATTACHMENT A  
GROUNDWATER ELEVATION DATA**

2023 35 I.A.C. § 845 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
G52D	Compliance	UA	07/10/2023	26.82	321.59
G52D	Compliance	UA	08/25/2023	29.10	319.31
G52D	Compliance	UA	09/25/2023	28.81	319.60
G52D	Compliance	UA	10/23/2023	31.11	317.30
G52D	Compliance	UA	11/07/2023	34.10	314.31
G52D	Compliance	UA	12/12/2023	30.40	318.01
G53D	Compliance	UA	05/01/2023	35.75	319.72
G53D	Compliance	UA	06/10/2023	37.62	317.85
G53D	Compliance	UA	07/10/2023	38.68	316.79
G53D	Compliance	UA	08/25/2023	38.50	316.97
G53D	Compliance	UA	09/25/2023	39.22	316.25
G53D	Compliance	UA	10/23/2023	39.82	315.65
G53D	Compliance	UA	11/07/2023	39.38	316.09
G53D	Compliance	UA	12/12/2023	40.23	315.24
G54D	Compliance	UA	04/01/2023	35.56	321.46
G54D	Compliance	UA	05/01/2023	41.25	315.77
G54D	Compliance	UA	06/10/2023	42.66	314.37
G54D	Compliance	UA	07/10/2023	43.52	313.51
G54D	Compliance	UA	09/25/2023	43.85	313.18
G54D	Compliance	UA	10/23/2023	44.38	312.65
G54D	Compliance	UA	11/07/2023	44.05	312.98
G54D	Compliance	UA	12/12/2023	44.74	312.29
XSG01	Water Level	CCR	05/15/2023	2.39	369.39

**Notes:**

Due to malfunctioning pressure transducer, data gaps exist in monthly water level elevations prior to the fourth quarter. Monthly depth to water measurements were collected manually in the fourth quarter.

BMP = below measuring point

NAVD88 = North American Vertical Datum of 1988

Monitored Unit Abbreviations:

CCR = coal combustion residuals

UA = uppermost aquifer

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**ATTACHMENT B  
ALTERNATIVE SOURCE DEMONSTRATION AND IEPA  
DENIAL LETTER**

Intended for  
**Electric Energy, Inc.**

Date  
**October 21, 2023**

Project No.  
**1940103649-011**

**35 I.A.C. § 845.650(e): ALTERNATIVE  
SOURCE DEMONSTRATION  
EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS  
IEPA ID: W1270100004-02**



## CERTIFICATIONS

I, Anne Frances Ackerman, 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 other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.



Anne Frances Ackerman  
Qualified Professional Engineer  
062-060586  
Illinois  
Ramboll Americas Engineering Solutions, Inc.  
Date: October 21, 2023



I, Brian G. Hennings, 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 other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.



Brian G. Hennings  
Professional Geologist  
196-001482  
Illinois  
Ramboll Americas Engineering Solutions, Inc.  
Date: October 21, 2023



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## TABLES (IN TEXT)

Table A Cobalt Concentration Ranges in G05 and EAP Porewater (March 2021 to May 2023)

## FIGURES (IN TEXT)

Figure A Scatter Plot and Linear Regression Results of Cobalt and Manganese in UA Solids  
Figure B Scatter Plot and Linear Regression Results of Total Cobalt and Total Manganese in Groundwater  
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## FIGURES (ATTACHED)

Figure 1 Top of Uppermost Aquifer  
Figure 2 Sampling Locations and Potentiometric Surface Map – May 1, 2023

## APPENDICES (ATTACHED)

Appendix A Supporting Solid Phase Analytical Data  
Appendix B Supporting Analysis for Reductive Dissolution of Manganese Oxides as a Likely Source of Cobalt Concentrations at G05  
Appendix C Supporting Groundwater and Porewater Analytical Data  
Appendix D Geochemical Analysis of Joppa East Ash Pond Groundwater in Support of An Alternative Source Demonstration (Life Cycle Geo, LLC, 2023)



## ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
ASD	Alternative Source Demonstration
CCR	coal combustion residuals
E001	Event 1
EAP	East Ash Pond
Geosyntec	Geosyntec Consultants
GWPS	groundwater protection standard
JPP	Joppa Power Plant
LAU	Lower aquifer unit
LCU	lower confining unit
LOE(s)	Line(s) of evidence
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NRT/OBG	Natural Resource Technology, an OBG Company
NTU	nephelometric turbidity units
OBG	O'Brien and Gere Engineers, Inc.
ORP	oxidation reduction potential
PCA	principal component analysis
PMP	potential migration pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	surface impoundment
UA	uppermost aquifer
UCU	upper confining unit
WAP	West Ash Pond

## 1. INTRODUCTION

Under Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(e), within 60 days from the date of determination of an exceedance of a groundwater protection standard (GWPS) for constituents listed in 35 I.A.C. § 845.600, an owner or operator of a coal combustion residuals (CCR) surface impoundment (SI) may complete a written demonstration that a source other than the CCR SI caused the contamination and the CCR SI did not contribute to the contamination, or that the exceedance of the GWPS resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction (Alternative Source Demonstration [ASD]).

This ASD has been prepared on behalf of Electric Energy Inc. by Ramboll Americas Engineering Solutions, Inc (Ramboll), to provide pertinent information pursuant to 35 I.A.C. § 845.650(e) for the Joppa Power Plant (JPP) East Ash Pond (EAP) (*i.e.*, Site) located near Joppa, Illinois.

The most recent quarterly sampling event (Event 1 [E001]) was completed on May 3, 2023, and analytical data were received on June 23, 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), comparison of statistically derived values with the GWPSs described in 35 I.A.C. § 845.600 to determine exceedances of the GWPS was completed by August 22, 2023, within 60 days of receipt of the analytical data (Ramboll, 2023). The statistical comparison identified the following GWPS exceedances at compliance groundwater monitoring wells:

- Boron at wells G06, G07, G08, G09, G10
- Cobalt at well G05
- pH at wells G11 and G51D

Pursuant to 35 I.A.C. § 845.650(e), the lines of evidence (LOE) presented in **Section 3** and **Section 4** demonstrate that sources other than the EAP are the cause of the cobalt and pH GWPS exceedances (respectively) listed above. Cobalt is believed to be naturally occurring and pH is associated with iron oxidation. This ASD was completed by October 21, 2023, within 60 days of determination of the exceedances (August 22, 2023), as required by 35 I.A.C. § 845.650(e).

Boron GWPS exceedances at the EAP will be addressed in accordance with 35 I.A.C. § 845.660.



## 2. BACKGROUND

### 2.1 Site Location and Description

The JPP is west of the Village of Joppa in Massac County, Illinois, northeast of the Ohio River in Section 14, Township 15 South, Range 3 East. The JPP property is bordered by LaFarge North America cement plant to the west, Trunkline Gas Company-Joppa Compressor Station to the north and west, the Village of Joppa to the east, and the Ohio River to the south. The EAP is located in the west half of Section 14 directly north of the JPP and is bounded immediately to the east by the railway right-of-way, which is adjacent to forested portions of residential property in the Village of Joppa.

### 2.2 Description of East Ash Pond CCR Unit

The JPP operated the EAP for management of CCR waste streams between 1973 and 2022. Another inactive SI, referred to as the West Ash Pond (WAP), is present in the western portion of the JPP property, and a permit exempt landfill is present in the northwestern portion of the JPP property. The landfill and the WAP are not the subject of this ASD but are relevant to the discussion of the LOEs presented below.

The EAP is an unlined CCR SI which was used to manage both fly ash and bottom ash. The EAP perimeter embankment height varies from approximately 15 to 45 feet above the outboard toe of slope and the crest is at an approximate elevation of 380 feet North American Vertical Datum of 1988 (NAVD88) (O'Brien and Gere Engineers, Inc. [OBG], 2010).

### 2.3 Geology and Hydrogeology

The information used to describe the hydrogeology is based on the local geology obtained from published sources, hydrogeologic investigation data, and boring data collected during site investigations conducted from 1997 to 2022 (Natural Resource Technology, an OBG Company [NRT/OBG], 2017; Ramboll, 2021a; Geosyntec, 2023).

Quaternary deposits in the Joppa area consist mainly of diamictons and lacustrine/alluvial deposits that were deposited during Illinoian and Pre-Illinoian glaciations (Lineback, 1979; Willman et al., 1975). The unconsolidated deposits include the following units (beginning at the ground surface):

- **Upper Confining Unit (UCU):** The uppermost hydrostratigraphic unit is comprised of the Equality Formation, the Silt Unit, and Metropolis Formation deposits. The average thickness of this unit is approximately 40 feet with a range of 8 to 58 feet. The UCU underlies the CCR fill in all locations and is thinnest in the southeast portion of the unit. These deposits are predominantly fine-grained, comprised of clay, silt, and silty clay with limited intervals of sandy material. This hydrostratigraphic unit was encountered at all locations and extends down to the McNairy Formation.
- **Uppermost Aquifer (UA):** The UA consists of the McNairy Formation and Mounds Gravel which are composed of highly permeable sands and gravels with isolated lenses of finer grained material. The Mounds Gravel has been interpreted as a braided river deposit, located within eroded portions of the McNairy Formation (Nelson and Masters, 2008). The McNairy formation, underlying the Mounds Gravel, at the site is mostly composed of medium to fine grained sand with mica and lenses of silt and clay. At the EAP, this unit has been further divided into the Upper McNairy Formation consisting of relatively thick fine to medium grained

sand with some gravel while the Lower McNairy exhibits more variability including lenses and zones with higher silt and clay content.

A northwest to southeast trending stratigraphic high in the UA is present through the center of the EAP and bifurcates near the eastern extent of the unit. This stratigraphic high (elevations higher than 305 ft) is illustrated on **Figure 1** where the UA is bounded by the UCU which is shaded purple where elevations extend below 305 feet. Wells screened within the UA along the southern fork of the stratigraphic high (G07, G08, G12S/D, G13S/D) generally encountered thicker gravel layers at higher elevations and reported higher hydraulic conductivities (Ramboll, 2021a; Geosyntec, 2023). The thicker gravels at higher elevations also extend east and southeast of the EAP (G12S/D, G13S/D, G16S/D) and connect to the Ohio River as illustrated in **Figure 1**. The UA was encountered at a thickness of up to 58 feet thick, with elevations ranging from 215 to 316.6 feet, and is underlain by the lower confining unit (LCU).

- **Lower Confining Unit (LCU):** Clay, silt, or chert gravel residuum in on-Site wells (Nelson, 1997) has been interpreted and characterized as part of the Lower McNairy Formation, Post Creek (Tuscaloosa) Formation, or weathered limestone residuum. This material has been encountered in all borings advanced to bedrock. Based on material descriptions (high clay and/or silt content, and partial cementation), continuous lateral extent, and vertical gradients observed between the UA and the lower aquifer unit (LAU), this unit is identified as the LCU.
- **Lower Aquifer Unit (LAU):** The LAU, composed of the Salem Limestone bedrock, is the lowermost hydrostratigraphic unit identified and is considered a potential migration pathway (PMP). The limestone bedrock is encountered at an elevation of approximately 200 feet NAVD88 below the EAP, slopes towards a syncline to the east (Nelson and Masters, 2008), and has a reported thickness of 200 to 500 feet. The Salem Limestone is used to supply water for various uses in the region and provides non-potable water for the JPP and potable water for the Village of Joppa.

Groundwater elevations in the UA (referenced to NAVD88) across the EAP ranged from approximately 312 to 322 feet during E001 (**Figure 2**). Historically they have ranged from approximately 305 feet near the Ohio River to 330 feet near the northern property boundary. Depth to groundwater measurements used to generate the groundwater elevation contours shown on **Figure 2** were collected on May 1, 2023. Groundwater elevations vary seasonally and may fluctuate by about 10 feet within a well.

Groundwater flow directions are largely a result of the aquifer geology described above. The shallow highly permeable gravels present a path of least resistance (preferential flow pathway) for groundwater migrating toward the Ohio River which is the receiving body of water in the region (**Figure 1**). Wells located to the north of the UA stratigraphic high, such as G05, were terminated shortly after penetrating the UA and did not encounter significant gravel layers indicating gravel may be at a lower elevation or not present, and flow through this area may not be as significant. Interpreted groundwater flow directions are illustrated on **Figure 1** with flow to the southeast, generally parallel to the UA stratigraphic high across the EAP, and then south toward the Ohio River.



## 2.4 Groundwater and EAP Monitoring

The monitoring system for the EAP is shown on **Figure 2** and consists of two background monitoring wells (G01D and G02D) and 12 compliance monitoring wells (G03, G05, G06, G07, G08, G09, G10, G11, G51D, G52D, G53D, and G54D) screened within the UA. The monitoring system also includes two temporary water level only surface water staff gage (XSG01 and SG02) to monitor potential impacts from the EAP (Ramboll, 2021b). Porewater samples are collected from locations XPW01 and XPW02 on the northern side of the EAP, and from XPW03 on the southern side of the EAP (**Figure 2**). To further delineate potential boron exceedances, 10 monitoring wells were installed in September 2021 (nests G12 through G16) and 21 wells (10 off-Site) were installed between May 2022 and September 2023 (nests G17 through G24, and G13; Geosyntec Consultants [Geosyntec], 2023).

### 3. ALTERNATIVE SOURCE DEMONSTRATION: LINES OF EVIDENCE FOR COBALT

As allowed by 35 I.A.C. § 845.650(e), this ASD demonstrates that sources other than the EAP (the CCR unit) caused the cobalt exceedance at G05. LOEs supporting the ASD for the pH exceedances at G11 and G51D are presented in **Section 4**. This section presents the LOEs supporting the ASD for cobalt at G05, which include the following:

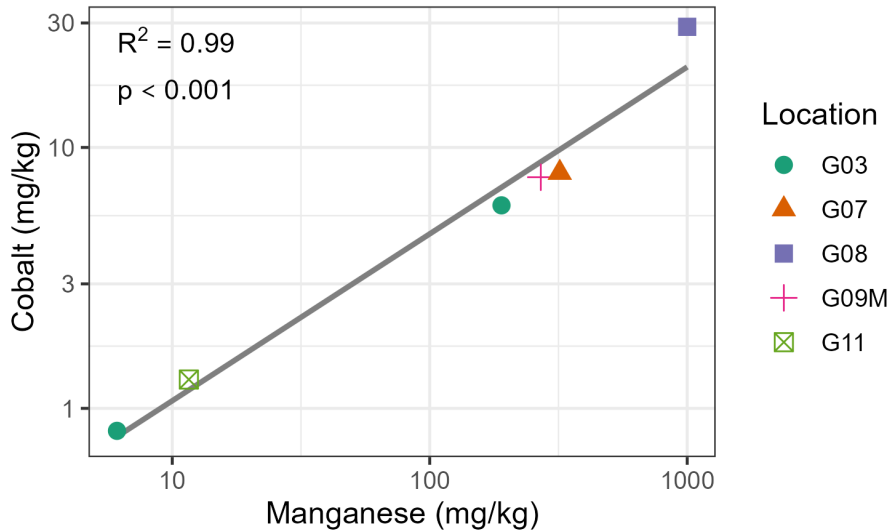
1. Cobalt concentrations at G05 are consistent with cobalt mobilization from native soils due to reductive dissolution of manganese oxides.
2. Cobalt concentrations at G05 are greater than source concentrations.
3. Cobalt concentrations at G05 are not correlated with concentrations of CCR indicator parameters.

#### 3.1 LOE #1: Cobalt Concentrations at G05 are Consistent with Cobalt Mobilization from Native Soils Due to Reductive Dissolution of Manganese Oxides

Cobalt and manganese are often closely associated with each other in soils due to their similar chemical properties (Uren, 2013). Under oxidizing conditions, manganese is present in the solid phase as manganese oxides. Cobalt sorbs strongly to manganese oxides and is thus often associated with manganese in the solid phase. When solid-phase manganese oxides in soils are dissolved by reduction of manganese to a more soluble species (a process called reductive dissolution), the cobalt previously sorbed to the manganese oxide surface is also released. If cobalt concentrations in groundwater are primarily controlled by the reductive dissolution of manganese oxides, cobalt and manganese concentrations in both soils and groundwater will be correlated with one another. This LOE demonstrates that cobalt concentrations at G05 are consistent with reductive dissolution of manganese, and the cobalt exceedance at G05 is therefore likely due to natural variation in groundwater quality. Solid phase data were used to determine if cobalt and manganese are associated in the solid phase. Groundwater redox potential and pH were assessed to determine if reductive dissolution of manganese oxides is thermodynamically favorable under observed groundwater conditions. To inform further analysis of groundwater data, wells with a geochemical signature similar to G05 were identified using principal component analysis (PCA). The relationship between cobalt and manganese in similar groundwater was then evaluated using regression analysis.

**Figure A** on the following page shows the relationship between total cobalt and total manganese in soil samples from the UA at five soil boring locations (data tabulated in **Appendix A**). The strong correlation between cobalt and manganese in these data ( $R^2$  of 0.99) indicates that they are likely physically associated in soils, consistent with literature data (Uren, 2013). It is possible that cobalt released from CCR porewater could become associated with naturally occurring manganese oxides in the downgradient environment and accumulate in the soils; however, this is not likely at the site based on the following observations: 1) Cobalt is not present in CCR porewater (described further in **Section 3.2**), indicating that the EAP could not be a source of cobalt to the downgradient solid phase; 2) The ratio of cobalt to manganese is consistent across five different samples, some of which are from areas of the site with no known influence from

CCR porewater (*i.e.*, have had no reported exceedances). Therefore, the cobalt present in the UA soil is likely naturally occurring.



**Figure A. Scatter Plot and Linear Regression Results of Cobalt and Manganese in UA Solids**

mg/kg = milligrams per kilogram

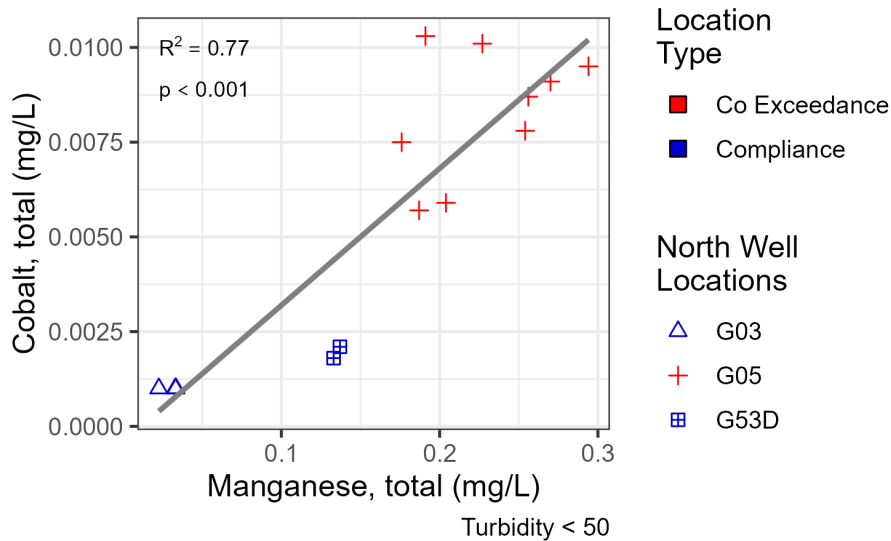
The thermodynamic favorability of manganese oxide reductive dissolution depends on the oxidation reduction potential (ORP) and pH of the groundwater. The pH and ORP of the groundwater samples collected from the EAP monitoring network all indicate that manganese is expected to exist in the reduced  $Mn^{2+}$  form in groundwater (**see Appendix B**), supporting the conclusion that reductive dissolution of manganese oxides can occur in the groundwater.

To determine if cobalt and manganese are correlated in groundwater, locations with a similar groundwater signature to G05 were identified for appropriate inclusion in the correlation analysis. PCA, a multivariate statistical approach, was used to evaluate how the groundwater composition at G05 related to the groundwater composition of EAP porewater, background groundwater, and downgradient groundwater north versus south of the UA stratigraphic high (**Section 2.3**). Details about the PCA analysis are included in **Appendix B**. The PCA results indicate that the geochemical signatures of the UA wells located on either side of the northwest to southeast trending stratigraphic high in the UA that extends through the EAP are largely distinct from one another, with wells to the north of the stratigraphic high being more similar to background. This difference may be related to the differences in stratigraphic conditions, with wells to the north of the stratigraphic high having less gravel beds, while the wells to the south of the stratigraphic high have shallow highly permeable gravels which create a preferential flow pathway to the south. Groundwater from well G05 is most like other northeast wells, suggesting similar geochemical influences.

**Figure B** on the following page shows the relationship between total cobalt and total manganese in wells to the north of the stratigraphic high (data tabulated in **Appendix C**). To avoid potential confounding effects due to the presence of suspended solids in the groundwater sample, only samples with a turbidity less than 50 nephelometric turbidity units (NTU) were used in the



correlation analysis. The strong ( $R^2$  of 0.77) statistically significant ( $p < 0.001$ ) correlation between total cobalt and total manganese in the groundwater suggests similar controls on concentrations.



**Figure B. Scatter Plot and Linear Regression Results of Total Cobalt and Total Manganese in Groundwater**

The strong association between cobalt and manganese in both the soil and groundwater, in addition to groundwater conditions in the area of G05 favoring manganese reduction, supports the conclusion that reductive dissolution of manganese oxides in native soil is occurring and is strongly influencing the cobalt concentrations in the groundwater rather than the EAP.

### 3.2 LOE #2: Cobalt Concentrations at G05 are Greater Than Source Concentrations

**Table A** on the following page provides the range of cobalt concentrations detection in G05 between March 2021 and May 2023. Porewater samples collected from XPW01, XPW02 and XPW03 between March 2021 and May 2023 did not have cobalt concentrations above the reporting limit. A summary of the laboratory data is included in **Appendix C**.

**Table A. Cobalt Concentration Ranges in G05 and EAP Porewater (March 2021 to May 2023).**

Sample Location	Cobalt (mg/L)			
	Samples	Non-Detects	Minimum	Maximum
<b>Composite Porewater<sup>1</sup></b>	24	24	<0.0001	<0.001
<b>G05</b>	11	0	0.0057	0.0103

<sup>1</sup> **Composite Porewater includes summary statistics of data collected at EAP porewater locations XPW01, XPW02, and XPW03**

**mg/L = milligrams per liter**

The following observations can be made from **Table A**:

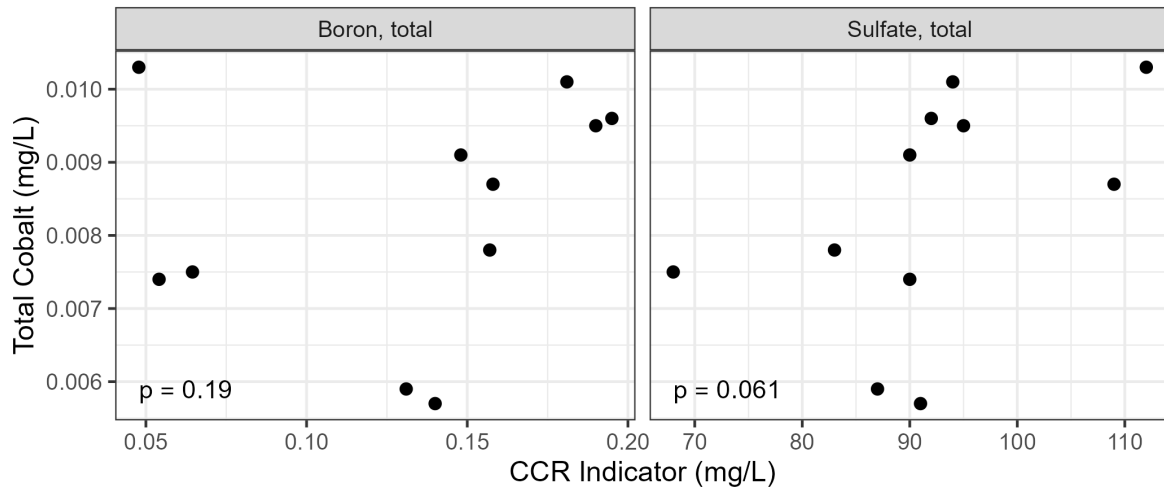
- The concentration of cobalt in compliance monitoring well G05 ranged from 0.0057 mg/L to 0.0103 mg/L.
- Cobalt was not detected in EAP porewater, with reporting limits ranging from 0.0001 mg/L to 0.001 mg/L.
- The minimum cobalt concentration observed at G05 is five times the highest reporting limit for cobalt in porewater.

If the EAP were the source of cobalt in downgradient groundwater, EAP porewater concentrations of cobalt would be expected to be higher than the groundwater concentrations. Cobalt was not detected above the reporting limit in any porewater samples, indicating that cobalt concentrations are not related to the EAP.

### **3.3 LOE #3: Cobalt Concentrations at G05 Are Not Correlated with Concentrations of CCR Indicator Parameters**

Boron is commonly used as an indicator parameter for contaminant transport of CCR because: (i) it is commonly present at elevated concentrations in coal ash leachate; (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater; and (iii) it is less likely than other constituents to be present at elevated concentrations in background groundwater from natural or other anthropogenic sources. Porewater in the EAP is elevated in both boron and sulfate (**Appendix C**), indicating that these parameters are Site-specific key indicators for CCR. If an exceedance is identified for a monitored CCR parameter but concentrations of boron and sulfate are not correlated with that parameter, it is unlikely that the CCR unit is the source of the GWPS exceedance.

A scatter plot of cobalt versus boron and sulfate concentrations for G05 between March 2021 and May 2023 is presented in **Figure C** on the following page and laboratory data is included in **Appendix C**. The p-value of a Kendall correlation test for non-parametric data are also included on **Figure C**. Typically, a p-value greater than 0.05 is considered to be a statistically insignificant relationship.



**Figure C. Scatter Plot of Cobalt Versus Boron and Sulfate Concentrations at Monitoring Well G05**

Calculated p-values greater than 0.05 indicate that cobalt is not correlated with boron and sulfate at monitoring well G05. A lack of correlation between cobalt and CCR indicators in the compliance monitoring well indicates the EAP is not the source of the cobalt exceedance.



## 4. ALTERNATIVE SOURCE DEMONSTRATION: LINES OF EVIDENCE FOR pH

As allowed by 35 I.A.C. § 845.650(e), this ASD demonstrates that sources other than the EAP (the CCR unit) caused the pH exceedances at G11 and G51D. This section presents the LOEs supporting the ASD for pH at G11 and G51D, which include the following:

1. G11 and G51D are upgradient of the EAP.
2. Groundwater chemistry at G11 and G51D is aligned with the groundwater signature observed west of the monitoring wells.
3. pH exceedances at G11 and G51D are consistent with iron oxidation.

These LOEs are summarized below and described in greater detail in **Appendix D**.

### 4.1 LOE #1: G11 and G51D are Upgradient of the EAP

As described in **Section 2.3** dominant UA groundwater flow direction at the EAP is to the southeast, generally parallel to the UA stratigraphic high across the EAP, and then south toward the Ohio River (**Figure 1**). Wells G11 and G51D are located on the western edge of the EAP and are upgradient of the EAP. Therefore, it is unlikely that porewater from the EAP would flow in the direction of G11 and G51D. Because the wells with pH exceedances are upgradient of the unit, it is unlikely that the EAP is the source of the exceedances.

### 4.2 LOE #2: Groundwater Chemistry at G11 and G51D is Aligned with the Groundwater Signature Observed West of the Monitoring Wells

Groundwater from exceedance wells G11 and G51D exhibit a high degree of similarity with groundwater from upgradient UA wells west of G11 and G51D (western groundwater) as opposed to eastern groundwater or CCR porewaters from other compliance wells in the EAP monitoring network (eastern groundwater). PCA (**Appendix D**) was used to compare the geochemical compositions of the western groundwater, CCR porewaters, and pH exceedance wells G11 and G51D. The PCA found that:

- Exceedance wells G51D and G11 exhibit a high degree of similarity with the western (*i.e.*, upgradient) wells screened in the UA.
- The CCR porewaters are distinctly separate from the groundwater samples.

The similarity of the groundwater composition at G11 and G51D to upgradient western groundwater, as opposed to eastern groundwater or CCR porewater, suggests that the EAP does not influence the groundwater at G11 and G51D and therefore is not the source of the pH exceedances.

### 4.3 LOE #3: pH Exceedances at G11 and G51D are Consistent with Iron Oxidation

The PCA analysis (**Appendix D**) suggests chemical evolution and/or communication within the western groundwater. The western UCU groundwater composition is dominated by the redox-sensitive parameters manganese, iron, and sulfate. The UA groundwater composition is spread between a composition similar to the UCU and a composition similar to background. Groundwater

composition at wells G11 and G51D is very similar to (*i.e.*, plots close to on the PCA diagram) the background wells, all of which are dominated by alkalinity, chloride, fluoride and sodium.

Redox conditions were evaluated along the flow path from upgradient (further northwest) to downgradient (further southeast) groundwater wells. A distinct redox transition was identified, shifting from more reducing conditions in upgradient waters to more oxidizing conditions in downgradient wells, including the exceedance wells. The reducing upgradient waters are characterized by lower ORP and higher iron concentrations, while downgradient waters are largely the opposite with higher ORP and lower iron concentrations.

This change in redox condition is the likely source of acidity in G11 and G51D. It is likely that dissolved iron present in reducing environments moves downgradient with groundwater and subsequently oxidizes. The oxidation of dissolved iron to iron oxides is known to produce acidity. In this way, reduced upgradient waters from the northwest provides the constituent (*i.e.*, reduced iron) necessary to cause a drop in pH (*i.e.*, through iron oxidation) in G11 and G51D, once transported into an area with sufficient dissolved oxygen to drive the precipitation reaction. The oxidized environment in wells G11 and G51D likely results from mixing with the upgradient oxidized background groundwater. Therefore, mixing of groundwater resulting in natural variability in the groundwater conditions is the likely driver of the pH exceedances at G11 and G51D.

## 5. CONCLUSIONS

Based on the LOEs presented below and described in **Section 3**, it has been demonstrated that sources other than the EAP (the CCR unit) caused the cobalt exceedance at G05.

1. Cobalt concentrations at G05 are consistent with cobalt mobilization from native soils due to reductive dissolution of manganese oxides.
2. Cobalt concentrations at G05 are greater than source concentrations.
3. Cobalt concentrations at G05 are not correlated with concentrations of CCR indicator parameters.

Furthermore, based on the LOEs presented below and described in **Section 4**, it has been demonstrated that sources other than the EAP caused the pH exceedances at G11 and G51D.

1. G11 and G51D are upgradient of the EAP.
2. Groundwater chemistry at G11 and G51D is aligned with the groundwater signature observed west of the monitoring wells.
3. pH exceedances at G11 and G51D are consistent with iron oxidation.

Pursuant to 35 I.A.C. § 845.650(e), the LOEs presented in **Section 3** and **Section 4** demonstrate that sources other than the EAP were the cause of the cobalt and pH GWPS exceedances (respectively) listed above. Boron GWPS exceedances at the EAP will be addressed in accordance with 35 I.A.C. § 845.660.



## 6. REFERENCES

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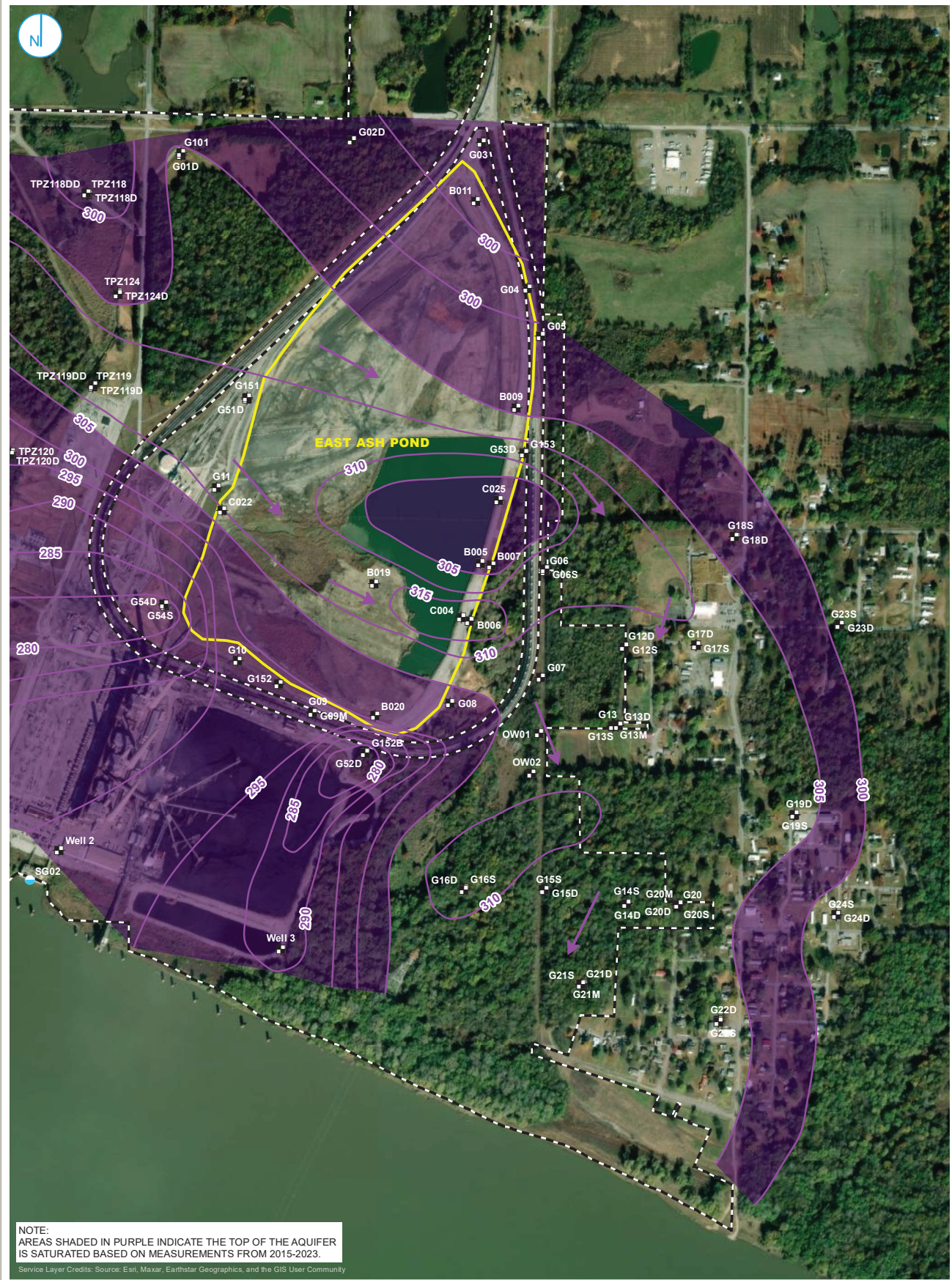
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## FIGURES



- MONITORING WELL
  - STAFF GAGE, RIVER
  - TOP OF MCNAIRY FORMATION ELEVATION (5-FT CONTOUR INTERVAL)
  - FLOW DIRECTION
  - AREA WHERE TOP OF AQUIFER IS SATURATED BASED ON MEASUREMENTS FROM 2015-2023
  - REGULATED UNIT (SUBJECT UNIT)
  - PROPERTY BOUNDARY
- 0 300 600  
 Feet

**TOP OF UPPERMOST AQUIFER**

35 I.A.C. § 845.650(e): ALTERNATIVE SOURCE DEMONSTRATION  
 EAST ASH POND  
 JOPPA POWER PLANT JOPPA, ILLINOIS

**FIGURE 1**

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.







Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- STAFF GAGE, RIVER
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- - - INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- ▭ REGULATED UNIT (SUBJECT UNIT)
- - - PROPERTY BOUNDARY

NOTES  
 1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.  
 2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)  
 \*GAGING DATA FROM USGS 03612600 OHIO RIVER AT OLMSTED, ILL LOCATED APPROXIMATELY 12 MILES DOWNSTREAM OF JOPPA POWER PLANT.

### SAMPLING LOCATIONS AND POTENTIOMETRIC SURFACE MAP - MAY 1, 2023

35 I.A.C. § 845.650(e): ALTERNATIVE SOURCE DEMONSTRATION EAST ASH POND JOPPA POWER PLANT JOPPA, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.



0 300 600 Feet

## **APPENDICES**

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G01D	3/3/2021	Alkalinity, bicarbonate	209	FALSE	FALSE
G01D	3/3/2021	Calcium	25.8	FALSE	FALSE
G01D	3/3/2021	Magnesium	7.79	FALSE	FALSE
G01D	3/3/2021	Sodium	79	FALSE	FALSE
G01D	3/3/2021	Potassium	1.24	FALSE	FALSE
G01D	3/3/2021	Chloride	10	FALSE	FALSE
G01D	3/3/2021	Sulfate	18	FALSE	FALSE
G01D	3/3/2021	Fluoride	0.2	FALSE	FALSE
G01D	3/3/2021	Barium	0.137	FALSE	FALSE
G01D	3/3/2021	Boron	0.158	FALSE	TRUE
G01D	3/3/2021	Cobalt	0.0015	FALSE	FALSE
G01D	3/3/2021	Iron	1.09	FALSE	FALSE
G01D	3/3/2021	Manganese	0.0232	FALSE	FALSE
G01D	3/3/2021	H+	0.000000251	FALSE	FALSE
G01D	3/24/2021	Alkalinity, bicarbonate	219	FALSE	FALSE
G01D	3/24/2021	Calcium	24.8	FALSE	FALSE
G01D	3/24/2021	Magnesium	7.06	FALSE	FALSE
G01D	3/24/2021	Sodium	73.9	FALSE	FALSE
G01D	3/24/2021	Potassium	1.05	FALSE	FALSE
G01D	3/24/2021	Chloride	9	FALSE	FALSE
G01D	3/24/2021	Sulfate	21	FALSE	FALSE
G01D	3/24/2021	Fluoride	0.21	FALSE	FALSE
G01D	3/24/2021	Barium	0.136	FALSE	FALSE
G01D	3/24/2021	Boron	0.158	FALSE	TRUE
G01D	3/24/2021	Cobalt	0.0316	FALSE	TRUE
G01D	3/24/2021	Iron	1.15	FALSE	FALSE
G01D	3/24/2021	Manganese	0.0181	FALSE	FALSE
G01D	3/24/2021	H+	0.000000324	FALSE	FALSE
G01D	4/14/2021	Alkalinity, bicarbonate	240	FALSE	FALSE
G01D	4/14/2021	Calcium	23.3	FALSE	FALSE
G01D	4/14/2021	Magnesium	7.56	FALSE	FALSE
G01D	4/14/2021	Sodium	94.5	FALSE	FALSE
G01D	4/14/2021	Potassium	0.979	FALSE	FALSE
G01D	4/14/2021	Chloride	6	FALSE	FALSE
G01D	4/14/2021	Sulfate	39	FALSE	FALSE
G01D	4/14/2021	Fluoride	0.23	FALSE	FALSE
G01D	4/14/2021	Barium	0.112	FALSE	FALSE
G01D	4/14/2021	Boron	0.158	FALSE	TRUE
G01D	4/14/2021	Cobalt	0.0316	FALSE	TRUE
G01D	4/14/2021	Iron	0.698	FALSE	FALSE
G01D	4/14/2021	Manganese	0.0117	FALSE	FALSE
G01D	4/14/2021	H+	0.0000002	FALSE	FALSE
G01D	5/12/2021	Alkalinity, bicarbonate	200	FALSE	FALSE
G01D	5/12/2021	Calcium	24.9	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G01D	5/12/2021	Magnesium	7.55	FALSE	FALSE
G01D	5/12/2021	Sodium	82.5	FALSE	FALSE
G01D	5/12/2021	Potassium	1.13	FALSE	FALSE
G01D	5/12/2021	Chloride	7	FALSE	FALSE
G01D	5/12/2021	Sulfate	20	FALSE	FALSE
G01D	5/12/2021	Fluoride	0.21	FALSE	FALSE
G01D	5/12/2021	Barium	0.133	FALSE	FALSE
G01D	5/12/2021	Boron	0.0167	FALSE	FALSE
G01D	5/12/2021	Cobalt	0.0316	FALSE	TRUE
G01D	5/12/2021	Iron	0.65	FALSE	FALSE
G01D	5/12/2021	Manganese	0.012	FALSE	FALSE
G01D	5/12/2021	H+	0.000000324	FALSE	FALSE
G01D	6/1/2021	Alkalinity, bicarbonate	198	FALSE	FALSE
G01D	6/1/2021	Calcium	24.4	FALSE	FALSE
G01D	6/1/2021	Magnesium	7.36	FALSE	FALSE
G01D	6/1/2021	Sodium	75.3	FALSE	FALSE
G01D	6/1/2021	Potassium	1.26	FALSE	FALSE
G01D	6/1/2021	Chloride	7	FALSE	FALSE
G01D	6/1/2021	Sulfate	18	FALSE	FALSE
G01D	6/1/2021	Fluoride	0.23	FALSE	FALSE
G01D	6/1/2021	Barium	0.134	FALSE	FALSE
G01D	6/1/2021	Boron	0.158	FALSE	TRUE
G01D	6/1/2021	Cobalt	0.0316	FALSE	TRUE
G01D	6/1/2021	Iron	1.92	FALSE	FALSE
G01D	6/1/2021	Manganese	0.0249	FALSE	FALSE
G01D	6/1/2021	H+	0.000000457	FALSE	FALSE
G01D	6/14/2021	Alkalinity, bicarbonate	219	FALSE	FALSE
G01D	6/14/2021	Calcium	24.4	FALSE	FALSE
G01D	6/14/2021	Magnesium	7.41	FALSE	FALSE
G01D	6/14/2021	Sodium	78.8	FALSE	FALSE
G01D	6/14/2021	Potassium	1.26	FALSE	FALSE
G01D	6/14/2021	Chloride	9	FALSE	FALSE
G01D	6/14/2021	Sulfate	20	FALSE	FALSE
G01D	6/14/2021	Fluoride	0.23	FALSE	FALSE
G01D	6/14/2021	Barium	0.136	FALSE	FALSE
G01D	6/14/2021	Boron	0.158	FALSE	TRUE
G01D	6/14/2021	Cobalt	0.0316	FALSE	TRUE
G01D	6/14/2021	Iron	0.831	FALSE	FALSE
G01D	6/14/2021	Manganese	0.0147	FALSE	FALSE
G01D	6/14/2021	H+	0.000000347	FALSE	FALSE
G01D	7/21/2021	Alkalinity, bicarbonate	204	FALSE	FALSE
G01D	7/21/2021	Calcium	26	FALSE	FALSE
G01D	7/21/2021	Magnesium	7.54	FALSE	FALSE
G01D	7/21/2021	Sodium	75.1	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G01D	7/21/2021	Potassium	1.24	FALSE	FALSE
G01D	7/21/2021	Chloride	9	FALSE	FALSE
G01D	7/21/2021	Sulfate	18	FALSE	FALSE
G01D	7/21/2021	Fluoride	0.21	FALSE	FALSE
G01D	7/21/2021	Barium	0.125	FALSE	FALSE
G01D	7/21/2021	Boron	0.158	FALSE	TRUE
G01D	7/21/2021	Cobalt	0.0316	FALSE	TRUE
G01D	7/21/2021	Iron	1.35	FALSE	FALSE
G01D	7/21/2021	Manganese	0.0121	FALSE	FALSE
G01D	7/21/2021	H+	0.000000427	FALSE	FALSE
G01D	9/20/2021	Alkalinity, bicarbonate	215	FALSE	FALSE
G01D	9/20/2021	Calcium	26	FALSE	FALSE
G01D	9/20/2021	Magnesium	7.54	TRUE	NA
G01D	9/20/2021	Sodium	75.1	TRUE	NA
G01D	9/20/2021	Potassium	1.12	TRUE	NA
G01D	9/20/2021	Chloride	9	FALSE	FALSE
G01D	9/20/2021	Sulfate	18	FALSE	FALSE
G01D	9/20/2021	Fluoride	0.21	FALSE	FALSE
G01D	9/20/2021	Barium	0.145	FALSE	FALSE
G01D	9/20/2021	Boron	0.158	FALSE	TRUE
G01D	9/20/2021	Cobalt	0.0316	FALSE	TRUE
G01D	9/20/2021	Iron	1.15	TRUE	NA
G01D	9/20/2021	Manganese	0.0147	TRUE	NA
G01D	9/20/2021	H+	0.000000309	FALSE	FALSE
G01D	9/20/2022	Alkalinity, bicarbonate	171	TRUE	NA
G01D	9/20/2022	Calcium	25.5	FALSE	FALSE
G01D	9/20/2022	Magnesium	7.79	TRUE	NA
G01D	9/20/2022	Sodium	82.5	TRUE	NA
G01D	9/20/2022	Potassium	1.13	TRUE	NA
G01D	9/20/2022	Chloride	8	FALSE	FALSE
G01D	9/20/2022	Sulfate	23	FALSE	FALSE
G01D	9/20/2022	Fluoride	0.19	FALSE	FALSE
G01D	9/20/2022	Barium	0.142	FALSE	FALSE
G01D	9/20/2022	Boron	0.014	FALSE	FALSE
G01D	9/20/2022	Cobalt	0.0007	FALSE	FALSE
G01D	9/20/2022	Iron	1.15	TRUE	NA
G01D	9/20/2022	Manganese	0.0181	TRUE	NA
G01D	9/20/2022	H+	0.000000316	FALSE	FALSE
G01D	3/7/2023	Alkalinity, bicarbonate	223	FALSE	FALSE
G01D	3/7/2023	Calcium	23	FALSE	FALSE
G01D	3/7/2023	Magnesium	7.66	FALSE	FALSE
G01D	3/7/2023	Sodium	85.8	FALSE	FALSE
G01D	3/7/2023	Potassium	1.06	FALSE	FALSE
G01D	3/7/2023	Chloride	5	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G01D	3/7/2023	Sulfate	36	FALSE	FALSE
G01D	3/7/2023	Fluoride	0.21	FALSE	FALSE
G01D	3/7/2023	Barium	0.134	FALSE	FALSE
G01D	3/7/2023	Boron	0.029	FALSE	FALSE
G01D	3/7/2023	Cobalt	0.0022	FALSE	FALSE
G01D	3/7/2023	Iron	1.09	TRUE	NA
G01D	3/7/2023	Manganese	0.0181	TRUE	NA
G01D	3/7/2023	H+	0.000000295	FALSE	FALSE
G01D	5/2/2023	Alkalinity, bicarbonate	240	FALSE	FALSE
G01D	5/2/2023	Calcium	28.8	FALSE	FALSE
G01D	5/2/2023	Magnesium	8.43	FALSE	FALSE
G01D	5/2/2023	Sodium	90.3	FALSE	FALSE
G01D	5/2/2023	Potassium	1.28	FALSE	FALSE
G01D	5/2/2023	Chloride	10	FALSE	FALSE
G01D	5/2/2023	Sulfate	26	FALSE	FALSE
G01D	5/2/2023	Fluoride	0.22	FALSE	FALSE
G01D	5/2/2023	Barium	0.213	FALSE	FALSE
G01D	5/2/2023	Boron	0.021	FALSE	FALSE
G01D	5/2/2023	Cobalt	0.0058	FALSE	FALSE
G01D	5/2/2023	Iron	4.09	FALSE	FALSE
G01D	5/2/2023	Manganese	0.345	FALSE	FALSE
G01D	5/2/2023	H+	0.000000457	FALSE	FALSE
G02D	5/12/2021	Alkalinity, bicarbonate	153	FALSE	FALSE
G02D	5/12/2021	Calcium	34.6	FALSE	FALSE
G02D	5/12/2021	Magnesium	10.4	FALSE	FALSE
G02D	5/12/2021	Sodium	53.6	FALSE	FALSE
G02D	5/12/2021	Potassium	1.17	FALSE	FALSE
G02D	5/12/2021	Chloride	18	FALSE	FALSE
G02D	5/12/2021	Sulfate	27	FALSE	FALSE
G02D	5/12/2021	Fluoride	0.18	FALSE	FALSE
G02D	5/12/2021	Barium	0.208	FALSE	FALSE
G02D	5/12/2021	Boron	0.0356	FALSE	FALSE
G02D	5/12/2021	Cobalt	0.0316	FALSE	TRUE
G02D	5/12/2021	Iron	0.316	FALSE	TRUE
G02D	5/12/2021	Manganese	0.0707	FALSE	TRUE
G02D	5/12/2021	H+	0.000000447	FALSE	FALSE
G02D	7/21/2021	Alkalinity, bicarbonate	148	FALSE	FALSE
G02D	7/21/2021	Calcium	36.6	FALSE	FALSE
G02D	7/21/2021	Magnesium	10.1	FALSE	FALSE
G02D	7/21/2021	Sodium	38.7	FALSE	FALSE
G02D	7/21/2021	Potassium	1.14	FALSE	FALSE
G02D	7/21/2021	Chloride	22	FALSE	FALSE
G02D	7/21/2021	Sulfate	20	FALSE	FALSE
G02D	7/21/2021	Fluoride	0.2	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G02D	7/21/2021	Barium	0.181	FALSE	FALSE
G02D	7/21/2021	Boron	0.0329	FALSE	FALSE
G02D	7/21/2021	Cobalt	0.0316	FALSE	TRUE
G02D	7/21/2021	Iron	0.0594	FALSE	FALSE
G02D	7/21/2021	Manganese	0.0026	FALSE	FALSE
G02D	7/21/2021	H+	0.000000661	FALSE	FALSE
G02D	9/20/2021	Alkalinity, bicarbonate	156	FALSE	FALSE
G02D	9/20/2021	Calcium	34.3	FALSE	FALSE
G02D	9/20/2021	Magnesium	10.2	TRUE	NA
G02D	9/20/2021	Sodium	38.7	TRUE	NA
G02D	9/20/2021	Potassium	1.12	TRUE	NA
G02D	9/20/2021	Chloride	20	FALSE	FALSE
G02D	9/20/2021	Sulfate	19	FALSE	FALSE
G02D	9/20/2021	Fluoride	0.18	FALSE	FALSE
G02D	9/20/2021	Barium	0.189	FALSE	FALSE
G02D	9/20/2021	Boron	0.0313	FALSE	FALSE
G02D	9/20/2021	Cobalt	0.0316	FALSE	TRUE
G02D	9/20/2021	Iron	0.158	TRUE	NA
G02D	9/20/2021	Manganese	0.0032	TRUE	NA
G02D	9/20/2021	H+	0.000000479	FALSE	FALSE
G02D	1/24/2023	Alkalinity, bicarbonate	136	FALSE	FALSE
G02D	1/24/2023	Calcium	35.9	FALSE	FALSE
G02D	1/24/2023	Magnesium	10.2	FALSE	FALSE
G02D	1/24/2023	Sodium	29	FALSE	FALSE
G02D	1/24/2023	Potassium	1.11	FALSE	FALSE
G02D	1/24/2023	Chloride	23	FALSE	FALSE
G02D	1/24/2023	Sulfate	12	FALSE	FALSE
G02D	1/24/2023	Fluoride	0.21	FALSE	FALSE
G02D	1/24/2023	Barium	0.19	FALSE	FALSE
G02D	1/24/2023	Boron	0.0311	FALSE	FALSE
G02D	1/24/2023	Cobalt	0.0316	FALSE	TRUE
G02D	1/24/2023	Iron	0.158	FALSE	TRUE
G02D	1/24/2023	Manganese	0.0014	FALSE	FALSE
G02D	1/24/2023	H+	0.000000229	FALSE	FALSE
G02D	3/8/2023	Alkalinity, bicarbonate	141	FALSE	FALSE
G02D	3/8/2023	Calcium	37.3	FALSE	FALSE
G02D	3/8/2023	Magnesium	10.3	FALSE	FALSE
G02D	3/8/2023	Sodium	28.3	FALSE	FALSE
G02D	3/8/2023	Potassium	1.12	FALSE	FALSE
G02D	3/8/2023	Chloride	21	FALSE	FALSE
G02D	3/8/2023	Sulfate	11	FALSE	FALSE
G02D	3/8/2023	Fluoride	0.2	FALSE	FALSE
G02D	3/8/2023	Barium	0.171	FALSE	FALSE
G02D	3/8/2023	Boron	0.027	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G02D	3/8/2023	Cobalt	0.0316	FALSE	TRUE
G02D	3/8/2023	Iron	0.158	TRUE	NA
G02D	3/8/2023	Manganese	0.0032	TRUE	NA
G02D	3/8/2023	H+	0.000000275	FALSE	FALSE
G02D	5/3/2023	Alkalinity, bicarbonate	140	FALSE	FALSE
G02D	5/3/2023	Calcium	38.7	FALSE	FALSE
G02D	5/3/2023	Magnesium	10.4	FALSE	FALSE
G02D	5/3/2023	Sodium	39.1	FALSE	FALSE
G02D	5/3/2023	Potassium	1.14	FALSE	FALSE
G02D	5/3/2023	Chloride	21	FALSE	FALSE
G02D	5/3/2023	Sulfate	13	FALSE	FALSE
G02D	5/3/2023	Fluoride	0.22	FALSE	FALSE
G02D	5/3/2023	Barium	0.21	FALSE	FALSE
G02D	5/3/2023	Boron	0.0412	FALSE	FALSE
G02D	5/3/2023	Cobalt	0.0316	FALSE	TRUE
G02D	5/3/2023	Iron	0.049	FALSE	FALSE
G02D	5/3/2023	Manganese	0.0032	FALSE	FALSE
G02D	5/3/2023	H+	0.000000347	FALSE	FALSE
G03	6/15/2021	Alkalinity, bicarbonate	148	FALSE	FALSE
G03	6/15/2021	Calcium	46.7	FALSE	FALSE
G03	6/15/2021	Magnesium	15.1	FALSE	FALSE
G03	6/15/2021	Sodium	40.4	FALSE	FALSE
G03	6/15/2021	Potassium	1.26	FALSE	FALSE
G03	6/15/2021	Chloride	22	FALSE	FALSE
G03	6/15/2021	Sulfate	79	FALSE	FALSE
G03	6/15/2021	Fluoride	0.22	FALSE	FALSE
G03	6/15/2021	Barium	0.0705	FALSE	FALSE
G03	6/15/2021	Boron	0.225	FALSE	FALSE
G03	6/15/2021	Cobalt	0.0316	FALSE	TRUE
G03	6/15/2021	Iron	1.69	FALSE	FALSE
G03	6/15/2021	Manganese	0.033	FALSE	FALSE
G03	6/15/2021	H+	0.000000575	FALSE	FALSE
G03	7/6/2021	Alkalinity, bicarbonate	140	FALSE	FALSE
G03	7/6/2021	Calcium	42.1	FALSE	FALSE
G03	7/6/2021	Magnesium	14	FALSE	FALSE
G03	7/6/2021	Sodium	38	FALSE	FALSE
G03	7/6/2021	Potassium	1.13	FALSE	FALSE
G03	7/6/2021	Chloride	22	FALSE	FALSE
G03	7/6/2021	Sulfate	77	FALSE	FALSE
G03	7/6/2021	Fluoride	0.22	FALSE	FALSE
G03	7/6/2021	Barium	0.0564	FALSE	FALSE
G03	7/6/2021	Boron	0.235	FALSE	FALSE
G03	7/6/2021	Cobalt	0.0316	FALSE	TRUE
G03	7/6/2021	Iron	1.06	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G03	7/6/2021	Manganese	0.0226	FALSE	FALSE
G03	7/6/2021	H+	0.000000457	FALSE	FALSE
G03	7/21/2021	Alkalinity, bicarbonate	141	FALSE	FALSE
G03	7/21/2021	Calcium	50	FALSE	FALSE
G03	7/21/2021	Magnesium	15.7	FALSE	FALSE
G03	7/21/2021	Sodium	40.2	FALSE	FALSE
G03	7/21/2021	Potassium	1.39	FALSE	FALSE
G03	7/21/2021	Chloride	24	FALSE	FALSE
G03	7/21/2021	Sulfate	92	FALSE	FALSE
G03	7/21/2021	Fluoride	0.2	FALSE	FALSE
G03	7/21/2021	Barium	0.0555	FALSE	FALSE
G03	7/21/2021	Boron	0.294	FALSE	FALSE
G03	7/21/2021	Cobalt	0.0316	FALSE	TRUE
G03	7/21/2021	Iron	2.42	FALSE	FALSE
G03	7/21/2021	Manganese	0.0334	FALSE	FALSE
G03	7/21/2021	H+	0.000000437	FALSE	FALSE
G05	3/4/2021	Alkalinity, bicarbonate	180	FALSE	FALSE
G05	3/4/2021	Calcium	55.3	FALSE	FALSE
G05	3/4/2021	Magnesium	17.2	FALSE	FALSE
G05	3/4/2021	Sodium	44.1	FALSE	FALSE
G05	3/4/2021	Potassium	1.37	FALSE	FALSE
G05	3/4/2021	Chloride	13	FALSE	FALSE
G05	3/4/2021	Sulfate	94	FALSE	FALSE
G05	3/4/2021	Fluoride	0.28	FALSE	FALSE
G05	3/4/2021	Barium	0.13	FALSE	FALSE
G05	3/4/2021	Boron	0.181	FALSE	FALSE
G05	3/4/2021	Cobalt	0.0101	FALSE	FALSE
G05	3/4/2021	Iron	0.905	FALSE	FALSE
G05	3/4/2021	Manganese	0.227	FALSE	FALSE
G05	3/4/2021	H+	0.000000316	FALSE	FALSE
G05	4/13/2021	Alkalinity, bicarbonate	206	FALSE	FALSE
G05	4/13/2021	Calcium	68.5	FALSE	FALSE
G05	4/13/2021	Magnesium	19.5	FALSE	FALSE
G05	4/13/2021	Sodium	53.7	FALSE	FALSE
G05	4/13/2021	Potassium	2.14	FALSE	FALSE
G05	4/13/2021	Chloride	21	FALSE	FALSE
G05	4/13/2021	Sulfate	95	FALSE	FALSE
G05	4/13/2021	Fluoride	0.33	FALSE	FALSE
G05	4/13/2021	Barium	0.126	FALSE	FALSE
G05	4/13/2021	Boron	0.19	FALSE	FALSE
G05	4/13/2021	Cobalt	0.0095	FALSE	FALSE
G05	4/13/2021	Iron	2	FALSE	FALSE
G05	4/13/2021	Manganese	0.294	FALSE	FALSE
G05	4/13/2021	H+	0.000000316	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G05	5/11/2021	Alkalinity, bicarbonate	193	FALSE	FALSE
G05	5/11/2021	Calcium	60.3	FALSE	FALSE
G05	5/11/2021	Magnesium	19.4	FALSE	FALSE
G05	5/11/2021	Sodium	49.6	FALSE	FALSE
G05	5/11/2021	Potassium	1.97	FALSE	FALSE
G05	5/11/2021	Chloride	19	FALSE	FALSE
G05	5/11/2021	Sulfate	109	FALSE	FALSE
G05	5/11/2021	Fluoride	0.34	FALSE	FALSE
G05	5/11/2021	Barium	0.132	FALSE	FALSE
G05	5/11/2021	Boron	0.158	FALSE	FALSE
G05	5/11/2021	Cobalt	0.0087	FALSE	FALSE
G05	5/11/2021	Iron	1.14	FALSE	FALSE
G05	5/11/2021	Manganese	0.256	FALSE	FALSE
G05	5/11/2021	H+	0.000000417	FALSE	FALSE
G05	6/1/2021	Alkalinity, bicarbonate	190	FALSE	FALSE
G05	6/1/2021	Calcium	57.1	FALSE	FALSE
G05	6/1/2021	Magnesium	18.6	FALSE	FALSE
G05	6/1/2021	Sodium	45.5	FALSE	FALSE
G05	6/1/2021	Potassium	2.18	FALSE	FALSE
G05	6/1/2021	Chloride	21	FALSE	FALSE
G05	6/1/2021	Sulfate	83	FALSE	FALSE
G05	6/1/2021	Fluoride	0.34	FALSE	FALSE
G05	6/1/2021	Barium	0.144	FALSE	FALSE
G05	6/1/2021	Boron	0.157	FALSE	FALSE
G05	6/1/2021	Cobalt	0.0078	FALSE	FALSE
G05	6/1/2021	Iron	0.81	FALSE	FALSE
G05	6/1/2021	Manganese	0.254	FALSE	FALSE
G05	6/1/2021	H+	0.000000331	FALSE	FALSE
G05	7/6/2021	Alkalinity, bicarbonate	178	FALSE	FALSE
G05	7/6/2021	Calcium	51.8	FALSE	FALSE
G05	7/6/2021	Magnesium	17.6	FALSE	FALSE
G05	7/6/2021	Sodium	45.9	FALSE	FALSE
G05	7/6/2021	Potassium	2.04	FALSE	FALSE
G05	7/6/2021	Chloride	22	FALSE	FALSE
G05	7/6/2021	Sulfate	90	FALSE	FALSE
G05	7/6/2021	Fluoride	0.34	FALSE	FALSE
G05	7/6/2021	Barium	0.139	FALSE	FALSE
G05	7/6/2021	Boron	0.148	FALSE	FALSE
G05	7/6/2021	Cobalt	0.0091	FALSE	FALSE
G05	7/6/2021	Iron	0.729	FALSE	FALSE
G05	7/6/2021	Manganese	0.27	FALSE	FALSE
G05	7/6/2021	H+	0.00000038	FALSE	FALSE
G05	7/20/2021	Alkalinity, bicarbonate	186	FALSE	FALSE
G05	7/20/2021	Calcium	55.9	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G05	7/20/2021	Magnesium	18.5	FALSE	FALSE
G05	7/20/2021	Sodium	43.4	FALSE	FALSE
G05	7/20/2021	Potassium	1.75	FALSE	FALSE
G05	7/20/2021	Chloride	20	FALSE	FALSE
G05	7/20/2021	Sulfate	87	FALSE	FALSE
G05	7/20/2021	Fluoride	0.32	FALSE	FALSE
G05	7/20/2021	Barium	0.133	FALSE	FALSE
G05	7/20/2021	Boron	0.131	FALSE	FALSE
G05	7/20/2021	Cobalt	0.0059	FALSE	FALSE
G05	7/20/2021	Iron	0.747	FALSE	FALSE
G05	7/20/2021	Manganese	0.204	FALSE	FALSE
G05	7/20/2021	H+	0.000000447	FALSE	FALSE
G05	7/26/2022	Alkalinity, bicarbonate	181	FALSE	FALSE
G05	7/26/2022	Calcium	50.6	FALSE	FALSE
G05	7/26/2022	Magnesium	17.6	FALSE	FALSE
G05	7/26/2022	Sodium	35.4	FALSE	FALSE
G05	7/26/2022	Potassium	1.07	FALSE	FALSE
G05	7/26/2022	Chloride	15	FALSE	FALSE
G05	7/26/2022	Sulfate	68	FALSE	FALSE
G05	7/26/2022	Fluoride	0.37	FALSE	FALSE
G05	7/26/2022	Barium	0.141	FALSE	FALSE
G05	7/26/2022	Boron	0.0645	FALSE	FALSE
G05	7/26/2022	Cobalt	0.0075	FALSE	FALSE
G05	7/26/2022	Iron	1.38	FALSE	FALSE
G05	7/26/2022	Manganese	0.176	FALSE	FALSE
G05	7/26/2022	H+	0.000000234	FALSE	FALSE
G05	3/9/2023	Alkalinity, bicarbonate	179	FALSE	FALSE
G05	3/9/2023	Calcium	52.6	FALSE	FALSE
G05	3/9/2023	Magnesium	19.4	FALSE	FALSE
G05	3/9/2023	Sodium	41.8	FALSE	FALSE
G05	3/9/2023	Potassium	1.59	FALSE	FALSE
G05	3/9/2023	Chloride	22	FALSE	FALSE
G05	3/9/2023	Sulfate	90	FALSE	FALSE
G05	3/9/2023	Fluoride	0.32	FALSE	FALSE
G05	3/9/2023	Barium	0.175	FALSE	FALSE
G05	3/9/2023	Boron	0.0541	FALSE	FALSE
G05	3/9/2023	Cobalt	0.0074	FALSE	FALSE
G05	3/9/2023	Iron	0.81	TRUE	NA
G05	3/9/2023	Manganese	0.204	TRUE	NA
G05	3/9/2023	H+	0.000000316	FALSE	FALSE
G05	5/3/2023	Alkalinity, bicarbonate	163	FALSE	FALSE
G05	5/3/2023	Calcium	54.4	FALSE	FALSE
G05	5/3/2023	Magnesium	19.3	FALSE	FALSE
G05	5/3/2023	Sodium	46.7	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G05	5/3/2023	Potassium	1.68	FALSE	FALSE
G05	5/3/2023	Chloride	24	FALSE	FALSE
G05	5/3/2023	Sulfate	112	FALSE	FALSE
G05	5/3/2023	Fluoride	0.38	FALSE	FALSE
G05	5/3/2023	Barium	0.212	FALSE	FALSE
G05	5/3/2023	Boron	0.0478	FALSE	FALSE
G05	5/3/2023	Cobalt	0.0103	FALSE	FALSE
G05	5/3/2023	Iron	1.5	FALSE	FALSE
G05	5/3/2023	Manganese	0.191	FALSE	FALSE
G05	5/3/2023	H+	0.000000324	FALSE	FALSE
G06	5/11/2021	Alkalinity, bicarbonate	156	FALSE	FALSE
G06	5/11/2021	Calcium	93.4	FALSE	FALSE
G06	5/11/2021	Magnesium	26.8	FALSE	FALSE
G06	5/11/2021	Sodium	52.8	FALSE	FALSE
G06	5/11/2021	Potassium	2.5	FALSE	FALSE
G06	5/11/2021	Chloride	22	FALSE	FALSE
G06	5/11/2021	Sulfate	219	FALSE	FALSE
G06	5/11/2021	Fluoride	0.26	FALSE	FALSE
G06	5/11/2021	Barium	0.0311	FALSE	FALSE
G06	5/11/2021	Boron	3.37	FALSE	FALSE
G06	5/11/2021	Cobalt	0.0316	FALSE	TRUE
G06	5/11/2021	Iron	0.702	FALSE	FALSE
G06	5/11/2021	Manganese	0.0957	FALSE	FALSE
G06	5/11/2021	H+	0.000000372	FALSE	FALSE
G06	6/1/2021	Alkalinity, bicarbonate	167	FALSE	FALSE
G06	6/1/2021	Calcium	92.6	FALSE	FALSE
G06	6/1/2021	Magnesium	25.3	FALSE	FALSE
G06	6/1/2021	Sodium	46.4	FALSE	FALSE
G06	6/1/2021	Potassium	2.5	FALSE	FALSE
G06	6/1/2021	Chloride	22	FALSE	FALSE
G06	6/1/2021	Sulfate	216	FALSE	FALSE
G06	6/1/2021	Fluoride	0.28	FALSE	FALSE
G06	6/1/2021	Barium	0.0323	FALSE	FALSE
G06	6/1/2021	Boron	3.56	FALSE	FALSE
G06	6/1/2021	Cobalt	0.0316	FALSE	TRUE
G06	6/1/2021	Iron	1.69	FALSE	FALSE
G06	6/1/2021	Manganese	0.0892	FALSE	FALSE
G06	6/1/2021	H+	0.000000275	FALSE	FALSE
G06	6/15/2021	Alkalinity, bicarbonate	170	FALSE	FALSE
G06	6/15/2021	Calcium	91.5	FALSE	FALSE
G06	6/15/2021	Magnesium	25.2	FALSE	FALSE
G06	6/15/2021	Sodium	50.7	FALSE	FALSE
G06	6/15/2021	Potassium	2.57	FALSE	FALSE
G06	6/15/2021	Chloride	21	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G06	6/15/2021	Sulfate	230	FALSE	FALSE
G06	6/15/2021	Fluoride	0.28	FALSE	FALSE
G06	6/15/2021	Barium	0.028	FALSE	FALSE
G06	6/15/2021	Boron	2.97	FALSE	FALSE
G06	6/15/2021	Cobalt	0.0316	FALSE	TRUE
G06	6/15/2021	Iron	0.379	FALSE	FALSE
G06	6/15/2021	Manganese	0.0682	FALSE	FALSE
G06	6/15/2021	H+	0.000000309	FALSE	FALSE
G06	7/6/2021	Alkalinity, bicarbonate	163	FALSE	FALSE
G06	7/6/2021	Calcium	86.7	FALSE	FALSE
G06	7/6/2021	Magnesium	23.7	FALSE	FALSE
G06	7/6/2021	Sodium	50	FALSE	FALSE
G06	7/6/2021	Potassium	2.57	FALSE	FALSE
G06	7/6/2021	Chloride	22	FALSE	FALSE
G06	7/6/2021	Sulfate	223	FALSE	FALSE
G06	7/6/2021	Fluoride	0.27	FALSE	FALSE
G06	7/6/2021	Barium	0.0272	FALSE	FALSE
G06	7/6/2021	Boron	3.93	FALSE	FALSE
G06	7/6/2021	Cobalt	0.0316	FALSE	TRUE
G06	7/6/2021	Iron	0.495	FALSE	FALSE
G06	7/6/2021	Manganese	0.0631	FALSE	FALSE
G06	7/6/2021	H+	0.000000479	FALSE	FALSE
G06	7/20/2021	Alkalinity, bicarbonate	162	FALSE	FALSE
G06	7/20/2021	Calcium	90.6	FALSE	FALSE
G06	7/20/2021	Magnesium	24.4	FALSE	FALSE
G06	7/20/2021	Sodium	47	FALSE	FALSE
G06	7/20/2021	Potassium	2.37	FALSE	FALSE
G06	7/20/2021	Chloride	21	FALSE	FALSE
G06	7/20/2021	Sulfate	213	FALSE	FALSE
G06	7/20/2021	Fluoride	0.26	FALSE	FALSE
G06	7/20/2021	Barium	0.0244	FALSE	FALSE
G06	7/20/2021	Boron	3.41	FALSE	FALSE
G06	7/20/2021	Cobalt	0.0316	FALSE	TRUE
G06	7/20/2021	Iron	0.613	FALSE	FALSE
G06	7/20/2021	Manganese	0.0456	FALSE	FALSE
G06	7/20/2021	H+	0.000000389	FALSE	FALSE
G06	3/9/2023	Alkalinity, bicarbonate	161	FALSE	FALSE
G06	3/9/2023	Calcium	87.6	FALSE	FALSE
G06	3/9/2023	Magnesium	24.1	FALSE	FALSE
G06	3/9/2023	Sodium	42.1	FALSE	FALSE
G06	3/9/2023	Potassium	2.2	FALSE	FALSE
G06	3/9/2023	Chloride	21	FALSE	FALSE
G06	3/9/2023	Sulfate	221	FALSE	FALSE
G06	3/9/2023	Fluoride	0.22	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G06	3/9/2023	Barium	0.0257	FALSE	FALSE
G06	3/9/2023	Boron	2.95	FALSE	FALSE
G06	3/9/2023	Cobalt	0.0006	FALSE	FALSE
G06	3/9/2023	Iron	0.537	TRUE	NA
G06	3/9/2023	Manganese	0.0682	TRUE	NA
G06	3/9/2023	H+	0.000000269	FALSE	FALSE
G07	3/24/2021	Alkalinity, bicarbonate	171	FALSE	FALSE
G07	3/24/2021	Calcium	92.8	FALSE	FALSE
G07	3/24/2021	Magnesium	24.2	FALSE	FALSE
G07	3/24/2021	Sodium	71.4	FALSE	FALSE
G07	3/24/2021	Potassium	3.87	FALSE	FALSE
G07	3/24/2021	Chloride	21	FALSE	FALSE
G07	3/24/2021	Sulfate	258	FALSE	FALSE
G07	3/24/2021	Fluoride	0.42	FALSE	FALSE
G07	3/24/2021	Barium	0.0643	FALSE	FALSE
G07	3/24/2021	Boron	4.67	FALSE	FALSE
G07	3/24/2021	Cobalt	0.0035	FALSE	FALSE
G07	3/24/2021	Iron	2.71	FALSE	FALSE
G07	3/24/2021	Manganese	4.48	FALSE	FALSE
G07	3/24/2021	H+	0.000000398	FALSE	FALSE
G07	4/13/2021	Alkalinity, bicarbonate	164	FALSE	FALSE
G07	4/13/2021	Calcium	126	FALSE	FALSE
G07	4/13/2021	Magnesium	24.4	FALSE	FALSE
G07	4/13/2021	Sodium	90.4	FALSE	FALSE
G07	4/13/2021	Potassium	3.98	FALSE	FALSE
G07	4/13/2021	Chloride	20	FALSE	FALSE
G07	4/13/2021	Sulfate	274	FALSE	FALSE
G07	4/13/2021	Fluoride	0.42	FALSE	FALSE
G07	4/13/2021	Barium	0.0497	FALSE	FALSE
G07	4/13/2021	Boron	5.04	FALSE	FALSE
G07	4/13/2021	Cobalt	0.0024	FALSE	FALSE
G07	4/13/2021	Iron	1.2	FALSE	FALSE
G07	4/13/2021	Manganese	4.56	FALSE	FALSE
G07	4/13/2021	H+	0.000000501	FALSE	FALSE
G07	5/11/2021	Alkalinity, bicarbonate	162	FALSE	FALSE
G07	5/11/2021	Calcium	90.4	FALSE	FALSE
G07	5/11/2021	Magnesium	22.9	FALSE	FALSE
G07	5/11/2021	Sodium	68.6	FALSE	FALSE
G07	5/11/2021	Potassium	3.9	FALSE	FALSE
G07	5/11/2021	Chloride	19	FALSE	FALSE
G07	5/11/2021	Sulfate	248	FALSE	FALSE
G07	5/11/2021	Fluoride	0.41	FALSE	FALSE
G07	5/11/2021	Barium	0.0448	FALSE	FALSE
G07	5/11/2021	Boron	4.55	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G07	5/11/2021	Cobalt	0.00185	FALSE	FALSE
G07	5/11/2021	Iron	0.537	FALSE	FALSE
G07	5/11/2021	Manganese	3.71	FALSE	FALSE
G07	5/11/2021	H+	0.000000525	FALSE	FALSE
G07	6/1/2021	Alkalinity, bicarbonate	173	FALSE	FALSE
G07	6/1/2021	Calcium	96.6	FALSE	FALSE
G07	6/1/2021	Magnesium	22.9	FALSE	FALSE
G07	6/1/2021	Sodium	67.5	FALSE	FALSE
G07	6/1/2021	Potassium	4.32	FALSE	FALSE
G07	6/1/2021	Chloride	22	FALSE	FALSE
G07	6/1/2021	Sulfate	257	FALSE	FALSE
G07	6/1/2021	Fluoride	0.43	FALSE	FALSE
G07	6/1/2021	Barium	0.054	FALSE	FALSE
G07	6/1/2021	Boron	5.23	FALSE	FALSE
G07	6/1/2021	Cobalt	0.0023	FALSE	FALSE
G07	6/1/2021	Iron	2.49	FALSE	FALSE
G07	6/1/2021	Manganese	3.54	FALSE	FALSE
G07	6/1/2021	H+	0.000000562	FALSE	FALSE
G07	6/15/2021	Alkalinity, bicarbonate	177	FALSE	FALSE
G07	6/15/2021	Calcium	89.3	FALSE	FALSE
G07	6/15/2021	Magnesium	21.8	FALSE	FALSE
G07	6/15/2021	Sodium	66.7	FALSE	FALSE
G07	6/15/2021	Potassium	3.97	FALSE	FALSE
G07	6/15/2021	Chloride	20	FALSE	FALSE
G07	6/15/2021	Sulfate	246	FALSE	FALSE
G07	6/15/2021	Fluoride	0.41	FALSE	FALSE
G07	6/15/2021	Barium	0.0429	FALSE	FALSE
G07	6/15/2021	Boron	3.91	FALSE	FALSE
G07	6/15/2021	Cobalt	0.0013	FALSE	FALSE
G07	6/15/2021	Iron	0.294	FALSE	FALSE
G07	6/15/2021	Manganese	3.7	FALSE	FALSE
G07	6/15/2021	H+	0.000000562	FALSE	FALSE
G07	7/6/2021	Alkalinity, bicarbonate	166	FALSE	FALSE
G07	7/6/2021	Calcium	84.8	FALSE	FALSE
G07	7/6/2021	Magnesium	20.5	FALSE	FALSE
G07	7/6/2021	Sodium	66.5	FALSE	FALSE
G07	7/6/2021	Potassium	3.87	FALSE	FALSE
G07	7/6/2021	Chloride	21	FALSE	FALSE
G07	7/6/2021	Sulfate	258	FALSE	FALSE
G07	7/6/2021	Fluoride	0.4	FALSE	FALSE
G07	7/6/2021	Barium	0.0373	FALSE	FALSE
G07	7/6/2021	Boron	4.95	FALSE	FALSE
G07	7/6/2021	Cobalt	0.0012	FALSE	FALSE
G07	7/6/2021	Iron	0.134	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G07	7/6/2021	Manganese	4.1	FALSE	FALSE
G07	7/6/2021	H+	0.00000105	FALSE	FALSE
G07	7/20/2021	Alkalinity, bicarbonate	166	FALSE	FALSE
G07	7/20/2021	Calcium	96.5	FALSE	FALSE
G07	7/20/2021	Magnesium	23	FALSE	FALSE
G07	7/20/2021	Sodium	67.4	FALSE	FALSE
G07	7/20/2021	Potassium	4.03	FALSE	FALSE
G07	7/20/2021	Chloride	21	FALSE	FALSE
G07	7/20/2021	Sulfate	252	FALSE	FALSE
G07	7/20/2021	Fluoride	0.4	FALSE	FALSE
G07	7/20/2021	Barium	0.047	FALSE	FALSE
G07	7/20/2021	Boron	4.48	FALSE	FALSE
G07	7/20/2021	Cobalt	0.0014	FALSE	FALSE
G07	7/20/2021	Iron	0.639	FALSE	FALSE
G07	7/20/2021	Manganese	3.28	FALSE	FALSE
G07	7/20/2021	H+	0.000000724	FALSE	FALSE
G08	4/13/2021	Alkalinity, bicarbonate	177	FALSE	FALSE
G08	4/13/2021	Calcium	142	FALSE	FALSE
G08	4/13/2021	Magnesium	31.9	FALSE	FALSE
G08	4/13/2021	Sodium	33.6	FALSE	FALSE
G08	4/13/2021	Potassium	1.6	FALSE	FALSE
G08	4/13/2021	Chloride	15	FALSE	FALSE
G08	4/13/2021	Sulfate	286	FALSE	FALSE
G08	4/13/2021	Fluoride	0.34	FALSE	FALSE
G08	4/13/2021	Barium	0.0772	FALSE	FALSE
G08	4/13/2021	Boron	5.25	FALSE	FALSE
G08	4/13/2021	Cobalt	0.0041	FALSE	FALSE
G08	4/13/2021	Iron	4.82	FALSE	FALSE
G08	4/13/2021	Manganese	6.03	FALSE	FALSE
G08	4/13/2021	H+	0.0000001	FALSE	FALSE
G08	5/11/2021	Alkalinity, bicarbonate	185	FALSE	FALSE
G08	5/11/2021	Calcium	101	FALSE	FALSE
G08	5/11/2021	Magnesium	25.4	FALSE	FALSE
G08	5/11/2021	Sodium	24.3	FALSE	FALSE
G08	5/11/2021	Potassium	1.45	FALSE	FALSE
G08	5/11/2021	Chloride	12	FALSE	FALSE
G08	5/11/2021	Sulfate	203	FALSE	FALSE
G08	5/11/2021	Fluoride	0.36	FALSE	FALSE
G08	5/11/2021	Barium	0.0685	FALSE	FALSE
G08	5/11/2021	Boron	3.77	FALSE	FALSE
G08	5/11/2021	Cobalt	0.0022	FALSE	FALSE
G08	5/11/2021	Iron	1.33	FALSE	FALSE
G08	5/11/2021	Manganese	3.09	FALSE	FALSE
G08	5/11/2021	H+	0.000000115	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G08	6/1/2021	Alkalinity, bicarbonate	201	FALSE	FALSE
G08	6/1/2021	Calcium	114	FALSE	FALSE
G08	6/1/2021	Magnesium	27.2	FALSE	FALSE
G08	6/1/2021	Sodium	25.4	FALSE	FALSE
G08	6/1/2021	Potassium	1.48	FALSE	FALSE
G08	6/1/2021	Chloride	15	FALSE	FALSE
G08	6/1/2021	Sulfate	204	FALSE	FALSE
G08	6/1/2021	Fluoride	0.34	FALSE	FALSE
G08	6/1/2021	Barium	0.0588	FALSE	FALSE
G08	6/1/2021	Boron	4.63	FALSE	FALSE
G08	6/1/2021	Cobalt	0.0041	FALSE	FALSE
G08	6/1/2021	Iron	4.43	FALSE	FALSE
G08	6/1/2021	Manganese	3.15	FALSE	FALSE
G08	6/1/2021	H+	0.00000011	FALSE	FALSE
G08	7/23/2022	Alkalinity, bicarbonate	191	FALSE	FALSE
G08	7/23/2022	Calcium	118	FALSE	FALSE
G08	7/23/2022	Magnesium	29	FALSE	FALSE
G08	7/23/2022	Sodium	30.5	FALSE	FALSE
G08	7/23/2022	Potassium	1.46	FALSE	FALSE
G08	7/23/2022	Chloride	16	FALSE	FALSE
G08	7/23/2022	Sulfate	229	FALSE	FALSE
G08	7/23/2022	Fluoride	0.3	FALSE	FALSE
G08	7/23/2022	Barium	0.0387	FALSE	FALSE
G08	7/23/2022	Boron	4.74	FALSE	FALSE
G08	7/23/2022	Cobalt	0.0028	FALSE	FALSE
G08	7/23/2022	Iron	2.25	FALSE	FALSE
G08	7/23/2022	Manganese	2.89	FALSE	FALSE
G08	7/23/2022	H+	2.57E-08	FALSE	FALSE
G08	3/9/2023	Alkalinity, bicarbonate	174	FALSE	FALSE
G08	3/9/2023	Calcium	119	FALSE	FALSE
G08	3/9/2023	Magnesium	28.9	FALSE	FALSE
G08	3/9/2023	Sodium	28.5	FALSE	FALSE
G08	3/9/2023	Potassium	1.47	FALSE	FALSE
G08	3/9/2023	Chloride	15	FALSE	FALSE
G08	3/9/2023	Sulfate	297	FALSE	FALSE
G08	3/9/2023	Fluoride	0.23	FALSE	FALSE
G08	3/9/2023	Barium	0.0495	FALSE	FALSE
G08	3/9/2023	Boron	4.33	FALSE	FALSE
G08	3/9/2023	Cobalt	0.0036	FALSE	FALSE
G08	3/9/2023	Iron	2.25	TRUE	NA
G08	3/9/2023	Manganese	0.0892	TRUE	NA
G08	3/9/2023	H+	0.000000141	FALSE	FALSE
G08	5/3/2023	Alkalinity, bicarbonate	154	FALSE	FALSE
G08	5/3/2023	Calcium	140	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G08	5/3/2023	Magnesium	32.2	FALSE	FALSE
G08	5/3/2023	Sodium	41.7	FALSE	FALSE
G08	5/3/2023	Potassium	1.67	FALSE	FALSE
G08	5/3/2023	Chloride	16	FALSE	FALSE
G08	5/3/2023	Sulfate	363	FALSE	FALSE
G08	5/3/2023	Fluoride	0.29	FALSE	FALSE
G08	5/3/2023	Barium	0.0974	FALSE	FALSE
G08	5/3/2023	Boron	5.43	FALSE	FALSE
G08	5/3/2023	Cobalt	0.0113	FALSE	FALSE
G08	5/3/2023	Iron	16.8	FALSE	FALSE
G08	5/3/2023	Manganese	2.62	FALSE	FALSE
G08	5/3/2023	H+	0.000000132	FALSE	FALSE
G09	3/4/2021	Alkalinity, bicarbonate	188	FALSE	FALSE
G09	3/4/2021	Calcium	103	FALSE	FALSE
G09	3/4/2021	Magnesium	33.8	FALSE	FALSE
G09	3/4/2021	Sodium	72	FALSE	FALSE
G09	3/4/2021	Potassium	2.78	FALSE	FALSE
G09	3/4/2021	Chloride	24	FALSE	FALSE
G09	3/4/2021	Sulfate	351	FALSE	FALSE
G09	3/4/2021	Fluoride	0.25	FALSE	FALSE
G09	3/4/2021	Barium	0.0675	FALSE	FALSE
G09	3/4/2021	Boron	3.19	FALSE	FALSE
G09	3/4/2021	Cobalt	0.0108	FALSE	FALSE
G09	3/4/2021	Iron	1.93	FALSE	FALSE
G09	3/4/2021	Manganese	4.15	FALSE	FALSE
G09	3/4/2021	H+	0.000000631	FALSE	FALSE
G09	6/1/2021	Alkalinity, bicarbonate	177	FALSE	FALSE
G09	6/1/2021	Calcium	91.3	FALSE	FALSE
G09	6/1/2021	Magnesium	31.4	FALSE	FALSE
G09	6/1/2021	Sodium	65.3	FALSE	FALSE
G09	6/1/2021	Potassium	1.87	FALSE	FALSE
G09	6/1/2021	Chloride	23	FALSE	FALSE
G09	6/1/2021	Sulfate	284	FALSE	FALSE
G09	6/1/2021	Fluoride	0.33	FALSE	FALSE
G09	6/1/2021	Barium	0.0548	FALSE	FALSE
G09	6/1/2021	Boron	3.65	FALSE	FALSE
G09	6/1/2021	Cobalt	0.0096	FALSE	FALSE
G09	6/1/2021	Iron	5.65	FALSE	FALSE
G09	6/1/2021	Manganese	3.87	FALSE	FALSE
G09	6/1/2021	H+	0.000000575	FALSE	FALSE
G09	6/15/2021	Alkalinity, bicarbonate	179	FALSE	FALSE
G09	6/15/2021	Calcium	137	FALSE	FALSE
G09	6/15/2021	Magnesium	49.3	FALSE	FALSE
G09	6/15/2021	Sodium	58.5	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G09	6/15/2021	Potassium	1.56	FALSE	FALSE
G09	6/15/2021	Chloride	21	FALSE	FALSE
G09	6/15/2021	Sulfate	294	FALSE	FALSE
G09	6/15/2021	Fluoride	0.32	FALSE	FALSE
G09	6/15/2021	Barium	0.0136	FALSE	FALSE
G09	6/15/2021	Boron	0.282	FALSE	FALSE
G09	6/15/2021	Cobalt	0.0011	FALSE	FALSE
G09	6/15/2021	Iron	0.0556	FALSE	FALSE
G09	6/15/2021	Manganese	0.104	FALSE	FALSE
G09	6/15/2021	H+	0.00000107	FALSE	FALSE
G09	7/6/2021	Alkalinity, bicarbonate	163	FALSE	FALSE
G09	7/6/2021	Calcium	79	FALSE	FALSE
G09	7/6/2021	Magnesium	28.7	FALSE	FALSE
G09	7/6/2021	Sodium	68.3	FALSE	FALSE
G09	7/6/2021	Potassium	1.65	FALSE	FALSE
G09	7/6/2021	Chloride	22	FALSE	FALSE
G09	7/6/2021	Sulfate	289	FALSE	FALSE
G09	7/6/2021	Fluoride	0.36	FALSE	FALSE
G09	7/6/2021	Barium	0.0444	FALSE	FALSE
G09	7/6/2021	Boron	4.05	FALSE	FALSE
G09	7/6/2021	Cobalt	0.0089	FALSE	FALSE
G09	7/6/2021	Iron	5.69	FALSE	FALSE
G09	7/6/2021	Manganese	4.06	FALSE	FALSE
G09	7/6/2021	H+	0.000000513	FALSE	FALSE
G09	7/21/2021	Alkalinity, bicarbonate	164	FALSE	FALSE
G09	7/21/2021	Calcium	92.1	FALSE	FALSE
G09	7/21/2021	Magnesium	32	FALSE	FALSE
G09	7/21/2021	Sodium	64.3	FALSE	FALSE
G09	7/21/2021	Potassium	1.55	FALSE	FALSE
G09	7/21/2021	Chloride	21	FALSE	FALSE
G09	7/21/2021	Sulfate	286	FALSE	FALSE
G09	7/21/2021	Fluoride	0.31	FALSE	FALSE
G09	7/21/2021	Barium	0.0454	FALSE	FALSE
G09	7/21/2021	Boron	3.75	FALSE	FALSE
G09	7/21/2021	Cobalt	0.0085	FALSE	FALSE
G09	7/21/2021	Iron	5.11	FALSE	FALSE
G09	7/21/2021	Manganese	3.17	FALSE	FALSE
G09	7/21/2021	H+	0.00000102	FALSE	FALSE
G10	3/4/2021	Alkalinity, bicarbonate	108	FALSE	FALSE
G10	3/4/2021	Calcium	107	FALSE	FALSE
G10	3/4/2021	Magnesium	35.7	FALSE	FALSE
G10	3/4/2021	Sodium	60.3	FALSE	FALSE
G10	3/4/2021	Potassium	2.54	FALSE	FALSE
G10	3/4/2021	Chloride	35	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G10	3/4/2021	Sulfate	391	FALSE	FALSE
G10	3/4/2021	Fluoride	0.29	FALSE	FALSE
G10	3/4/2021	Barium	0.0608	FALSE	FALSE
G10	3/4/2021	Boron	4.98	FALSE	FALSE
G10	3/4/2021	Cobalt	0.0109	FALSE	FALSE
G10	3/4/2021	Iron	2.38	FALSE	FALSE
G10	3/4/2021	Manganese	1.14	FALSE	FALSE
G10	3/4/2021	H+	0.0000002	FALSE	FALSE
G10	3/24/2021	Alkalinity, bicarbonate	132	FALSE	FALSE
G10	3/24/2021	Calcium	115	FALSE	FALSE
G10	3/24/2021	Magnesium	39.3	FALSE	FALSE
G10	3/24/2021	Sodium	62.1	FALSE	FALSE
G10	3/24/2021	Potassium	2.91	FALSE	FALSE
G10	3/24/2021	Chloride	31	FALSE	FALSE
G10	3/24/2021	Sulfate	369	FALSE	FALSE
G10	3/24/2021	Fluoride	0.3	FALSE	FALSE
G10	3/24/2021	Barium	0.0553	FALSE	FALSE
G10	3/24/2021	Boron	4.31	FALSE	FALSE
G10	3/24/2021	Cobalt	0.0122	FALSE	FALSE
G10	3/24/2021	Iron	4.61	FALSE	FALSE
G10	3/24/2021	Manganese	1.38	FALSE	FALSE
G10	3/24/2021	H+	0.0000002	FALSE	FALSE
G10	5/11/2021	Alkalinity, bicarbonate	134	FALSE	FALSE
G10	5/11/2021	Calcium	120	FALSE	FALSE
G10	5/11/2021	Magnesium	41.1	FALSE	FALSE
G10	5/11/2021	Sodium	56.8	FALSE	FALSE
G10	5/11/2021	Potassium	2.13	FALSE	FALSE
G10	5/11/2021	Chloride	25	FALSE	FALSE
G10	5/11/2021	Sulfate	364	FALSE	FALSE
G10	5/11/2021	Fluoride	0.28	FALSE	FALSE
G10	5/11/2021	Barium	0.0453	FALSE	FALSE
G10	5/11/2021	Boron	3.95	FALSE	FALSE
G10	5/11/2021	Cobalt	0.00754	FALSE	FALSE
G10	5/11/2021	Iron	1.12	FALSE	FALSE
G10	5/11/2021	Manganese	0.702	FALSE	FALSE
G10	5/11/2021	H+	0.000000457	FALSE	FALSE
G10	6/1/2021	Alkalinity, bicarbonate	127	FALSE	FALSE
G10	6/1/2021	Calcium	124	FALSE	FALSE
G10	6/1/2021	Magnesium	38.5	FALSE	FALSE
G10	6/1/2021	Sodium	55	FALSE	FALSE
G10	6/1/2021	Potassium	2.27	FALSE	FALSE
G10	6/1/2021	Chloride	29	FALSE	FALSE
G10	6/1/2021	Sulfate	401	FALSE	FALSE
G10	6/1/2021	Fluoride	0.29	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G10	6/1/2021	Barium	0.0444	FALSE	FALSE
G10	6/1/2021	Boron	4.73	FALSE	FALSE
G10	6/1/2021	Cobalt	0.0071	FALSE	FALSE
G10	6/1/2021	Iron	2.82	FALSE	FALSE
G10	6/1/2021	Manganese	0.608	FALSE	FALSE
G10	6/1/2021	H+	0.000000316	FALSE	FALSE
G10	6/15/2021	Alkalinity, bicarbonate	149	FALSE	FALSE
G10	6/15/2021	Calcium	128	FALSE	FALSE
G10	6/15/2021	Magnesium	40.8	FALSE	FALSE
G10	6/15/2021	Sodium	59.3	FALSE	FALSE
G10	6/15/2021	Potassium	2.25	FALSE	FALSE
G10	6/15/2021	Chloride	26	FALSE	FALSE
G10	6/15/2021	Sulfate	407	FALSE	FALSE
G10	6/15/2021	Fluoride	0.28	FALSE	FALSE
G10	6/15/2021	Barium	0.0439	FALSE	FALSE
G10	6/15/2021	Boron	3.74	FALSE	FALSE
G10	6/15/2021	Cobalt	0.005	FALSE	FALSE
G10	6/15/2021	Iron	0.864	FALSE	FALSE
G10	6/15/2021	Manganese	0.47	FALSE	FALSE
G10	6/15/2021	H+	0.000000347	FALSE	FALSE
G10	7/6/2021	Alkalinity, bicarbonate	144	FALSE	FALSE
G10	7/6/2021	Calcium	119	FALSE	FALSE
G10	7/6/2021	Magnesium	37.3	FALSE	FALSE
G10	7/6/2021	Sodium	57.6	FALSE	FALSE
G10	7/6/2021	Potassium	2.09	FALSE	FALSE
G10	7/6/2021	Chloride	26	FALSE	FALSE
G10	7/6/2021	Sulfate	415	FALSE	FALSE
G10	7/6/2021	Fluoride	0.27	FALSE	FALSE
G10	7/6/2021	Barium	0.0356	FALSE	FALSE
G10	7/6/2021	Boron	4.81	FALSE	FALSE
G10	7/6/2021	Cobalt	0.0049	FALSE	FALSE
G10	7/6/2021	Iron	0.556	FALSE	FALSE
G10	7/6/2021	Manganese	0.416	FALSE	FALSE
G10	7/6/2021	H+	0.000000309	FALSE	FALSE
G10	7/20/2021	Alkalinity, bicarbonate	141	FALSE	FALSE
G10	7/20/2021	Calcium	132	FALSE	FALSE
G10	7/20/2021	Magnesium	40	FALSE	FALSE
G10	7/20/2021	Sodium	56.5	FALSE	FALSE
G10	7/20/2021	Potassium	2.06	FALSE	FALSE
G10	7/20/2021	Chloride	26	FALSE	FALSE
G10	7/20/2021	Sulfate	410	FALSE	FALSE
G10	7/20/2021	Fluoride	0.26	FALSE	FALSE
G10	7/20/2021	Barium	0.0368	FALSE	FALSE
G10	7/20/2021	Boron	4.2	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G10	7/20/2021	Cobalt	0.0045	FALSE	FALSE
G10	7/20/2021	Iron	0.473	FALSE	FALSE
G10	7/20/2021	Manganese	0.348	FALSE	FALSE
G10	7/20/2021	H+	0.000000324	FALSE	FALSE
G52D	9/20/2021	Alkalinity, bicarbonate	147	FALSE	FALSE
G52D	9/20/2021	Calcium	47.8	FALSE	FALSE
G52D	9/20/2021	Magnesium	16.4	TRUE	NA
G52D	9/20/2021	Sodium	49.2	TRUE	NA
G52D	9/20/2021	Potassium	0.355	TRUE	NA
G52D	9/20/2021	Chloride	13	FALSE	FALSE
G52D	9/20/2021	Sulfate	83	FALSE	FALSE
G52D	9/20/2021	Fluoride	0.26	FALSE	FALSE
G52D	9/20/2021	Barium	0.232	FALSE	FALSE
G52D	9/20/2021	Boron	0.158	FALSE	TRUE
G52D	9/20/2021	Cobalt	0.0011	FALSE	FALSE
G52D	9/20/2021	Iron	0.537	TRUE	NA
G52D	9/20/2021	Manganese	3.71	TRUE	NA
G52D	9/20/2021	H+	0.000000513	FALSE	FALSE
G52D	3/10/2023	Alkalinity, bicarbonate	156	FALSE	FALSE
G52D	3/10/2023	Calcium	49.3	FALSE	FALSE
G52D	3/10/2023	Magnesium	15.3	FALSE	FALSE
G52D	3/10/2023	Sodium	27.7	FALSE	FALSE
G52D	3/10/2023	Potassium	0.768	FALSE	FALSE
G52D	3/10/2023	Chloride	12	FALSE	FALSE
G52D	3/10/2023	Sulfate	74	FALSE	FALSE
G52D	3/10/2023	Fluoride	0.22	FALSE	FALSE
G52D	3/10/2023	Barium	0.307	FALSE	FALSE
G52D	3/10/2023	Boron	0.0319	FALSE	FALSE
G52D	3/10/2023	Cobalt	0.0022	FALSE	FALSE
G52D	3/10/2023	Iron	0.639	TRUE	NA
G52D	3/10/2023	Manganese	3.71	TRUE	NA
G52D	3/10/2023	H+	0.000000288	FALSE	FALSE
G53D	3/25/2021	Alkalinity, bicarbonate	166	FALSE	FALSE
G53D	3/25/2021	Calcium	38.6	FALSE	FALSE
G53D	3/25/2021	Magnesium	15.7	FALSE	FALSE
G53D	3/25/2021	Sodium	50.8	FALSE	FALSE
G53D	3/25/2021	Potassium	0.278	FALSE	FALSE
G53D	3/25/2021	Chloride	19	FALSE	FALSE
G53D	3/25/2021	Sulfate	71	FALSE	FALSE
G53D	3/25/2021	Fluoride	0.71	FALSE	FALSE
G53D	3/25/2021	Barium	0.112	FALSE	FALSE
G53D	3/25/2021	Boron	0.355	FALSE	FALSE
G53D	3/25/2021	Cobalt	0.0026	FALSE	FALSE
G53D	3/25/2021	Iron	1.69	TRUE	NA

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G53D	3/25/2021	Manganese	0.0334	TRUE	NA
G53D	3/25/2021	H+	0.000000295	FALSE	FALSE
G53D	9/20/2021	Alkalinity, bicarbonate	171	FALSE	FALSE
G53D	9/20/2021	Calcium	38.5	FALSE	FALSE
G53D	9/20/2021	Magnesium	16.4	TRUE	NA
G53D	9/20/2021	Sodium	50.8	TRUE	NA
G53D	9/20/2021	Potassium	0.355	TRUE	NA
G53D	9/20/2021	Chloride	19	FALSE	FALSE
G53D	9/20/2021	Sulfate	78	FALSE	FALSE
G53D	9/20/2021	Fluoride	0.7	FALSE	FALSE
G53D	9/20/2021	Barium	0.103	FALSE	FALSE
G53D	9/20/2021	Boron	0.402	FALSE	FALSE
G53D	9/20/2021	Cobalt	0.0021	FALSE	FALSE
G53D	9/20/2021	Iron	1.69	TRUE	NA
G53D	9/20/2021	Manganese	0.0334	TRUE	NA
G53D	9/20/2021	H+	0.000000537	FALSE	FALSE
G53D	3/15/2022	Alkalinity, bicarbonate	176	FALSE	FALSE
G53D	3/15/2022	Calcium	38.1	FALSE	FALSE
G53D	3/15/2022	Magnesium	16.5	FALSE	FALSE
G53D	3/15/2022	Sodium	51.3	FALSE	FALSE
G53D	3/15/2022	Potassium	0.317	FALSE	FALSE
G53D	3/15/2022	Chloride	18	FALSE	FALSE
G53D	3/15/2022	Sulfate	74	FALSE	FALSE
G53D	3/15/2022	Fluoride	0.71	FALSE	FALSE
G53D	3/15/2022	Barium	0.0922	FALSE	FALSE
G53D	3/15/2022	Boron	0.332	FALSE	FALSE
G53D	3/15/2022	Cobalt	0.0022	FALSE	FALSE
G53D	3/15/2022	Iron	1.69	TRUE	NA
G53D	3/15/2022	Manganese	0.0334	TRUE	NA
G53D	3/15/2022	H+	0.000000316	FALSE	FALSE
G53D	7/25/2022	Alkalinity, bicarbonate	149	FALSE	FALSE
G53D	7/25/2022	Calcium	39.7	FALSE	FALSE
G53D	7/25/2022	Magnesium	17	FALSE	FALSE
G53D	7/25/2022	Sodium	49.4	FALSE	FALSE
G53D	7/25/2022	Potassium	0.3	FALSE	FALSE
G53D	7/25/2022	Chloride	19	FALSE	FALSE
G53D	7/25/2022	Sulfate	77	FALSE	FALSE
G53D	7/25/2022	Fluoride	0.72	FALSE	FALSE
G53D	7/25/2022	Barium	0.0913	FALSE	FALSE
G53D	7/25/2022	Boron	0.341	FALSE	FALSE
G53D	7/25/2022	Cobalt	0.0021	FALSE	FALSE
G53D	7/25/2022	Iron	0.281	FALSE	FALSE
G53D	7/25/2022	Manganese	0.137	FALSE	FALSE
G53D	7/25/2022	H+	1.32E-08	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G53D	3/9/2023	Alkalinity, bicarbonate	177	FALSE	FALSE
G53D	3/9/2023	Calcium	38.3	FALSE	FALSE
G53D	3/9/2023	Magnesium	16.4	FALSE	FALSE
G53D	3/9/2023	Sodium	49.2	FALSE	FALSE
G53D	3/9/2023	Potassium	0.355	FALSE	FALSE
G53D	3/9/2023	Chloride	17	FALSE	FALSE
G53D	3/9/2023	Sulfate	72	FALSE	FALSE
G53D	3/9/2023	Fluoride	0.59	FALSE	FALSE
G53D	3/9/2023	Barium	0.101	FALSE	FALSE
G53D	3/9/2023	Boron	0.37	FALSE	FALSE
G53D	3/9/2023	Cobalt	0.0022	FALSE	FALSE
G53D	3/9/2023	Iron	2.25	TRUE	NA
G53D	3/9/2023	Manganese	0.0334	TRUE	NA
G53D	3/9/2023	H+	0.000000347	FALSE	FALSE
G54D	3/24/2021	Alkalinity, bicarbonate	214	FALSE	FALSE
G54D	3/24/2021	Calcium	78.1	FALSE	FALSE
G54D	3/24/2021	Magnesium	24.2	FALSE	FALSE
G54D	3/24/2021	Sodium	62.4	FALSE	FALSE
G54D	3/24/2021	Potassium	1.12	FALSE	FALSE
G54D	3/24/2021	Chloride	23	FALSE	FALSE
G54D	3/24/2021	Sulfate	186	FALSE	FALSE
G54D	3/24/2021	Fluoride	0.32	FALSE	FALSE
G54D	3/24/2021	Barium	0.0941	FALSE	FALSE
G54D	3/24/2021	Boron	0.404	FALSE	FALSE
G54D	3/24/2021	Cobalt	0.0045	FALSE	FALSE
G54D	3/24/2021	Iron	5.11	TRUE	NA
G54D	3/24/2021	Manganese	3.87	TRUE	NA
G54D	3/24/2021	H+	0.000000275	FALSE	FALSE
G54D	9/20/2021	Alkalinity, bicarbonate	207	FALSE	FALSE
G54D	9/20/2021	Calcium	72.8	FALSE	FALSE
G54D	9/20/2021	Magnesium	24.1	TRUE	NA
G54D	9/20/2021	Sodium	49.2	TRUE	NA
G54D	9/20/2021	Potassium	1.12	TRUE	NA
G54D	9/20/2021	Chloride	24	FALSE	FALSE
G54D	9/20/2021	Sulfate	175	FALSE	FALSE
G54D	9/20/2021	Fluoride	0.29	FALSE	FALSE
G54D	9/20/2021	Barium	0.0879	FALSE	FALSE
G54D	9/20/2021	Boron	0.35	FALSE	FALSE
G54D	9/20/2021	Cobalt	0.0083	FALSE	FALSE
G54D	9/20/2021	Iron	5.11	TRUE	NA
G54D	9/20/2021	Manganese	3.87	TRUE	NA
G54D	9/20/2021	H+	0.000000331	FALSE	FALSE
G54D	3/15/2022	Alkalinity, bicarbonate	208	FALSE	FALSE
G54D	3/15/2022	Calcium	83.4	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
G54D	3/15/2022	Magnesium	25.8	FALSE	FALSE
G54D	3/15/2022	Sodium	54.2	FALSE	FALSE
G54D	3/15/2022	Potassium	1.21	FALSE	FALSE
G54D	3/15/2022	Chloride	21	FALSE	FALSE
G54D	3/15/2022	Sulfate	213	FALSE	FALSE
G54D	3/15/2022	Fluoride	0.31	FALSE	FALSE
G54D	3/15/2022	Barium	0.064	FALSE	FALSE
G54D	3/15/2022	Boron	0.451	FALSE	FALSE
G54D	3/15/2022	Cobalt	0.011	FALSE	FALSE
G54D	3/15/2022	Iron	5.11	TRUE	NA
G54D	3/15/2022	Manganese	3.87	TRUE	NA
G54D	3/15/2022	H+	0.000000245	FALSE	FALSE
G54D	9/20/2022	Alkalinity, bicarbonate	171	TRUE	NA
G54D	9/20/2022	Calcium	69.7	FALSE	FALSE
G54D	9/20/2022	Magnesium	19.4	TRUE	NA
G54D	9/20/2022	Sodium	49.2	TRUE	NA
G54D	9/20/2022	Potassium	0.355	TRUE	NA
G54D	9/20/2022	Chloride	22	FALSE	FALSE
G54D	9/20/2022	Sulfate	218	FALSE	FALSE
G54D	9/20/2022	Fluoride	0.27	FALSE	FALSE
G54D	9/20/2022	Barium	0.0768	FALSE	FALSE
G54D	9/20/2022	Boron	0.252	FALSE	FALSE
G54D	9/20/2022	Cobalt	0.0048	FALSE	FALSE
G54D	9/20/2022	Iron	5.11	TRUE	NA
G54D	9/20/2022	Manganese	3.87	TRUE	NA
G54D	9/20/2022	H+	0.000000316	FALSE	FALSE
G54D	5/3/2023	Alkalinity, bicarbonate	206	FALSE	FALSE
G54D	5/3/2023	Calcium	81.5	FALSE	FALSE
G54D	5/3/2023	Magnesium	26.4	FALSE	FALSE
G54D	5/3/2023	Sodium	57	FALSE	FALSE
G54D	5/3/2023	Potassium	1.21	FALSE	FALSE
G54D	5/3/2023	Chloride	22	FALSE	FALSE
G54D	5/3/2023	Sulfate	194	FALSE	FALSE
G54D	5/3/2023	Fluoride	0.3	FALSE	FALSE
G54D	5/3/2023	Barium	0.0794	FALSE	FALSE
G54D	5/3/2023	Boron	0.555	FALSE	FALSE
G54D	5/3/2023	Cobalt	0.0106	FALSE	FALSE
G54D	5/3/2023	Iron	1.39	FALSE	FALSE
G54D	5/3/2023	Manganese	1.19	FALSE	FALSE
G54D	5/3/2023	H+	0.000000158	FALSE	FALSE
XPW01	3/5/2021	Alkalinity, bicarbonate	155	FALSE	FALSE
XPW01	3/5/2021	Calcium	162	FALSE	FALSE
XPW01	3/5/2021	Magnesium	2.25	FALSE	FALSE
XPW01	3/5/2021	Sodium	35.5	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
XPW01	3/5/2021	Potassium	31.1	FALSE	FALSE
XPW01	3/5/2021	Chloride	10	FALSE	FALSE
XPW01	3/5/2021	Sulfate	345	FALSE	FALSE
XPW01	3/5/2021	Fluoride	0.67	FALSE	FALSE
XPW01	3/5/2021	Barium	0.165	FALSE	FALSE
XPW01	3/5/2021	Boron	10.4	FALSE	FALSE
XPW01	3/5/2021	Cobalt	0.0316	FALSE	TRUE
XPW01	3/5/2021	Iron	2.18	FALSE	FALSE
XPW01	3/5/2021	Manganese	1.24	FALSE	FALSE
XPW01	3/5/2021	H+	0.00000001	FALSE	FALSE
XPW01	3/24/2021	Alkalinity, bicarbonate	141	FALSE	FALSE
XPW01	3/24/2021	Calcium	158	FALSE	FALSE
XPW01	3/24/2021	Magnesium	1.7	FALSE	FALSE
XPW01	3/24/2021	Sodium	37.2	FALSE	FALSE
XPW01	3/24/2021	Potassium	38.1	FALSE	FALSE
XPW01	3/24/2021	Chloride	9	FALSE	FALSE
XPW01	3/24/2021	Sulfate	355	FALSE	FALSE
XPW01	3/24/2021	Fluoride	0.55	FALSE	FALSE
XPW01	3/24/2021	Barium	0.161	FALSE	FALSE
XPW01	3/24/2021	Boron	9.58	FALSE	FALSE
XPW01	3/24/2021	Cobalt	0.0316	FALSE	TRUE
XPW01	3/24/2021	Iron	1.18	FALSE	FALSE
XPW01	3/24/2021	Manganese	0.59	FALSE	FALSE
XPW01	3/24/2021	H+	3.98E-09	FALSE	FALSE
XPW01	4/14/2021	Alkalinity, bicarbonate	136	FALSE	FALSE
XPW01	4/14/2021	Calcium	156	FALSE	FALSE
XPW01	4/14/2021	Magnesium	1.28	FALSE	FALSE
XPW01	4/14/2021	Sodium	28.3	FALSE	FALSE
XPW01	4/14/2021	Potassium	34.7	FALSE	FALSE
XPW01	4/14/2021	Chloride	7	FALSE	FALSE
XPW01	4/14/2021	Sulfate	355	FALSE	FALSE
XPW01	4/14/2021	Fluoride	0.57	FALSE	FALSE
XPW01	4/14/2021	Barium	0.154	FALSE	FALSE
XPW01	4/14/2021	Boron	9.42	FALSE	FALSE
XPW01	4/14/2021	Cobalt	0.0316	FALSE	TRUE
XPW01	4/14/2021	Iron	1.36	FALSE	FALSE
XPW01	4/14/2021	Manganese	0.725	FALSE	FALSE
XPW01	4/14/2021	H+	6.31E-09	FALSE	FALSE
XPW01	5/12/2021	Alkalinity, bicarbonate	145	FALSE	FALSE
XPW01	5/12/2021	Calcium	166	FALSE	FALSE
XPW01	5/12/2021	Magnesium	1.31	FALSE	FALSE
XPW01	5/12/2021	Sodium	29.3	FALSE	FALSE
XPW01	5/12/2021	Potassium	36.9	FALSE	FALSE
XPW01	5/12/2021	Chloride	6	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
XPW01	5/12/2021	Sulfate	309	FALSE	FALSE
XPW01	5/12/2021	Fluoride	0.62	FALSE	FALSE
XPW01	5/12/2021	Barium	0.162	FALSE	FALSE
XPW01	5/12/2021	Boron	10.2	FALSE	FALSE
XPW01	5/12/2021	Cobalt	0.0316	FALSE	TRUE
XPW01	5/12/2021	Iron	1.98	FALSE	FALSE
XPW01	5/12/2021	Manganese	1.09	FALSE	FALSE
XPW01	5/12/2021	H+	3.98E-09	FALSE	FALSE
XPW01	3/15/2022	Alkalinity, bicarbonate	104	FALSE	FALSE
XPW01	3/15/2022	Calcium	159	FALSE	FALSE
XPW01	3/15/2022	Magnesium	0.443	FALSE	FALSE
XPW01	3/15/2022	Sodium	27.4	FALSE	FALSE
XPW01	3/15/2022	Potassium	36.9	FALSE	FALSE
XPW01	3/15/2022	Chloride	5	FALSE	FALSE
XPW01	3/15/2022	Sulfate	360	FALSE	FALSE
XPW01	3/15/2022	Fluoride	0.25	FALSE	FALSE
XPW01	3/15/2022	Barium	0.113	FALSE	FALSE
XPW01	3/15/2022	Boron	10.4	FALSE	FALSE
XPW01	3/15/2022	Cobalt	0.0316	FALSE	TRUE
XPW01	3/15/2022	Iron	1.36	TRUE	NA
XPW01	3/15/2022	Manganese	0.725	TRUE	NA
XPW01	3/15/2022	H+	4.68E-09	FALSE	FALSE
XPW01	3/8/2023	Alkalinity, bicarbonate	64	FALSE	FALSE
XPW01	3/8/2023	Calcium	164	FALSE	FALSE
XPW01	3/8/2023	Magnesium	0.254	FALSE	FALSE
XPW01	3/8/2023	Sodium	27.2	FALSE	FALSE
XPW01	3/8/2023	Potassium	37.2	FALSE	FALSE
XPW01	3/8/2023	Chloride	11	FALSE	FALSE
XPW01	3/8/2023	Sulfate	414	FALSE	FALSE
XPW01	3/8/2023	Fluoride	0.16	FALSE	FALSE
XPW01	3/8/2023	Barium	0.128	FALSE	FALSE
XPW01	3/8/2023	Boron	8.79	FALSE	FALSE
XPW01	3/8/2023	Cobalt	0.0002	FALSE	FALSE
XPW01	3/8/2023	Iron	1.36	TRUE	NA
XPW01	3/8/2023	Manganese	0.725	TRUE	NA
XPW01	3/8/2023	H+	3.39E-09	FALSE	FALSE
XPW01	5/3/2023	Alkalinity, bicarbonate	130	FALSE	FALSE
XPW01	5/3/2023	Calcium	151	FALSE	FALSE
XPW01	5/3/2023	Magnesium	0.405	FALSE	FALSE
XPW01	5/3/2023	Sodium	27	FALSE	FALSE
XPW01	5/3/2023	Potassium	38.5	FALSE	FALSE
XPW01	5/3/2023	Chloride	14	FALSE	FALSE
XPW01	5/3/2023	Sulfate	345	FALSE	FALSE
XPW01	5/3/2023	Fluoride	0.34	FALSE	FALSE



**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
XPW01	5/3/2023	Barium	0.137	FALSE	FALSE
XPW01	5/3/2023	Boron	10.6	FALSE	FALSE
XPW01	5/3/2023	Cobalt	0.0002	FALSE	FALSE
XPW01	5/3/2023	Iron	1	FALSE	FALSE
XPW01	5/3/2023	Manganese	0.544	FALSE	FALSE
XPW01	5/3/2023	H+	3.89E-09	FALSE	FALSE
XPW02	3/4/2021	Alkalinity, bicarbonate	121	FALSE	FALSE
XPW02	3/4/2021	Calcium	591	FALSE	FALSE
XPW02	3/4/2021	Magnesium	10.9	FALSE	FALSE
XPW02	3/4/2021	Sodium	888	FALSE	FALSE
XPW02	3/4/2021	Potassium	23.4	FALSE	FALSE
XPW02	3/4/2021	Chloride	130	FALSE	FALSE
XPW02	3/4/2021	Sulfate	2380	FALSE	FALSE
XPW02	3/4/2021	Fluoride	0.42	FALSE	FALSE
XPW02	3/4/2021	Barium	0.0342	FALSE	FALSE
XPW02	3/4/2021	Boron	12.1	FALSE	FALSE
XPW02	3/4/2021	Cobalt	0.0316	FALSE	TRUE
XPW02	3/4/2021	Iron	1.63	FALSE	FALSE
XPW02	3/4/2021	Manganese	0.47	FALSE	FALSE
XPW02	3/4/2021	H+	0.00000001	FALSE	FALSE
XPW02	3/24/2021	Alkalinity, bicarbonate	128	FALSE	FALSE
XPW02	3/24/2021	Calcium	484	FALSE	FALSE
XPW02	3/24/2021	Magnesium	11.3	FALSE	FALSE
XPW02	3/24/2021	Sodium	798	FALSE	FALSE
XPW02	3/24/2021	Potassium	26.3	FALSE	FALSE
XPW02	3/24/2021	Chloride	176	FALSE	FALSE
XPW02	3/24/2021	Sulfate	2830	FALSE	FALSE
XPW02	3/24/2021	Fluoride	0.45	FALSE	FALSE
XPW02	3/24/2021	Barium	0.0271	FALSE	FALSE
XPW02	3/24/2021	Boron	12.2	FALSE	FALSE
XPW02	3/24/2021	Cobalt	0.0316	FALSE	TRUE
XPW02	3/24/2021	Iron	1.25	FALSE	FALSE
XPW02	3/24/2021	Manganese	0.499	FALSE	FALSE
XPW02	3/24/2021	H+	0.00000001	FALSE	FALSE
XPW02	4/14/2021	Alkalinity, bicarbonate	128	FALSE	FALSE
XPW02	4/14/2021	Calcium	551	FALSE	FALSE
XPW02	4/14/2021	Magnesium	11.3	FALSE	FALSE
XPW02	4/14/2021	Sodium	705	FALSE	FALSE
XPW02	4/14/2021	Potassium	25.3	FALSE	FALSE
XPW02	4/14/2021	Chloride	110	FALSE	FALSE
XPW02	4/14/2021	Sulfate	2410	FALSE	FALSE
XPW02	4/14/2021	Fluoride	0.44	FALSE	FALSE
XPW02	4/14/2021	Barium	0.0283	FALSE	FALSE
XPW02	4/14/2021	Boron	11.5	FALSE	FALSE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
XPW02	4/14/2021	Cobalt	0.0316	FALSE	TRUE
XPW02	4/14/2021	Iron	1.69	FALSE	FALSE
XPW02	4/14/2021	Manganese	0.583	FALSE	FALSE
XPW02	4/14/2021	H+	1.26E-08	FALSE	FALSE
XPW02	5/12/2021	Alkalinity, bicarbonate	123	FALSE	FALSE
XPW02	5/12/2021	Calcium	495	FALSE	FALSE
XPW02	5/12/2021	Magnesium	11.8	FALSE	FALSE
XPW02	5/12/2021	Sodium	641	FALSE	FALSE
XPW02	5/12/2021	Potassium	24.5	FALSE	FALSE
XPW02	5/12/2021	Chloride	134	FALSE	FALSE
XPW02	5/12/2021	Sulfate	2410	FALSE	FALSE
XPW02	5/12/2021	Fluoride	0.41	FALSE	FALSE
XPW02	5/12/2021	Barium	0.0287	FALSE	FALSE
XPW02	5/12/2021	Boron	10.8	FALSE	FALSE
XPW02	5/12/2021	Cobalt	0.0316	FALSE	TRUE
XPW02	5/12/2021	Iron	2.15	FALSE	FALSE
XPW02	5/12/2021	Manganese	0.632	FALSE	FALSE
XPW02	5/12/2021	H+	1.41E-08	FALSE	FALSE
XPW02	7/21/2021	Alkalinity, bicarbonate	139	FALSE	FALSE
XPW02	7/21/2021	Calcium	494	FALSE	FALSE
XPW02	7/21/2021	Magnesium	11.1	FALSE	FALSE
XPW02	7/21/2021	Sodium	762	FALSE	FALSE
XPW02	7/21/2021	Potassium	24.7	FALSE	FALSE
XPW02	7/21/2021	Chloride	179	FALSE	FALSE
XPW02	7/21/2021	Sulfate	2330	FALSE	FALSE
XPW02	7/21/2021	Fluoride	0.4	FALSE	FALSE
XPW02	7/21/2021	Barium	0.0226	FALSE	FALSE
XPW02	7/21/2021	Boron	12	FALSE	FALSE
XPW02	7/21/2021	Cobalt	0.0316	FALSE	TRUE
XPW02	7/21/2021	Iron	2.7	FALSE	FALSE
XPW02	7/21/2021	Manganese	0.744	FALSE	FALSE
XPW02	7/21/2021	H+	1.74E-08	FALSE	FALSE
XPW02	3/15/2022	Alkalinity, bicarbonate	144	FALSE	FALSE
XPW02	3/15/2022	Calcium	483	FALSE	FALSE
XPW02	3/15/2022	Magnesium	10.7	FALSE	FALSE
XPW02	3/15/2022	Sodium	828	FALSE	FALSE
XPW02	3/15/2022	Potassium	27.1	FALSE	FALSE
XPW02	3/15/2022	Chloride	115	FALSE	FALSE
XPW02	3/15/2022	Sulfate	2590	FALSE	FALSE
XPW02	3/15/2022	Fluoride	0.48	FALSE	FALSE
XPW02	3/15/2022	Barium	0.023	FALSE	FALSE
XPW02	3/15/2022	Boron	16	FALSE	FALSE
XPW02	3/15/2022	Cobalt	0.0316	FALSE	TRUE

**Attachment A.****ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Date	Parameter	Result (mg/L)	Imputed Value	Half RL Used
XPW02	3/15/2022	Iron	1.69	TRUE	NA
XPW02	3/15/2022	Manganese	0.583	TRUE	NA
XPW02	3/15/2022	H+	1.82E-08	FALSE	FALSE
XPW02	5/3/2023	Alkalinity, bicarbonate	139	FALSE	FALSE
XPW02	5/3/2023	Calcium	451	FALSE	FALSE
XPW02	5/3/2023	Magnesium	12.3	FALSE	FALSE
XPW02	5/3/2023	Sodium	953	FALSE	FALSE
XPW02	5/3/2023	Potassium	27.4	FALSE	FALSE
XPW02	5/3/2023	Chloride	104	FALSE	FALSE
XPW02	5/3/2023	Sulfate	2650	FALSE	FALSE
XPW02	5/3/2023	Fluoride	0.48	FALSE	FALSE
XPW02	5/3/2023	Barium	0.0212	FALSE	FALSE
XPW02	5/3/2023	Boron	13.4	FALSE	FALSE
XPW02	5/3/2023	Cobalt	0.0002	FALSE	FALSE
XPW02	5/3/2023	Iron	3.49	FALSE	FALSE
XPW02	5/3/2023	Manganese	0.748	FALSE	FALSE
XPW02	5/3/2023	H+	1.91E-08	FALSE	FALSE
XPW03	5/12/2021	Alkalinity, bicarbonate	141	TRUE	FALSE
XPW03	5/12/2021	Calcium	16.4	FALSE	FALSE
XPW03	5/12/2021	Magnesium	0.316	FALSE	TRUE
XPW03	5/12/2021	Sodium	113	FALSE	FALSE
XPW03	5/12/2021	Potassium	27.5	FALSE	FALSE
XPW03	5/12/2021	Chloride	25	FALSE	FALSE
XPW03	5/12/2021	Sulfate	155	FALSE	FALSE
XPW03	5/12/2021	Fluoride	0.25	FALSE	FALSE
XPW03	5/12/2021	Barium	0.012	FALSE	FALSE
XPW03	5/12/2021	Boron	11.7	FALSE	FALSE
XPW03	5/12/2021	Cobalt	0.0316	FALSE	TRUE
XPW03	5/12/2021	Iron	0.316	FALSE	TRUE
XPW03	5/12/2021	Manganese	0.0707	FALSE	TRUE
XPW03	5/12/2021	H+	2E-11	FALSE	FALSE
XPW03	7/21/2021	Alkalinity, bicarbonate	141	TRUE	FALSE
XPW03	7/21/2021	Calcium	15.3	FALSE	FALSE
XPW03	7/21/2021	Magnesium	0.224	FALSE	TRUE
XPW03	7/21/2021	Sodium	104	FALSE	FALSE
XPW03	7/21/2021	Potassium	26.9	FALSE	FALSE
XPW03	7/21/2021	Chloride	26	FALSE	FALSE
XPW03	7/21/2021	Sulfate	148	FALSE	FALSE
XPW03	7/21/2021	Fluoride	0.26	FALSE	FALSE
XPW03	7/21/2021	Barium	0.0114	FALSE	FALSE
XPW03	7/21/2021	Boron	11.6	FALSE	FALSE
XPW03	7/21/2021	Cobalt	0.0316	FALSE	TRUE
XPW03	7/21/2021	Iron	0.158	FALSE	TRUE
XPW03	7/21/2021	Manganese	0.0447	FALSE	TRUE



**Attachment A.**

**ELECTRONIC PCA DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

<b>Well ID</b>	<b>Date</b>	<b>Parameter</b>	<b>Result (mg/L)</b>	<b>Imputed Value</b>	<b>Half RL Used</b>
XPW03	7/21/2021	H+	1.07E-10	FALSE	FALSE

**Note:**

mg/L = milligrams per liter

RL = reporting limit

**APPENDIX C  
SUPPORTING GROUNDWATER AND POREWATER  
ANALYTICAL DATA**

**APPENDIX C.**  
**SUPPORTING GROUNDWATER AND POREWATER ANALYTICAL DATA**  
 35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	Well Type	Date	Parameter	Result	Unit
G03	Compliance	06/15/2021	Cobalt, total	0.001 U	mg/L
G03	Compliance	07/06/2021	Cobalt, total	0.001 U	mg/L
G03	Compliance	07/21/2021	Cobalt, total	0.001 U	mg/L
G03	Compliance	06/15/2021	Manganese, total	0.0330	mg/L
G03	Compliance	07/06/2021	Manganese, total	0.0226	mg/L
G03	Compliance	07/21/2021	Manganese, total	0.0334	mg/L
G05	Compliance	03/04/2021	Boron, total	0.181	mg/L
G05	Compliance	03/24/2021	Boron, total	0.195	mg/L
G05	Compliance	04/13/2021	Boron, total	0.190	mg/L
G05	Compliance	05/11/2021	Boron, total	0.158	mg/L
G05	Compliance	06/01/2021	Boron, total	0.157	mg/L
G05	Compliance	06/15/2021	Boron, total	0.140	mg/L
G05	Compliance	07/06/2021	Boron, total	0.148	mg/L
G05	Compliance	07/20/2021	Boron, total	0.131	mg/L
G05	Compliance	07/26/2022	Boron, total	0.0645	mg/L
G05	Compliance	03/09/2023	Boron, total	0.0541	mg/L
G05	Compliance	05/03/2023	Boron, total	0.0478	mg/L
G05	Compliance	03/04/2021	Cobalt, total	0.0101	mg/L
G05	Compliance	03/24/2021	Cobalt, total	0.00960	mg/L
G05	Compliance	04/13/2021	Cobalt, total	0.00950	mg/L
G05	Compliance	05/11/2021	Cobalt, total	0.00870	mg/L
G05	Compliance	06/01/2021	Cobalt, total	0.00780	mg/L
G05	Compliance	06/15/2021	Cobalt, total	0.00570	mg/L
G05	Compliance	07/06/2021	Cobalt, total	0.00910	mg/L
G05	Compliance	07/20/2021	Cobalt, total	0.00590	mg/L
G05	Compliance	07/26/2022	Cobalt, total	0.00750	mg/L
G05	Compliance	03/09/2023	Cobalt, total	0.00740	mg/L
G05	Compliance	05/03/2023	Cobalt, total	0.0103	mg/L
G05	Compliance	03/04/2021	Manganese, total	0.227	mg/L
G05	Compliance	04/13/2021	Manganese, total	0.294	mg/L
G05	Compliance	05/11/2021	Manganese, total	0.256	mg/L
G05	Compliance	06/01/2021	Manganese, total	0.254	mg/L
G05	Compliance	06/15/2021	Manganese, total	0.187	mg/L
G05	Compliance	07/06/2021	Manganese, total	0.270	mg/L
G05	Compliance	07/20/2021	Manganese, total	0.204	mg/L
G05	Compliance	07/26/2022	Manganese, total	0.176	mg/L
G05	Compliance	05/03/2023	Manganese, total	0.191	mg/L
G05	Compliance	03/04/2021	Sulfate, total	94.0	mg/L
G05	Compliance	03/24/2021	Sulfate, total	92.0	mg/L
G05	Compliance	04/13/2021	Sulfate, total	95.0	mg/L
G05	Compliance	05/11/2021	Sulfate, total	109	mg/L
G05	Compliance	06/01/2021	Sulfate, total	83.0	mg/L
G05	Compliance	06/15/2021	Sulfate, total	91.0	mg/L
G05	Compliance	07/06/2021	Sulfate, total	90.0	mg/L
G05	Compliance	07/20/2021	Sulfate, total	87.0	mg/L
G05	Compliance	07/26/2022	Sulfate, total	68.0	mg/L



**APPENDIX C.  
SUPPORTING GROUNDWATER AND POREWATER ANALYTICAL DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Well Type	Date	Parameter	Result	Unit
G05	Compliance	03/09/2023	Sulfate, total	90.0	mg/L
G05	Compliance	05/03/2023	Sulfate, total	112	mg/L
G53D	Compliance	07/25/2022	Cobalt, total	0.00210	mg/L
G53D	Compliance	05/03/2023	Cobalt, total	0.00180	mg/L
G53D	Compliance	07/25/2022	Manganese, total	0.137	mg/L
G53D	Compliance	05/03/2023	Manganese, total	0.133	mg/L
XPW01	Porewater	03/05/2021	Boron, total	10.4	mg/L
XPW01	Porewater	03/24/2021	Boron, total	9.58	mg/L
XPW01	Porewater	04/14/2021	Boron, total	9.42	mg/L
XPW01	Porewater	05/12/2021	Boron, total	10.2	mg/L
XPW01	Porewater	07/21/2021	Boron, total	10.1	mg/L
XPW01	Porewater	03/15/2022	Boron, total	10.4	mg/L
XPW01	Porewater	03/08/2023	Boron, total	8.79	mg/L
XPW01	Porewater	05/03/2023	Boron, total	10.6	mg/L
XPW01	Porewater	03/05/2021	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	03/24/2021	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	04/14/2021	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	05/12/2021	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	07/21/2021	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	03/15/2022	Cobalt, total	0.001 U	mg/L
XPW01	Porewater	03/08/2023	Cobalt, total	0.0002 J	mg/L
XPW01	Porewater	05/03/2023	Cobalt, total	0.0002 J	mg/L
XPW01	Porewater	03/05/2021	Sulfate, total	345	mg/L
XPW01	Porewater	03/24/2021	Sulfate, total	355	mg/L
XPW01	Porewater	04/14/2021	Sulfate, total	355	mg/L
XPW01	Porewater	05/12/2021	Sulfate, total	309	mg/L
XPW01	Porewater	07/21/2021	Sulfate, total	328	mg/L
XPW01	Porewater	03/15/2022	Sulfate, total	360	mg/L
XPW01	Porewater	03/08/2023	Sulfate, total	414	mg/L
XPW01	Porewater	05/03/2023	Sulfate, total	345	mg/L
XPW02	Porewater	03/04/2021	Boron, total	12.1	mg/L
XPW02	Porewater	03/24/2021	Boron, total	12.2	mg/L
XPW02	Porewater	04/14/2021	Boron, total	11.5	mg/L
XPW02	Porewater	05/12/2021	Boron, total	10.8	mg/L
XPW02	Porewater	07/21/2021	Boron, total	12.0	mg/L
XPW02	Porewater	03/15/2022	Boron, total	16.0	mg/L
XPW02	Porewater	03/08/2023	Boron, total	10.8	mg/L
XPW02	Porewater	05/03/2023	Boron, total	13.4	mg/L
XPW02	Porewater	03/04/2021	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	03/24/2021	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	04/14/2021	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	05/12/2021	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	07/21/2021	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	03/15/2022	Cobalt, total	0.001 U	mg/L
XPW02	Porewater	03/08/2023	Cobalt, total	0.0003 J	mg/L
XPW02	Porewater	05/03/2023	Cobalt, total	0.0002 J	mg/L

**APPENDIX C.  
SUPPORTING GROUNDWATER AND POREWATER ANALYTICAL DATA**

35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION

JOPPA POWER PLANT

EAST ASH POND

JOPPA, IL

Well ID	Well Type	Date	Parameter	Result	Unit
XPW02	Porewater	03/04/2021	Sulfate, total	2,380	mg/L
XPW02	Porewater	03/24/2021	Sulfate, total	2,830	mg/L
XPW02	Porewater	04/14/2021	Sulfate, total	2,410	mg/L
XPW02	Porewater	05/12/2021	Sulfate, total	2,410	mg/L
XPW02	Porewater	07/21/2021	Sulfate, total	2,330	mg/L
XPW02	Porewater	03/15/2022	Sulfate, total	2,590	mg/L
XPW02	Porewater	03/08/2023	Sulfate, total	2,450	mg/L
XPW02	Porewater	05/03/2023	Sulfate, total	2,650	mg/L
XPW03	Porewater	03/04/2021	Boron, total	12.2	mg/L
XPW03	Porewater	03/24/2021	Boron, total	11.6	mg/L
XPW03	Porewater	04/14/2021	Boron, total	9.30	mg/L
XPW03	Porewater	05/12/2021	Boron, total	11.7	mg/L
XPW03	Porewater	07/21/2021	Boron, total	11.6	mg/L
XPW03	Porewater	03/15/2022	Boron, total	11.1	mg/L
XPW03	Porewater	03/09/2023	Boron, total	8.06	mg/L
XPW03	Porewater	05/03/2023	Boron, total	9.22	mg/L
XPW03	Porewater	03/04/2021	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	03/24/2021	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	04/14/2021	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	05/12/2021	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	07/21/2021	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	03/15/2022	Cobalt, total	0.001 U	mg/L
XPW03	Porewater	03/09/2023	Cobalt, total	0.0001 U	mg/L
XPW03	Porewater	05/03/2023	Cobalt, total	0.0001 U	mg/L
XPW03	Porewater	03/04/2021	Sulfate, total	133	mg/L
XPW03	Porewater	03/24/2021	Sulfate, total	138	mg/L
XPW03	Porewater	04/14/2021	Sulfate, total	152	mg/L
XPW03	Porewater	05/12/2021	Sulfate, total	155	mg/L
XPW03	Porewater	07/21/2021	Sulfate, total	148	mg/L
XPW03	Porewater	03/15/2022	Sulfate, total	152	mg/L
XPW03	Porewater	03/09/2023	Sulfate, total	142	mg/L
XPW03	Porewater	05/03/2023	Sulfate, total	144	mg/L

**APPENDIX C.**  
**SUPPORTING GROUNDWATER AND POREWATER ANALYTICAL DATA**  
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

mg/L = milligrams per liter

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.



**APPENDIX D  
GEOCHEMICAL ANALYSIS OF JOPPA EAST ASH POND  
GROUNDWATER IN SUPPORT OF AN ALTERNATIVE SOURCE  
DEMONSTRATION (LIFE CYCLE GEO, LLC, 2023)**

# TECHNICAL MEMORANDUM

**DATE** October 21, 2023 **Reference No.** 23RAM01-1

**TO** Brian G. Hennings - Ramboll  
Frances Ackerman - Ramboll  
Allison Kreinberg - Geosyntec

**CC** Stu Cravens - Vistra

**FROM** Shannon Zahuranec, Allie Wyman, Tom Meuzelaar **EMAIL:** shannon@lifecyclegeo.com

## GEOCHEMICAL ANALYSIS OF JOPPA EAST ASH POND GROUNDWATER IN SUPPORT OF AN ALTERNATIVE SOURCE DEMONSTRATION

### 1.0 EXECUTIVE SUMMARY

This document serves as an Appendix to the October 21, 2023, Alternative Source Demonstration (ASD) for Joppa (JOP) Power Plant East Ash Pond (EAP) for monitoring Event 1 (E001) (referred to as the E001 ASD), completed to fulfill the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(e). Life Cycle Geo, LLC (LCG) has completed a review of geochemical conditions to evaluate the feasibility of an ASD at monitoring wells G11 and G51D associated with the JOP EAP. Compliance wells G11 and G51D monitor conditions in the Uppermost Aquifer (UA) to the west of the EAP and currently exhibit pH levels lower than the groundwater protection standard (GWPS) range for pH. This technical evaluation considered all available groundwater and solid-phase chemical analyses and utilized multivariate statistical analysis to conclude that low pH levels at G11 and G51D are not attributed to influence from the EAP. Further, observed pH levels are likely the result of the oxidation of dissolved iron released from chemically reducing conditions in the upgradient area to the north and west of the G11 and G51D monitoring wells (also referred to in this document as exceedance wells). Oxidation of dissolved ferrous iron and subsequent precipitation of solid-phase iron generates acidity through fundamentally established geochemical reactions discussed in Section 4.0. This scope of work was executed by subcontract to Ramboll Americas Engineering Solutions, Inc. (Ramboll) on behalf of Electric Energy, Inc.

### 2.0 HYDROGEOLOGY AND GROUNDWATER CONDITION

Monitoring wells G11 and G51D are screened in the UA. The UA is composed predominantly of sand and is overlain by the upper confining unit (UCU), a clay-rich, low permeability stratigraphic unit (Ramboll, 2021). Monitoring wells G11 and G51D are on the western border of the EAP, hydraulically upgradient of the EAP and the other EAP monitoring wells (Attachment 1). Monitoring wells G11 and G51D are downgradient of the northernmost part of the JOP West Ash Pond (WAP), and the sewage treatment pond (Attachment 2) situated on the northwest corner of the WAP.

**Table 1: Concentration Ranges for Select Constituents in Joppa Groundwater and CCR Ponds.**

	pH	Boron (mg/L)	Magnesium (mg/L)
G11	5.78-6.33	0.25-0.42	27.8-72.4
G51D	5.30-6.92	0.03-0.96	12.3-14.4
CCR porewater	6.76-11.1	4.02-34.3	ND-27.8
Western Groundwater*	5.04-7.4	ND-24.7	4.0-126
Eastern Groundwater	5.62-7.88	ND-5.43	7.1-49.3
TPZ120	2.77-3.63	2.08-3.55	52.4-63.5

ND=Not Detected

Data provided in Appendix D-1

\*Western groundwater ranges presented do not include TPZ120, which is listed separately.

From March 2021 through May 2023, pH at G11 and G51D is generally below the GWPS lower limit of 6.0 standard pH units (SU) (Attachment 3). Groundwater pH elsewhere at the site has been measured as low as 5.0 SU (Table 1) but is typically between 6 and 8 SU (Attachment 3; Appendix D-1). The UCU monitoring well TPZ120 is an exception with a much lower groundwater pH (less than 4.0 SU).

This analysis focused predominantly on assessing the source of acidity in G11 and G51D as originating from either east or west of the exceedance wells to determine if the EAP (east of the exceedance wells) is the source of the low pH levels observed. To this end, monitoring wells to the east of the exceedance wells are discussed as the Eastern Wells and the monitoring wells to the west are discussed as the Western Wells. The Eastern Wells include the EAP porewater wells [XPW01, XPW02, and XPW03] as an endmember for evaluation, EAP compliance-based groundwater wells [G03, G05, G06, G07, G08, G09, G10, G52D, G53D, and G54D], and two EAP monitoring wells [G04 and G06S] that are not included in the regulatory network but are in close proximity to the compliance EAP monitoring wells. While most of these wells are downgradient of G11 and G51D, they provide a necessary comparison for assessing potential EAP impacts to G11 and G51D. The Western Wells are hydraulically upgradient or side-gradient of G11 and G51D and are used to evaluate potential alternate sources for the pH exceedances originating to the west. Western Wells included in this analysis are installed in the UA [TPZ118D, TPZ118DD, TPZ119D, TPZ119DD, TPZ120D, TPZ123, and TPZ124D] and UCU [TPZ118, TPZ120, and TPZ124], as well as the WAP porewater wells [XTPW01, XTPW02, XTPW03, and XTPW04]. The upgradient background wells G01D and G02D are assessed as the upgradient endmember reflective of groundwater uninfluenced by activity at the JOP site. This selection of Eastern and Western wells provides the best analysis of geochemical conditions and potential sources in the immediate area of G11 and G51D. Potential sources of acidity (which could drive the observed low pH levels at G11 and G51D) are assessed through comprehensive geochemical analysis, including time series analysis, correlation plots (scatterplot comparisons), Principal Components Analysis (PCA), and spatial and chemical distribution of iron.

## 3.0 GEOCHEMICAL ANALYSIS

### 3.1 CCR INDICATOR CONSTITUENT BORON

Boron is commonly used as an indicator parameter for contaminant transport of CCR because: (i) it is commonly present at elevated concentrations in coal ash leachate; (ii) it is mobile and typically not very





reactive but conservative (i.e., low rates of sorption or degradation) in groundwater; and (iii) it is less likely than other constituents to be present at elevated concentrations in background groundwater from natural or other anthropogenic sources. Boron is often assessed in groundwater to identify possible end-member sources of influence in downgradient areas that could be attributed to CCR. Porewater samples collected from both the EAP and WAP exhibit elevated concentrations of boron, whereas boron concentrations in monitoring wells G11 and G51D are low relative to CCR porewater and most groundwater monitoring wells located both to the east and west (Attachment 3). While boron concentrations suggest no immediate influence from either of the CCR units, it is not otherwise relied upon for distinguishing influence as originating from either the east (i.e., EAP) or west.

## 3.2 OTHER PERTINENT CHEMICAL TRACERS OF INFLUENCE

Magnesium is not commonly used as a CCR indicator, yet the substantial range in magnesium concentrations observed in groundwater to the west relative to east makes it a particularly useful tracer of influence (Attachment 3). Table 1 presents the range in magnesium measured for several different endmember components assessed for influence in relation to exceedance wells G11 and G51D.

Magnesium concentrations are notably elevated in several of the western groundwater monitoring wells, both within the UA and UCU stratigraphic units. Magnesium concentrations in G11 are similarly elevated when contrasted with groundwater concentrations measured to the east. Concentrations of magnesium at G51D are more similar to background (i.e., overall low). While some Eastern Wells do exhibit magnesium concentrations above background, the range is substantially lower than G11 and the Western Wells overall. The low magnesium concentrations observed in background groundwater, eastern groundwater, and CCR porewater lead in the direction of the western groundwater as a source of high magnesium to, and therefore a dominant influence on, the exceedance wells (G11 in particular).

A strong linear relationship is observed between sulfate and magnesium in groundwater (Attachment 4; Appendix D-1), except TPZ120, which appears as an outlier for the JOP groundwater. The linear relationship between magnesium and sulfate is observed in both western and eastern groundwaters, though the magnitude of measured concentrations in the Western Wells extends beyond that of the Eastern Wells, as discussed in the previous paragraph. Concentrations from monitoring well G11 plot among the Western Wells and are distinctly separate from Eastern Wells. Furthermore, the G11 magnesium-sulfate relationship is similar to Western UCU wells. This data suggests that G11 groundwater chemistry is more similar to western groundwater chemistry than eastern groundwater chemistry. Conditions at G51D are suspected to be under the same influence from the western groundwater chemistry, but are simultaneously influenced from upgradient background groundwater, discussed further in Section 4.0. This mixing of groundwaters produces a lower magnesium concentration in G51D relative to G11.

## 3.3 MULTIVARIATE DATA ANALYSIS

### 3.3.1 METHOD

Groundwater chemistry data are by nature multivariate datasets given the high number of parameters observed per sampling location and within a given timeframe. With such a large number of variables, advanced statistical analysis of multivariate groundwater data can provide important insights into spatial,



temporal, and chemical relationships influencing constituent distribution and compliance in groundwater. The multivariate technique Principal Component Analysis (PCA) is used to interrogate the groundwater chemistry around the exceedance wells.

PCA is a multivariate technique that reduces dataset dimensionality to its principal, independent components thereby revealing the inner structure of the dataset. Multivariate techniques such as PCA are valuable because they identify variables that are highly dependent on each other but do not inherently provide insights into water origin, type, or evolution. Reducing multivariate data dimensionality reduces redundant information, revealing inner structures in the data that might otherwise be obscured by these dependencies. These structures might include groups of related variables, chemical evolution through time, or spatial locations with similar chemical signatures.

PCA results are most easily viewed on a biplot (such as those provided in Attachment 5), which depicts the sample population plotted on two axes, each representing a principal component. The principal components are created from a linear combination of the original variables in the dataset and variance in the data. For natural compositional datasets, approximately 70% of the population variance can often be expressed in the first three or four principal components (in some cases less and in others, more), each representing decreasing amounts of variance in the data while remaining uncorrelated to previous principal components. The first two principal components often represent the majority of the dataset and are visualized using biplots with the variables expressed as vectors; the location of groups of samples (i.e., factor scores) relative to component vectors provides insight into geochemical relationships among groups of variables and samples.

### 3.3.2 DATA PREPARATION

When conducting multivariate analysis, it is first necessary to prepare the dataset. Raw chemical data requires preparation prior to analysis because the data often contains values in two forms unsuitable for advanced analytics: 1) measurements reported below a method detection limit (MDL), referred to as censored data, and 2) missing values. For this work, any sample or analyte with a high percentage ( $\geq 40\%$ ) of missing and/or censored data was assessed for meaningful statistical variance. If overall analyte variance was determined to be low, the analyte was removed, otherwise the data was included in the analysis. Any remaining censored data was converted to half the MDL. Remaining missing values were imputed, a method of assigning an estimated value that accounts for the entire distribution of the material's composition (Sanford et al., 1993) and also takes into consideration the values associated with samples of similar composition. Imputation was done with a nearest neighbor algorithm (Troyanskaya, 2001) and resulting values were checked against the overall data distribution for both the analyte and sample to ensure representative results. Imputed data represents 1.9% or less of the overall dataset in the PCA biplots presented here. Processed data for the PCA are presented in Electronic Attachment 1 and 2.

PCA also requires transformation of the dataset to address the numeric closure problem inherent within chemical compositional datasets (Aitchison, 1986). Numeric closure can often occur in water quality data since water quality concentrations are not completely independent. To address this issue, all data was converted to the same units (mg/L) and the centered-log ratio transformation (CLR; Aitchison 1986; Egozcue et al. 2011) was applied to the cleaned dataset. In practice, closure only significantly affects elements present in large concentrations (e.g., major ions in typical water quality samples), but for consistency the entire dataset (i.e., including trace metals) was CLR-transformed.



The resulting dataset includes both compliance wells and other monitoring wells and spans sampling events from 2017 through 2023. The dataset contains 18 measured analytes, including the hydrogen ion (H<sup>+</sup>), which represents acidity in groundwater and is proportional to pH. This data represents both the most recent data measured at JOP as well as the most complete set of regularly measured and detectable analytes. All data preparation was conducted using python programming language. Only total concentrations of major ions and metals were used in this analysis as those data are both relatively complete and consistent across the wells on site and are the parameters of interest for regulatory purposes.

### 3.3.3 RESULTS

Biplots showing principal components 1 and 2 (PC1 and PC2) are provided in Attachment 5. The PC1 and PC2 are represented on the X and Y axis and explain approximately 30% and 25% of the statistical variance in the water quality dataset, respectively. For each biplot, the first three components explain over 65% variance in the dataset, while the first four explain over 70%. Constituent variables are expressed as vectors. The grouping of samples relative to the component vectors is useful for providing immediate insight into geochemical relationships among groups of variables and samples.

Two iterations of biplots are provided; Attachment 5a depicts all Western and Eastern Wells and porewater locations with sufficient data. Attachment 5b depicts all potential endmember influences on the pH exceedances at G11 and G51D, as represented by background groundwater, EAP porewater, WAP porewater, and hydraulically upgradient groundwater wells (all of which exist to the north and west). Side-gradient western well TPZ120 is also included as it represents a geochemical endmember. While constituent vectors are arranged in a similar orientation across both biplots, biplot 5A which includes the downgradient eastern groundwater contains more noise in the dataset making it difficult to decipher meaningful inter-well trends. This biplot is provided as a reference but is not discussed further. The remaining analysis focuses on biplot 5B which contains hydraulically upgradient wells, background wells, and porewater wells as geochemical endmembers of G11 and G51D (Attachment 5b). This biplot exhibits the following key features:

- Exceedance wells G51D and G11 exhibit a high degree of similarity with the Western Wells screened in the UA.
- Groundwater samples are distributed linearly from the bottom right to the middle of the upper left quadrant, with clear separation between stratigraphic units within the spread of data. Background data plots as an endmember in the lower right quadrant, transitions into UA wells in the lower left quadrant, and continues through the UCU wells in the middle upper left quadrant.
- The EAP and WAP porewaters dominate the upper right quadrant and are distinctly separate from the groundwater samples. There is also a clear separation between EAP and WAP porewaters. The WAP porewater has a strong association with the boron and lithium vectors whereas the EAP porewater is more closely associated with arsenic, potassium, molybdenum, and selenium.
- The WAP UCU monitoring well TPZ120 plots alone in the upper left corner of the plot at the far end of the iron vector, indicating (a) iron is a key contributor to the variance associated with this location and (b) TPZ120 has a distinct chemical composition relative to the other groundwater compositions considered.

The linear spread of groundwater data suggests chemical evolution and/or communication within the aquifer system. The western UCU groundwater composition is dominated by redox sensitive vectors such as manganese, iron, and sulfate. The UA groundwater is observed to undergo a gradual chemical evolution from the UCU redox-sensitive composition endmember back to background conditions, which are dominated by





alkalinity, sodium, chloride, and fluoride. The exceedance wells plot among the western UA groundwater, suggesting geochemistry is broadly similar in these wells. Furthermore, the exceedance wells plot in near association with the background groundwater wells, also indicating some multi-variate geochemical similarity to background. This positioning may indicate potential mixing between reduced upgradient groundwaters from the northwest with oxidized background water from the north, discussed further in Section 4.0. Exceedance wells G51D and G11 do not demonstrate association with the EAP porewater composition, supporting the conclusion that the EAP porewater is not a primary influence on the groundwater composition observed at G51D and G11, and is therefore not found to be responsible for the pH exceedances.

## 4.0 POTENTIAL ALTERNATE SOURCES

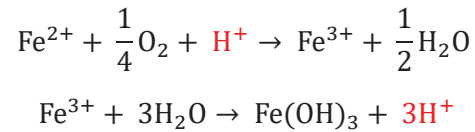
This technical review identified the likely source of acidity contributing to the low pH levels at G11 and G51D is dissolved iron in groundwater under reducing conditions and the redox transition that occurs in groundwater immediately upgradient of the G11 and G51D monitoring wells. This is demonstrated in Attachment 6, which includes figures depicting the redox condition at the site. The map included in Attachment 6A (Appendix D-2) demonstrates a distinct redox transition from more reducing conditions in upgradient waters and more oxidizing conditions near the exceedance wells. The reducing upgradient waters are characterized by lower oxidation reduction potential (ORP) and higher iron concentrations, while downgradient waters are largely the opposite with higher ORP and lower iron concentrations. This spatial gradient in redox conditions is also reflected in the Pourbaix diagram for the upgradient western groundwater network (Attachment 6B; Appendix D-3). This diagram demonstrates the predominant iron species and mineral forms under changing pH and Eh conditions (Eh is calculated from field measurements of ORP using the AquaTROLL conversion rate). There is a clear gradient from more reducing conditions in the north and west to more oxidized conditions in G11 and G51D with dissolved iron ( $\text{Fe}^{++}$ ) and iron hydroxide ( $\text{Fe}(\text{OH})_3$ ) as the dominant forms of iron. Simultaneously, there is a drop in pH as conditions become more oxidizing.

The source of the dissolved iron and reducing condition could be attributed to three possible upgradient influences existing to the west and north of the two exceedance wells: 1) low pH and relatively high dissolved iron existing in the general area around Western Well TPZ120, 2) the WAP, and 3) the sewage treatment pond. Results of the PCA suggest groundwater monitored in the area of Western Well TPZ120 and the WAP are both potential geochemical endmembers of the chemical evolution observed upgradient and to the west (Attachment 5). Monitoring well TPZ120 has an average iron concentration of 1.2 mg/L (determined from samples with turbidity <10 NTU) and is near enough in proximity to the exceedance wells to suggest cross-gradient flow between these wells may be possible (Attachment 2). The WAP and the sewage treatment pond are both upgradient sources of reduced groundwater, though high turbidity in field samples limits the use of existing iron data for full understanding of transport and speciation of dissolved iron in response to the redox gradient. These three locations represent possible alternate sources of reduced iron to the exceedance wells.

This change in redox condition is the likely source of acidity in G11 and G51D. It is interpreted that dissolved iron is released from the sediments through the process of reductive dissolution by upgradient waters, in response to the reducing conditions (as observed by low ORP). The dissolved iron is transported downgradient with groundwater and subsequently oxidizes and precipitates when it moves into an area with sufficient dissolved oxygen to drive the oxidation reaction.



The oxidation of dissolved iron to iron hydroxide is known to produce acidity via the following reactions:



Acidity is highlighted in red, and the equations demonstrate a net increase in acidity through iron oxidation and precipitation. In this way, reduced upgradient waters from the north and west provides the constituent (i.e., reduced iron) necessary to cause a drop in pH (i.e., through iron oxidation) in G11 and G51D. The oxidized environment near the exceedance wells results from sufficient mixing with the upgradient oxidized background groundwater. This is particularly evident in G51D, which has a more immediate influence of dissolved iron from reduced upgradient wells and has a compositional similarity to background wells (as seen in PCA and magnesium concentrations) resulting in the lowest pH in the JOP EAP groundwater network.

## 5.0 CONCLUSIONS

This technical review presents evidence that demonstrates the EAP is not the source of pH exceedances at compliance wells G11 and G51D. Results of the geochemical and multivariate analysis (i.e., PCA) demonstrate that groundwater associated with monitoring wells G11 and G51D are more similar to upgradient groundwater to the north and west than the EAP porewater. This analysis was supported by examination of magnesium concentrations and the magnesium-sulfate relationship, both of which indicate G11 and G51D have a chemical signature indicative of western groundwater and background groundwater. The pH exceedances are found to be the result of chemically reduced upgradient waters carrying dissolved iron (released from the aquifer solids through the geochemical process of reductive dissolution) subsequently mixing with oxidized background groundwater in the area of G51D and G11. Further analysis revealed three potential sources of dissolved iron to the north and west of the exceedance locations; however, this investigation did not attempt to identify the primary or singular source of dissolved iron driving the pH exceedances. Upon mixing, the dissolved iron originating from more reducing groundwater subsequently oxidizes and precipitates as iron hydroxide, consequently generating acidity and lowering the groundwater pH in this specific area. The information and analysis presented thus rules out the EAP as the source of the acidity, and therefore pH exceedances, in this area.



## 6.0 ABBREVIATIONS

Alk	Total Alkalinity
As	Arsenic
B	Boron
Ca	Calcium
CCR	Coal combustion residual
Cl	Chloride
Co	Cobalt
Cr	Chromium
EAP	East Ash Pond
F	Fluoride
Fe	Iron
H+	Hydrogen ion, represents acidity in groundwater
JOP	Joppa
K	Potassium
Li	Lithium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
Na	Sodium
ORP	Oxidation reduction potential
PCA	Principal components analysis
Redox	Oxidation-Reduction
Se	Selenium
SO4	Sulfate
UA	Upper Aquifer
UCU	Upper confining unit
WAP	West Ash Pond





## 7.0 REFERENCES

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Egozcue J.J. and V. Pawlowsky-Glahn. 2011. Basic concepts and procedures. In: Pawlowsky-Glahn V, Buccianti A, editors. *Compositional data analysis: theory and applications*. Chichester: Wiley; 2011. pp. 12–28.

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Olga Troyanskaya, Michael Cantor, Gavin Sherlock, Pat Brown, Trevor Hastie, Robert Tibshirani, David Botstein and Russ B. Altman, Missing value estimation methods for DNA microarrays, *BIOINFORMATICS* Vol. 17 no. 6, 2001 Pages 520-525.

Sanford, R. F., C.T. Pierson, and R.A. Crovelli. 1993. An objective replacement method for censored geochemical data: *Math. Geol.*, 25(1), p. 59–80.



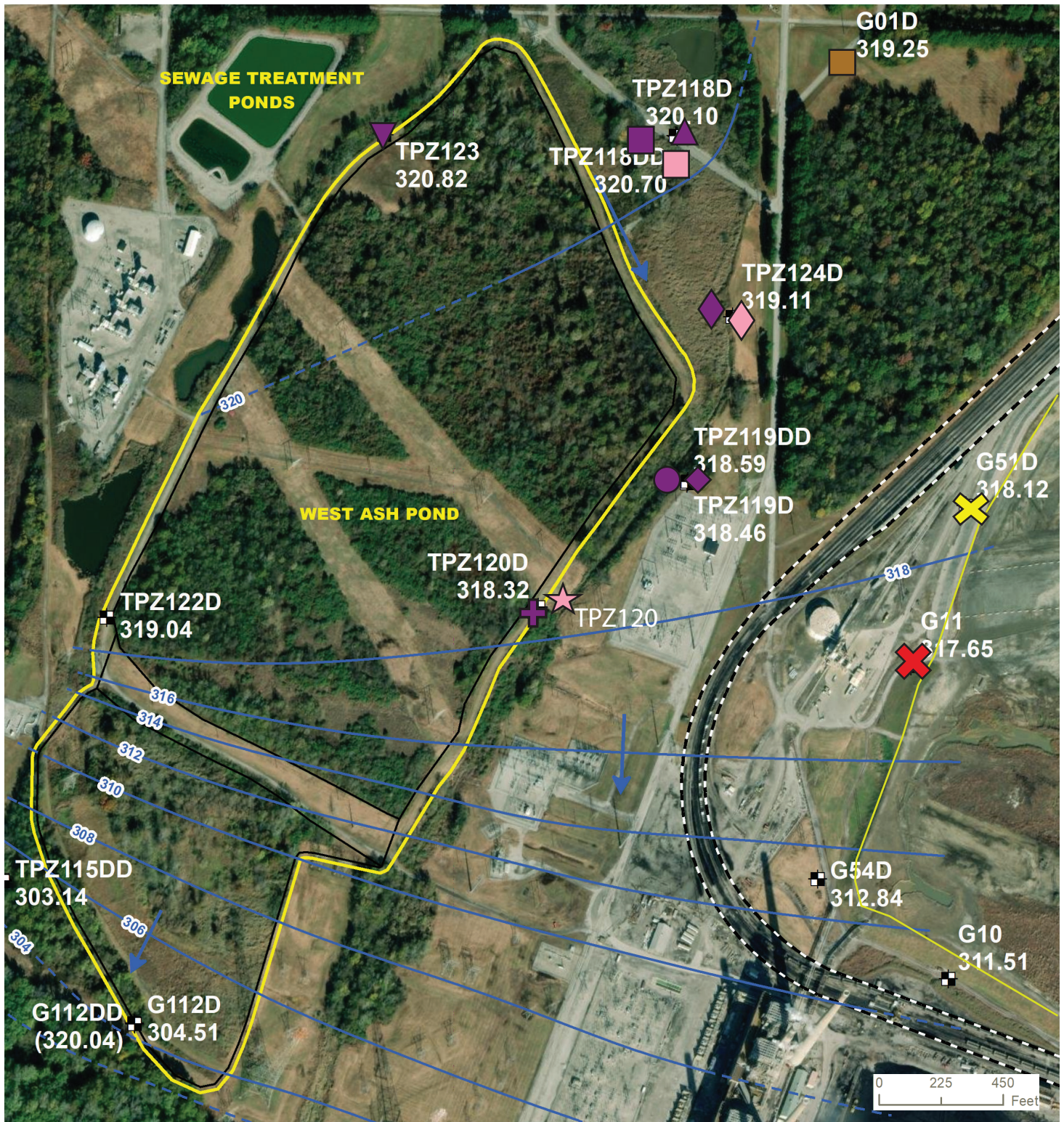
**Notes:**

- Wells with pH exceedances are shown with an X.
- East ash pond compliance wells are light blue and monitoring wells are dark blue.
- Western monitoring wells are purple (UA) and pink (UCU).
- Background wells are brown. Ash ponds are outlined in yellow.
- Contours are from March 2023.



Title Joppa East Ash Pond Well Locations and Hydrology			
Project Name Joppa- East Ash Pond Evaluation		Project Number [23RAM01-1] Vistra CCR	Attachment <b>1</b>
Client Name Ramboll Americas Engineering Solutions, Inc.		Date 10/21/2023	



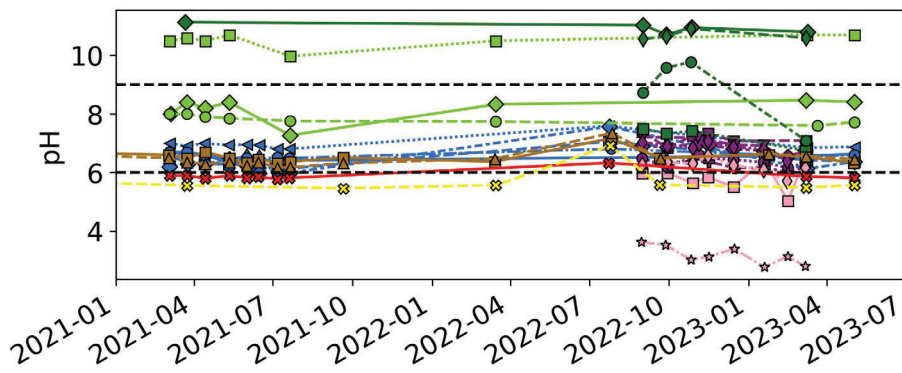


Notes:  
 Wells with pH exceedances are shown with an X.  
 Western wells are purple (UA) and pink (UCU).  
 Background wells are brown. Ash ponds are outlined in yellow.  
 Contours are from September 2022.

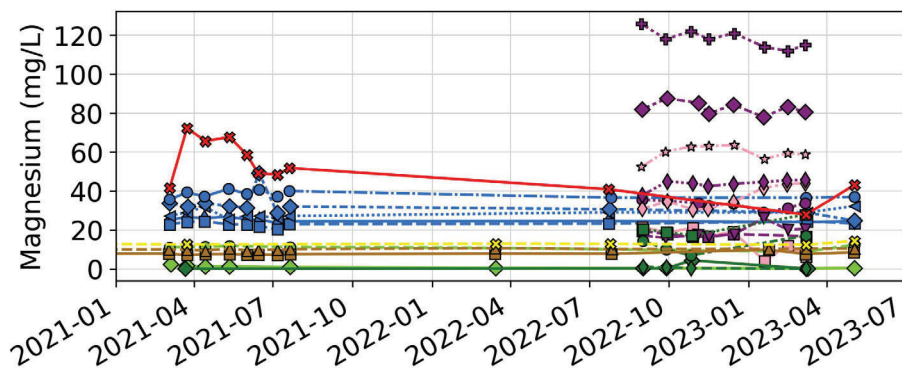
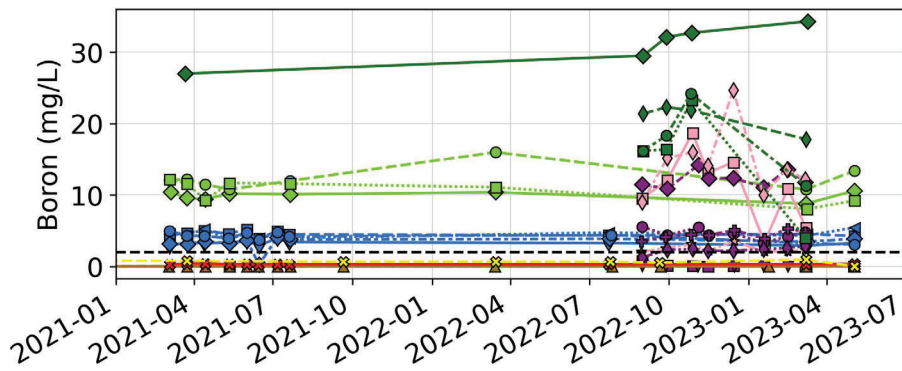


Title Joppa West Ash Pond Well Locations and Upper Aquifer Groundwater Elevation		
Project Name Joppa- East Ash Pond Evaluation	Project Number [23RAM01-1] Vistra CCR	Attachment 2
Client Name Ramboll Americas Engineering Solutions, Inc.	Date 10/21/2023	





Notes:  
 Data is colored according to well classification.  
 All data shown is for eastern compliance wells, upgradient western upgradient wells, background, and porewaters



Well ID		
◆ G06	◆ TPZ118DD	◆ XTPW01
◆ G07	◆ TPZ119D	◆ XTPW02
◆ G08	◆ TPZ119DD	◆ XTPW03
◆ G09	◆ TPZ120	◆ XTPW04
◆ G10	◆ TPZ120D	◆ G01D
◆ XPW01	◆ TPZ123	◆ G02D
◆ XPW02	◆ TPZ124	◆ G11
◆ XPW03	◆ TPZ124D	◆ G51D
◆ TPZ118		

— Background
— Eastern Compliance Well
— Western UA Well
— Western UCU Well
— EAP Porewater
— WAP Porewater
--- GWPS
✱ Exceedance



Title  
Time Series for pH, Boron, and Magnesium

Project Name  
Joppa- East Ash Pond Evaluation

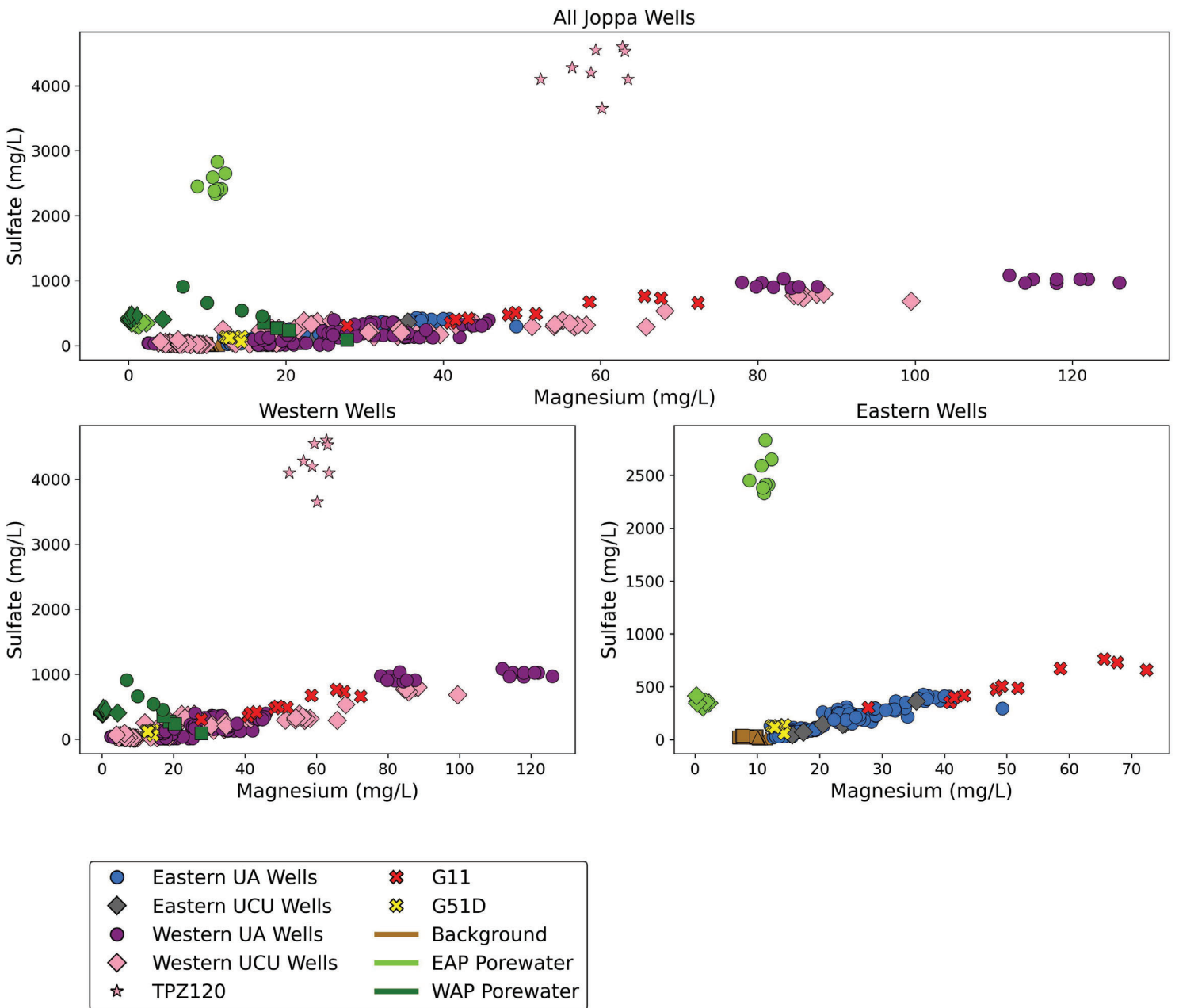
Project Number  
[23RAM01-1] Vistra CCR

Attachment

Client Name  
Ramboll Americas Engineering Solutions, Inc.

Date  
10/21/2023

3



Scatterplots of magnesium and sulfate for all Joppa wells (top), the western wells (bottom left) and eastern wells (bottom right).



Title  
Joppa Magnesium-Sulfate Scatterplot

Project Name  
Joppa- East Ash Pond Evaluation

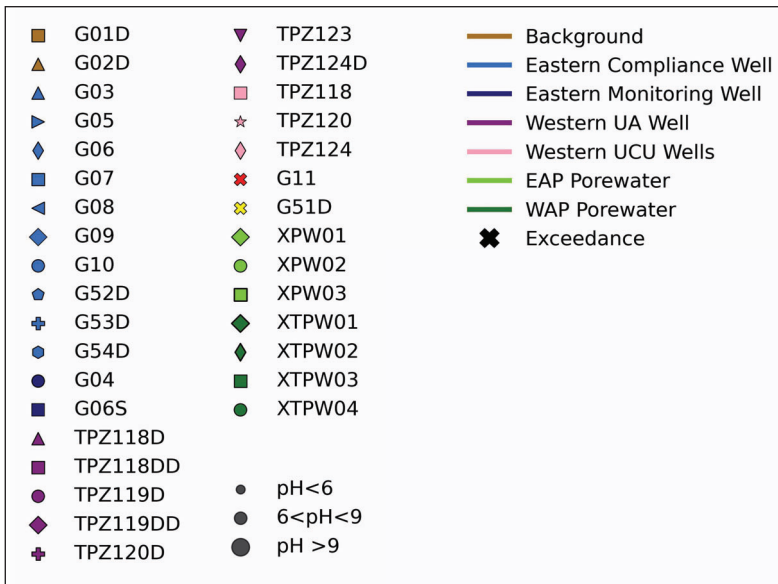
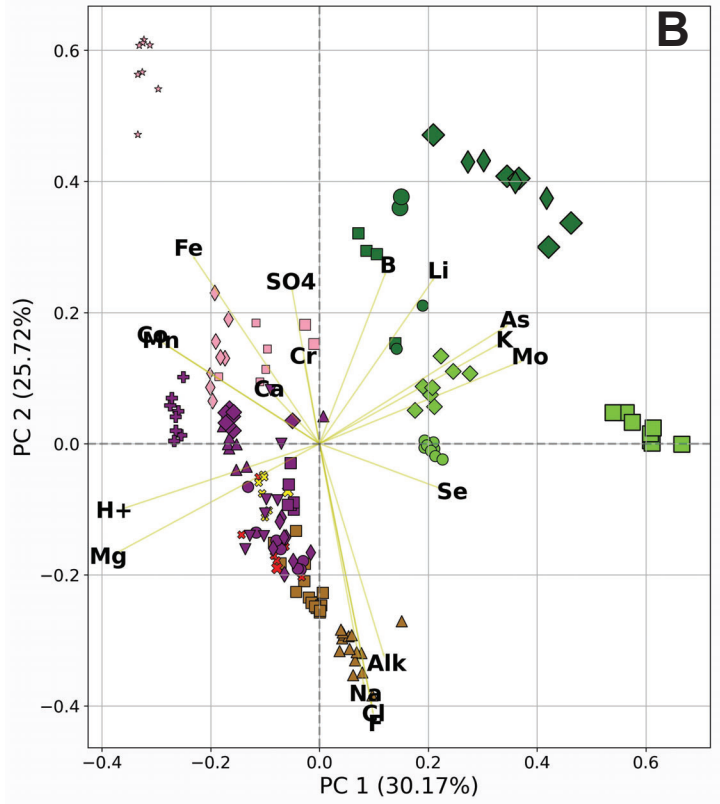
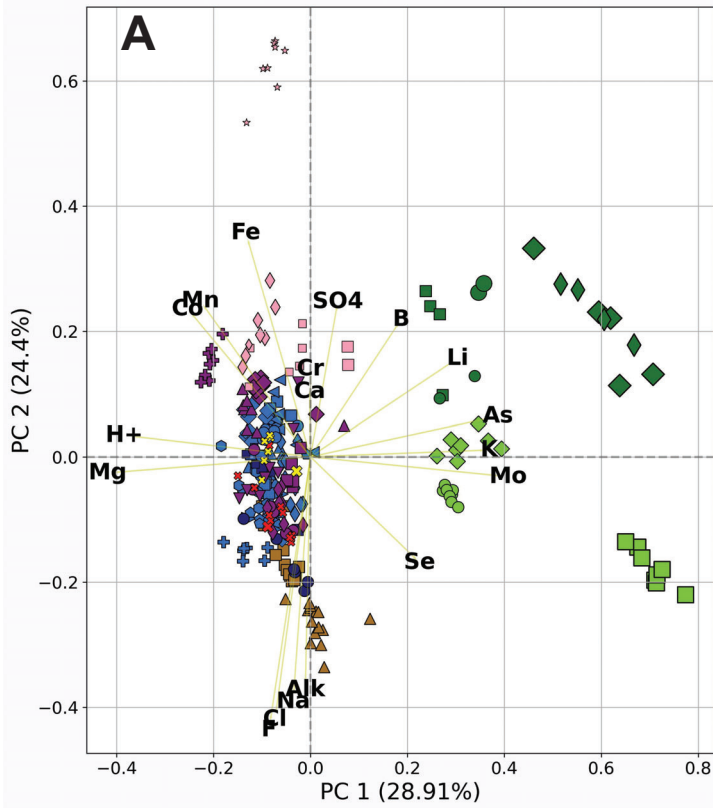
Client Name  
Ramboll Americas Engineering Solutions, Inc.

Project Number  
[23RAM01-1] Vistra CCR

Date  
10/21/2023

Attachment

4



**Notes:**

Data is colored according to well classification and sized according to pH. See abbreviations list for complete analyte and unit names.

A) PCA with all eastern and western wells, including porewater.

B) PCA with only western wells, background, and porewater.



Title  
Joppa Principal Components Analysis Results

Project Name  
Joppa- East Ash Pond Evaluation

Client Name  
Ramboll Americas Engineering Solutions, Inc.

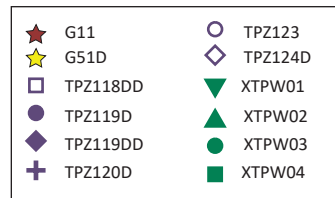
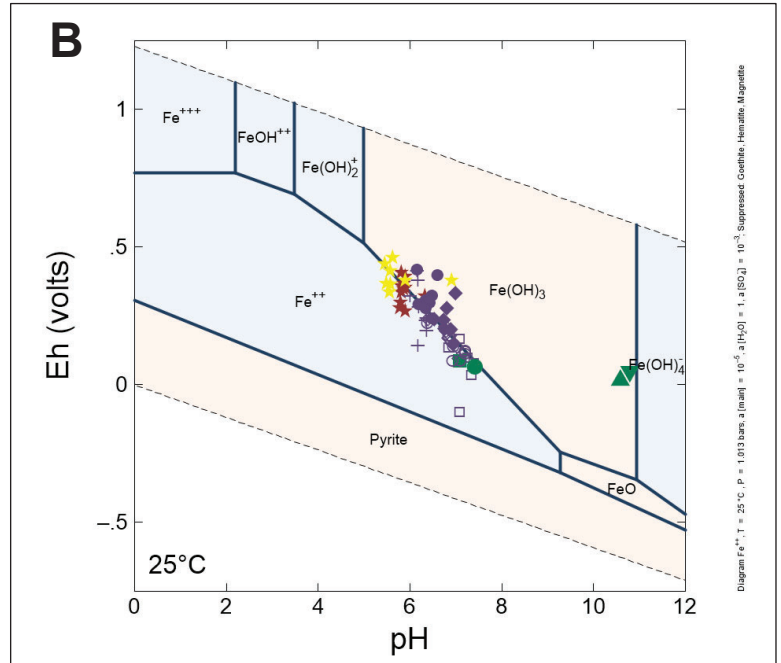
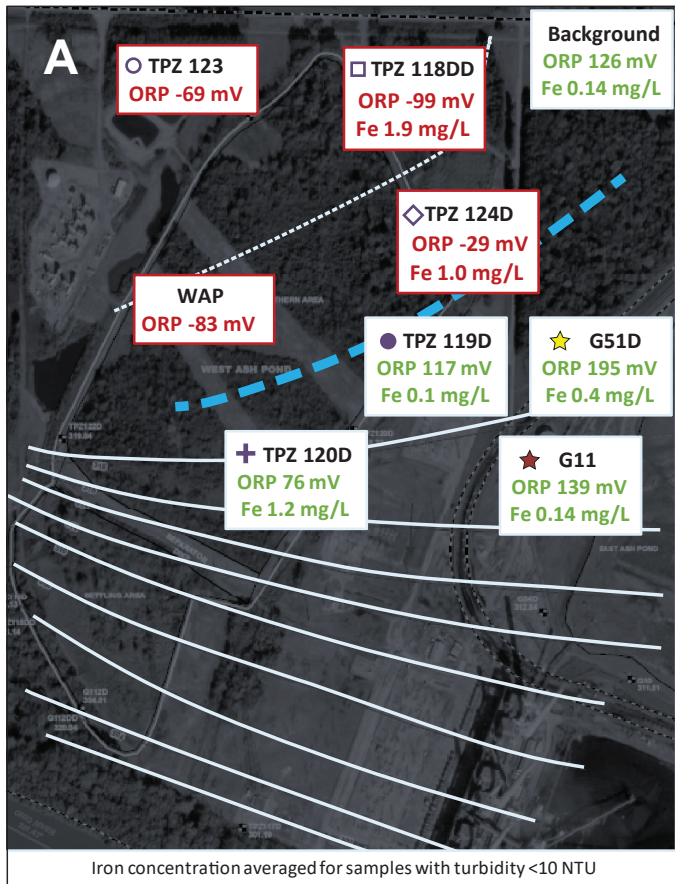
Project Number  
[23RAM01-1] Vistra CCR

Date  
10/21/2023

Attachment

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Notes:

A) Redox conditions upgradient of G11 and G51D. White lines are upper aquifer groundwater contours, blue line indicates where conditions change from reducing to oxidizing. Contours from September 2022. Iron concentration not shown where turbidity >10 NTU.

B) Pourbaix diagram depicting iron solubility upgradient of G11 and G51D. WAP porewater is shown in green, western monitoring wells are shown in purple, G11 is red, and G51D is yellow. Blue areas indicate aqueous phase iron; brown areas indicate solid phase iron.



Title  
Joppa Oxidation Reduction Conditions

Project Name  
Joppa- East Ash Pond Evaluation

Client Name  
Ramboll Americas Engineering Solutions, Inc.

Project Number  
[23RAM01-1] Vistra CCR

Date  
10/21/2023

Attachment

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Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G01D	12/3/2015	Background	6.7	<0.025	--	20
G01D	3/15/2016	Background	6.7	0.036	--	126
G01D	6/15/2016	Background	6.9	0.0296	--	157
G01D	9/14/2016	Background	6.8	0.0416	--	129
G01D	12/14/2016	Background	6.8	<0.025	--	53
G01D	3/7/2017	Background	6.2	<0.025	--	72
G01D	6/15/2017	Background	6.7	<0.025	--	56
G01D	7/20/2017	Background	6.8	<0.025	9.87	31
G01D	11/30/2017	Background	6.8	<0.025	--	117
G01D	6/19/2018	Background	6.8	<0.025	--	70
G01D	9/5/2018	Background	7	<0.025	--	94
G01D	3/27/2019	Background	6.7	<0.025	--	30
G01D	9/9/2019	Background	6.4	<0.025	--	37
G01D	3/30/2020	Background	6.8	<0.025	7.6	35
G01D	9/23/2020	Background	6.72	<0.025	--	34
G02D	7/6/2021	Background	6.17	0.0431	9.77	22
G02D	7/21/2021	Background	6.18	0.0329	10.1	20
G02D	6/1/2021	Background	6.23	0.0433	9.39	23
G02D	4/14/2021	Background	6.3	0.0318	9.39	19
G02D	9/20/2021	Background	6.32	0.0313	--	19
G01D	7/6/2021	Background	6.33	<0.025	7.18	20
G01D	6/1/2021	Background	6.34	<0.025	7.36	18
G01D	5/2/2023	Background	6.34	0.021	8.43	26
G02D	3/24/2021	Background	6.35	0.033	9.76	18
G02D	5/12/2021	Background	6.35	0.0356	10.4	27
G02D	6/14/2021	Background	6.36	0.0352	9.84	23
G01D	7/21/2021	Background	6.37	<0.025	7.54	18
G01D	3/14/2022	Background	6.37	<0.025	7.77	22
G02D	5/3/2023	Background	6.46	0.0412	10.4	13
G01D	6/14/2021	Background	6.46	<0.025	7.41	20
G02D	12/3/2015	Background	6.7	0.0536	--	16
G02D	3/15/2016	Background	6.6	0.0494	--	17
G02D	6/15/2016	Background	6.8	0.0508	--	15
G02D	9/14/2016	Background	6.6	0.0534	--	22
G02D	12/14/2016	Background	6.3	0.0552	--	22
G02D	7/20/2017	Background	6.7	0.044	11.4	12
G02D	11/30/2017	Background	6.9	0.0496	--	17
G02D	6/19/2018	Background	6.7	0.0404	--	17
G02D	9/5/2018	Background	6.6	0.0468	--	19

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G02D	3/27/2019	Background	6.6	0.0473	--	20
G02D	9/9/2019	Background	6.5	0.0429	--	20
G02D	3/30/2020	Background	6.59	0.0449	9.96	22
G02D	9/23/2020	Background	6.62	0.0442	--	22
G02D	3/14/2022	Background	6.47	0.0283	10.6	11
G02D	9/21/2022	Background	6.48	0.0266	--	15
G01D	5/12/2021	Background	6.49	0.0167	7.55	20
G01D	3/24/2021	Background	6.49	<0.025	7.06	21
G02D	3/3/2021	Background	6.5	0.0296	9.98	21
G01D	9/20/2022	Background	6.5	<0.014	--	23
G01D	9/20/2021	Background	6.51	<0.025	--	18
G01D	3/7/2023	Background	6.53	0.029	7.66	36
G02D	3/8/2023	Background	6.56	0.027	10.3	11
G01D	3/3/2021	Background	6.6	<0.025	7.79	18
G01D	1/24/2023	Background	6.62	<0.022	9.75	24
G02D	3/8/2017	Background	6.9	0.0546	--	18
G02D	6/14/2017	Background	6.3	0.0467	--	20
G02D	1/24/2023	Background	6.64	0.0311	10.2	12
G01D	4/14/2021	Background	6.7	<0.025	7.56	39
G01D	7/26/2022	Background	7.17	<0.015	7.74	36
G02D	7/27/2022	Background	7.35	0.0322	10.1	19
G03	3/24/2021	Eastern Compliance	6.3	0.343	17.6	104
G03	4/14/2021	Eastern Compliance	6.2	0.603	28.3	168
G03	5/12/2021	Eastern Compliance	6.39	0.26	15.8	112
G03	6/1/2021	Eastern Compliance	6.35	0.232	14.9	73
G03	7/6/2021	Eastern Compliance	6.34	0.235	14	77
G03	7/21/2021	Eastern Compliance	6.36	0.294	15.7	92
G03	7/26/2022	Eastern Compliance	6.51	0.532	22.9	164
G03	5/3/2023	Eastern Compliance	6.18	0.38	16.6	97
G03	3/5/2021	Eastern Compliance	6.4	0.213	15.1	66
G03	6/15/2021	Eastern Compliance	6.24	0.225	15.1	79
G03	3/9/2023	Eastern Compliance	6.23	0.33	15.2	82
G04	3/24/2021	Eastern Monitoring	6.5	<0.025	14.6	41
G04	7/26/2022	Eastern Monitoring	6.82	<0.0092	34.1	216
G04	3/4/2021	Eastern Monitoring	6.5	<0.025	12.6	21
G04	4/13/2021	Eastern Monitoring	6.5	<0.025	17.3	63
G04	5/11/2021	Eastern Monitoring	6.28	0.0157	17.6	73
G04	7/20/2021	Eastern Monitoring	6.33	<0.025	20.6	131
G05	3/24/2021	Eastern Compliance	6.4	0.195	18.8	92



Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G05	6/1/2021	Eastern Compliance	6.48	0.157	18.6	83
G05	7/6/2021	Eastern Compliance	6.42	0.148	17.6	90
G05	7/26/2022	Eastern Compliance	6.63	0.0645	17.6	68
G05	5/3/2023	Eastern Compliance	6.49	0.0478	19.3	112
G05	6/15/2021	Eastern Compliance	6.34	0.14	18.4	91
G05	3/9/2023	Eastern Compliance	6.5	0.0541	19.4	90
G05	3/4/2021	Eastern Compliance	6.5	0.181	17.2	94
G05	4/13/2021	Eastern Compliance	6.5	0.19	19.5	95
G05	5/11/2021	Eastern Compliance	6.38	0.158	19.4	109
G05	7/20/2021	Eastern Compliance	6.35	0.131	18.5	87
G06	3/24/2021	Eastern Compliance	6.6	3.4	26.6	215
G06	6/1/2021	Eastern Compliance	6.56	3.56	25.3	216
G06	7/6/2021	Eastern Compliance	6.32	3.93	23.7	223
G06	5/3/2023	Eastern Compliance	6.63	3.28	24.4	208
G06	6/15/2021	Eastern Compliance	6.51	2.97	25.2	230
G06	3/9/2023	Eastern Compliance	6.57	2.95	24.1	221
G06	3/4/2021	Eastern Compliance	6.7	2.9	25.1	250
G06	4/13/2021	Eastern Compliance	6.6	3.27	26	229
G06	5/11/2021	Eastern Compliance	6.43	3.37	26.8	219
G06	7/20/2021	Eastern Compliance	6.41	3.41	24.4	213
G06	7/23/2022	Eastern Compliance	--	3.29	24.5	216
G06S	3/24/2021	Eastern Monitoring	5.8	0.253	13.5	31
G06S	3/4/2021	Eastern Monitoring	6.2	0.229	12.9	35
G06S	4/13/2021	Eastern Monitoring	5.8	0.265	14.3	30
G06S	5/11/2021	Eastern Monitoring	5.62	0.245	15.6	31
G06S	7/20/2021	Eastern Monitoring	5.73	0.248	13	30
G06S	7/23/2022	Eastern Monitoring	6.54	0.269	13.5	30
G07	3/24/2021	Eastern Compliance	6.4	4.67	24.2	258
G07	6/1/2021	Eastern Compliance	6.25	5.23	22.9	257
G07	7/6/2021	Eastern Compliance	5.98	4.95	20.5	258
G07	5/3/2023	Eastern Compliance	6.38	4.27	23.4	260
G07	6/15/2021	Eastern Compliance	6.25	3.91	21.8	246
G07	3/9/2023	Eastern Compliance	6.42	4.55	24.3	308
G07	3/4/2021	Eastern Compliance	6.5	4.37	22.9	285
G07	4/13/2021	Eastern Compliance	6.3	5.04	24.4	274
G07	5/11/2021	Eastern Compliance	6.28	4.55	22.9	248
G07	7/20/2021	Eastern Compliance	6.14	4.48	23	252
G07	7/23/2022	Eastern Compliance	7.06	4.35	23.2	246
G08	3/24/2021	Eastern Compliance	6.9	4.39	29	225

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G08	6/1/2021	Eastern Compliance	6.96	4.63	27.2	204
G08	7/6/2021	Eastern Compliance	6.81	4.56	26.2	227
G08	5/3/2023	Eastern Compliance	6.88	5.43	32.2	363
G08	6/15/2021	Eastern Compliance	6.94	3.97	27.2	226
G08	3/9/2023	Eastern Compliance	6.85	4.33	28.9	297
G08	3/4/2021	Eastern Compliance	7	4.53	27.2	241
G08	4/13/2021	Eastern Compliance	7	5.25	31.9	286
G08	5/11/2021	Eastern Compliance	6.94	3.77	25.4	203
G08	7/20/2021	Eastern Compliance	6.81	3.98	27.1	227
G08	7/23/2022	Eastern Compliance	7.59	4.74	29	229
G09	4/14/2021	Eastern Compliance	6.3	3.48	33.7	297
G09	5/12/2021	Eastern Compliance	6.45	3.26	32.1	272
G09	6/1/2021	Eastern Compliance	6.24	3.65	31.4	284
G09	7/6/2021	Eastern Compliance	6.29	4.05	28.7	289
G09	7/21/2021	Eastern Compliance	5.99	3.75	32	286
G09	5/3/2023	Eastern Compliance	6.37	3.87	24.7	241
G09	6/15/2021	Eastern Compliance	5.97	0.282	49.3	294
G09	3/9/2023	Eastern Compliance	6.13	3.49	28.9	295
G09	3/4/2021	Eastern Compliance	6.2	3.19	33.8	351
G09	3/25/2021	Eastern Compliance	6.3	3.15	32	286
G09	7/24/2022	Eastern Compliance	7.57	3.89	30.6	278
G10	3/24/2021	Eastern Compliance	6.7	4.31	39.3	369
G10	6/1/2021	Eastern Compliance	6.5	4.73	38.5	401
G10	7/6/2021	Eastern Compliance	6.51	4.81	37.3	415
G10	7/26/2022	Eastern Compliance	6.81	4.4	36.6	388
G10	3/8/2023	Eastern Compliance	6.55	3.28	36.6	425
G10	5/3/2023	Eastern Compliance	6.6	3.08	36.9	365
G10	6/15/2021	Eastern Compliance	6.46	3.74	40.8	407
G10	3/4/2021	Eastern Compliance	6.7	4.98	35.7	391
G10	4/13/2021	Eastern Compliance	6.6	4.26	37.2	382
G10	5/11/2021	Eastern Compliance	6.34	3.95	41.1	364
G10	7/20/2021	Eastern Compliance	6.49	4.2	40	410
G11	3/8/2023	Exceedance	5.87	0.327	27.8	303
G11	7/23/2022	Exceedance	6.33	0.31	40.9	352
G11	3/4/2021	Exceedance	5.9	0.247	41.6	400
G11	5/3/2023	Exceedance	5.82	0.373	43.2	416
G11	7/6/2021	Exceedance	5.78	0.358	48.3	474
G11	7/20/2021	Exceedance	5.82	0.302	51.8	487
G11	6/14/2021	Exceedance	5.86	0.266	49.2	505

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G11	3/24/2021	Exceedance	5.9	0.42	72.4	658
G11	6/1/2021	Exceedance	5.82	0.309	58.6	671
G11	5/12/2021	Exceedance	5.9	0.321	67.7	730
G11	4/14/2021	Exceedance	5.8	0.411	65.6	761
G51D	12/3/2015	Exceedance	6.2	0.117	--	117
G51D	3/15/2016	Exceedance	5.9	0.184	--	145
G51D	6/15/2016	Exceedance	5.8	0.213	--	139
G51D	9/14/2016	Exceedance	5.6	0.263	--	136
G51D	12/14/2016	Exceedance	5.9	0.171	--	101
G51D	6/15/2017	Exceedance	5.6	0.58	--	149
G51D	7/20/2017	Exceedance	5.9	0.332	14.4	140
G51D	11/30/2017	Exceedance	5.6	0.302	--	138
G51D	6/19/2018	Exceedance	5.7	0.337	--	124
G51D	9/5/2018	Exceedance	6	0.263	--	134
G51D	3/27/2019	Exceedance	5.7	0.778	--	125
G51D	9/9/2019	Exceedance	5.3	0.501	--	109
G51D	3/30/2020	Exceedance	5.62	0.697	13.4	130
G51D	9/23/2020	Exceedance	5.72	0.863	--	121
G51D	9/20/2021	Exceedance	5.46	0.689	--	131
G51D	3/8/2023	Exceedance	5.49	0.963	12.3	131
G51D	3/24/2021	Exceedance	5.56	0.786	12.5	122
G51D	3/8/2017	Exceedance	6.2	0.309	--	146
G51D	5/3/2023	Exceedance	5.57	0.0297	14.3	59
G51D	3/15/2022	Exceedance	5.57	0.689	12.9	123
G51D	9/20/2022	Exceedance	5.58	0.551	--	125
G51D	7/25/2022	Exceedance	6.92	0.663	12.8	116
G52D	12/3/2015	Eastern Compliance	6.5	<0.025	--	65
G52D	3/15/2016	Eastern Compliance	6.3	<0.025	--	99
G52D	6/15/2016	Eastern Compliance	6.6	<0.025	--	88
G52D	9/14/2016	Eastern Compliance	6.4	<0.025	--	84
G52D	12/14/2016	Eastern Compliance	6.7	<0.025	--	82
G52D	3/7/2017	Eastern Compliance	5.9	<0.025	--	115
G52D	11/30/2017	Eastern Compliance	6	<0.025	--	97
G52D	6/19/2018	Eastern Compliance	6.4	<0.025	--	97
G52D	9/5/2018	Eastern Compliance	6.3	<0.025	--	101
G52D	3/27/2019	Eastern Compliance	6.4	<0.025	--	81
G52D	9/9/2019	Eastern Compliance	6	<0.025	--	78
G52D	3/30/2020	Eastern Compliance	6.38	<0.025	15.3	84
G52D	9/23/2020	Eastern Compliance	6.54	<0.025	--	84



Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G52D	9/20/2021	Eastern Compliance	6.29	<0.025	--	83
G52D	6/14/2017	Eastern Compliance	6.2	<0.025	--	112
G52D	9/21/2022	Eastern Compliance	6.26	<0.011	--	72
G52D	5/3/2023	Eastern Compliance	6.31	0.682	12.1	129
G52D	3/25/2021	Eastern Compliance	6.25	<0.025	14.6	75
G52D	3/15/2022	Eastern Compliance	6.22	<0.025	15.1	68
G52D	3/10/2023	Eastern Compliance	6.54	0.0319	15.3	74
G52D	7/19/2017	Eastern Compliance	6.4	<0.025	17	108
G53D	12/3/2015	Eastern Compliance	6.8	0.332	--	103
G53D	3/15/2016	Eastern Compliance	6.7	0.334	--	107
G53D	6/15/2016	Eastern Compliance	6.6	0.342	--	107
G53D	9/14/2016	Eastern Compliance	6.5	0.368	--	104
G53D	12/14/2016	Eastern Compliance	6.8	0.364	--	106
G53D	6/15/2017	Eastern Compliance	6.6	0.309	--	79
G53D	7/20/2017	Eastern Compliance	6.8	0.366	19.2	94
G53D	11/30/2017	Eastern Compliance	6.6	0.427	--	98
G53D	6/19/2018	Eastern Compliance	6.6	0.361	--	84
G53D	9/5/2018	Eastern Compliance	6.8	0.392	--	81
G53D	3/27/2019	Eastern Compliance	6.6	0.269	--	54
G53D	9/9/2019	Eastern Compliance	6.2	0.385	--	80
G53D	3/30/2020	Eastern Compliance	6.7	0.334	15.7	66
G53D	9/23/2020	Eastern Compliance	6.67	0.411	--	79
G53D	9/20/2021	Eastern Compliance	6.27	0.402	--	78
G53D	9/20/2022	Eastern Compliance	6.48	0.431	--	79
G53D	3/8/2017	Eastern Compliance	7.2	0.138	--	35
G53D	5/3/2023	Eastern Compliance	6.48	0.367	15.3	68
G53D	3/9/2023	Eastern Compliance	6.46	0.37	16.4	72
G53D	3/25/2021	Eastern Compliance	6.53	0.355	15.7	71
G53D	7/25/2022	Eastern Compliance	7.88	0.341	17	77
G53D	3/15/2022	Eastern Compliance	6.5	0.332	16.5	74
G54D	12/3/2015	Eastern Compliance	7	0.663	--	191
G54D	3/15/2016	Eastern Compliance	6.8	0.513	--	176
G54D	6/15/2016	Eastern Compliance	6.6	0.508	--	160
G54D	9/14/2016	Eastern Compliance	6.6	0.557	--	149
G54D	12/14/2016	Eastern Compliance	6.7	0.564	--	144
G54D	6/15/2017	Eastern Compliance	6.8	0.685	--	170
G54D	7/20/2017	Eastern Compliance	6.8	0.58	25.2	151
G54D	11/30/2017	Eastern Compliance	6.7	0.646	--	136
G54D	6/19/2018	Eastern Compliance	6.7	0.631	--	146

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G54D	9/5/2018	Eastern Compliance	6.5	0.66	--	152
G54D	3/27/2019	Eastern Compliance	6.8	1.03	--	142
G54D	9/9/2019	Eastern Compliance	6.4	0.614	--	136
G54D	3/30/2020	Eastern Compliance	6.78	0.766	27.1	184
G54D	9/23/2020	Eastern Compliance	6.7	0.819	--	173
G54D	3/24/2021	Eastern Compliance	6.56	0.404	24.2	186
G54D	9/20/2021	Eastern Compliance	6.48	0.35	--	175
G54D	7/26/2022	Eastern Compliance	7.09	0.178	22.3	188
G54D	9/20/2022	Eastern Compliance	6.5	0.252	--	218
G54D	3/8/2017	Eastern Compliance	7.1	0.499	--	131
G54D	5/3/2023	Eastern Compliance	6.8	0.555	26.4	194
G54D	3/9/2023	Eastern Compliance	6.52	0.555	26.4	231
G54D	3/15/2022	Eastern Compliance	6.61	0.451	25.8	213
G101	7/26/2022	Other	7.31	<0.0092	5.09	30
G101	3/7/2023	Other	6.58	0.0294	5.4	28
G101	3/22/2021	Other	6.99	<0.02	7.65	39
G101	8/31/2022	Other	6.64	<0.0092	5.88	37
G101	9/28/2022	Other	6.49	<0.019	5.77	30
G101	10/26/2022	Other	6.9	0.0366	5.21	56
G101	11/15/2022	Other	6.85	<0.0092	5.51	37
G101	12/14/2022	Other	6.63	<0.0092	5.19	37
G101	1/18/2023	Other	6.58	<0.0092	5.01	32
G101	2/14/2023	Other	6.24	<0.0092	5.29	41
G101	12/14/2016	Other	6.7	<0.025	--	35
G101	3/7/2017	Other	6	<0.025	--	37
G101	11/30/2017	Other	6.6	<0.025	--	35
G101	6/19/2018	Other	6.7	<0.025	--	49
G101	3/27/2019	Other	6.7	<0.025	--	46
G101	9/9/2019	Other	6.3	<0.025	--	35
G101	3/30/2020	Other	6.76	<0.025	3.79	41
G101	9/23/2020	Other	6.51	<0.025	--	37
G101	9/20/2021	Other	6.4	<0.025	--	36
G101	3/14/2022	Other	6.48	<0.025	4.34	38
G101	9/20/2022	Other	6.58	<0.0092	--	38
G101	6/14/2017	Other	6.4	<0.025	--	51
G101	3/25/2021	Other	6.51	<0.025	4.36	37
G101	7/19/2017	Other	6.7	<0.025	4.68	52
G101	12/22/2015	Other	6.5	<0.025	--	33
G101	3/16/2016	Other	6.6	<0.025	--	86

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G101	6/14/2016	Other	6.3	<0.025	--	53
G101	9/13/2016	Other	6.4	<0.025	--	47
G101	12/6/2018	Other	6.7	<0.025	--	54
G101	3/21/2023	Other	6.59	0.0525	13.2	49
G102	3/7/2017	Other	5.8	<0.025	--	22
G102	11/30/2017	Other	6.3	<0.025	--	20
G102	6/19/2018	Other	6.5	<0.025	--	50
G102	3/27/2019	Other	6.5	<0.025	--	44
G102	9/9/2019	Other	6.1	<0.025	--	34
G102	3/30/2020	Other	6.48	<0.025	2.5	38
G102	9/23/2020	Other	6.24	<0.025	--	34
G102	9/20/2021	Other	6.38	<0.025	--	38
G102	3/14/2022	Other	6.37	<0.025	3.21	30
G102	9/20/2022	Other	6.44	<0.0092	--	41
G102	6/14/2017	Other	6.1	<0.025	--	27
G102	3/25/2021	Other	6.46	<0.025	2.64	35
G102	3/10/2023	Other	6.31	<0.02	3.6	40
G102	7/19/2017	Other	6.4	<0.025	3.3	28
G102	12/22/2015	Other	6.9	<0.025	--	15
G102	3/16/2016	Other	6.4	<0.025	--	58
G102	6/14/2016	Other	6.1	<0.025	--	65
G102	9/13/2016	Other	5.8	<0.025	--	49
G102	12/6/2018	Other	6.4	<0.025	--	28
G102	12/15/2016	Other	6.2	<0.025	--	24
G103	12/23/2015	Other	7.25	--	--	--
G104	6/23/2014	Other	6.8	<0.02	--	<50.0
G104	9/9/2014	Other	6.89	<0.02	--	<50.0
G104	12/9/2014	Other	6.9	0.0837	--	<50.0
G104	3/20/2015	Other	6.29	<0.02	--	--
G105	3/7/2017	Other	5.7	<0.025	--	12
G105	11/30/2017	Other	6.3	<0.025	--	12
G105	6/19/2018	Other	6.3	<0.025	--	12
G105	3/27/2019	Other	6.3	<0.025	--	11
G105	9/9/2019	Other	6.1	<0.025	--	12
G105	3/30/2020	Other	6.32	<0.025	9.11	13
G105	9/23/2020	Other	6.22	<0.025	--	16
G105	9/20/2021	Other	6.06	<0.025	--	13
G105	3/14/2022	Other	6.18	<0.025	8.95	12
G105	9/20/2022	Other	6.14	<0.0092	--	11



Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G105	6/14/2017	Other	6.1	<0.025	--	16
G105	3/25/2021	Other	6.13	<0.025	8.53	12
G105	3/10/2023	Other	6.03	<0.011	8.78	12
G105	7/19/2017	Other	6.4	<0.025	8.8	13
G105	12/22/2015	Other	6.6	<0.025	--	12
G105	3/16/2016	Other	6.4	<0.025	--	11
G105	6/14/2016	Other	6.4	<0.025	--	12
G105	9/13/2016	Other	6.4	<0.025	--	13
G105	12/6/2018	Other	6.2	<0.025	--	11
G105	12/15/2016	Other	6.2	<0.025	--	11
G106	12/23/2015	Other	6.34	--	--	--
G107	3/7/2017	Other	6.1	<0.025	--	93
G107	11/30/2017	Other	6.5	0.0295	--	88
G107	6/19/2018	Other	6.6	<0.025	--	77
G107	3/27/2019	Other	6.4	<0.025	--	30
G107	9/9/2019	Other	6.5	0.0373	--	112
G107	3/30/2020	Other	6.68	<0.025	24.8	89
G107	9/23/2020	Other	6.73	0.0353	--	101
G107	9/20/2021	Other	6.64	0.0282	--	67
G107	3/14/2022	Other	6.42	<0.025	21.3	40
G107	9/20/2022	Other	6.59	<0.023	--	49
G107	6/14/2017	Other	6.4	<0.025	--	50
G107	3/25/2021	Other	6.48	0.0291	19.5	54
G107	3/10/2023	Other	6.42	<0.023	20.6	42
G107	7/19/2017	Other	6.8	<0.025	26.7	123
G107	12/22/2015	Other	6.9	0.0365	--	29
G107	3/16/2016	Other	6.3	<0.025	--	11
G107	6/14/2016	Other	6.9	0.0311	--	58
G107	9/13/2016	Other	6.7	<0.025	--	127
G107	12/6/2018	Other	6.6	0.027	--	72
G107	12/15/2016	Other	6.6	<0.025	--	67
G108	12/23/2015	Other	7.04	--	--	--
G109	3/7/2017	Other	6	<0.025	--	37
G109	11/30/2017	Other	6.5	<0.025	--	48
G109	6/19/2018	Other	6.9	0.0277	--	100
G109	9/5/2018	Other	7	--	--	77
G109	3/27/2019	Other	6.7	0.0309	--	55
G109	9/9/2019	Other	6.5	0.0255	--	59
G109	3/30/2020	Other	6.76	0.0272	8.21	41

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G109	9/23/2020	Other	6.6	<0.025	--	42
G109	9/20/2021	Other	6.54	<0.025	--	27
G109	3/14/2022	Other	6.55	<0.025	7.91	30
G109	9/20/2022	Other	6.49	<0.014	--	21
G109	6/14/2017	Other	6.5	<0.025	--	68
G109	3/25/2021	Other	6.35	<0.025	6.16	32
G109	3/10/2023	Other	6.32	<0.018	7.7	37
G109	7/19/2017	Other	6.7	<0.025	7.34	65
G109	12/22/2015	Other	6.7	0.0315	--	23
G109	3/16/2016	Other	6.5	<0.025	--	22
G109	6/14/2016	Other	6.4	<0.025	--	29
G109	9/13/2016	Other	6.5	<0.025	--	41
G109	12/6/2018	Other	6.7	<0.025	--	68
G109	12/15/2016	Other	6.5	<0.025	--	33
G110	12/23/2015	Other	6.87	--	--	--
G111	3/7/2023	Other	7.05	<0.0092	8.94	16
G111	3/22/2021	Other	7.34	<0.02	9.48	17
G111	1/18/2023	Other	6.88	<0.0092	8.76	14
G111	9/1/2022	Other	7.02	0.0873	9.92	16
G111	9/27/2022	Other	7.03	0.0341	9	14
G111	10/28/2022	Other	6.9	0.0389	9.32	13
G111	11/16/2022	Other	7.11	<0.0092	8.67	16
G111	12/15/2022	Other	6.89	<0.0092	8.89	15
G111	2/15/2023	Other	6.48	<0.0092	9.14	16
G111	3/7/2017	Other	6.2	0.0308	--	29
G111	11/30/2017	Other	6.7	<0.025	--	<10.0
G111	6/19/2018	Other	6.8	<0.025	--	40
G111	3/27/2019	Other	6.8	0.0256	--	46
G111	9/9/2019	Other	5.9	0.0258	--	33
G111	3/30/2020	Other	6.68	0.03	7.49	44
G111	9/23/2020	Other	6.63	<0.025	--	31
G111	9/20/2021	Other	6.51	<0.025	--	21
G111	3/14/2022	Other	6.49	<0.025	6.03	29
G111	9/20/2022	Other	6.53	<0.013	--	19
G111	6/14/2017	Other	6.6	<0.025	--	37
G111	3/25/2021	Other	6.4	<0.025	6.06	33
G111	7/19/2017	Other	6.8	<0.025	5.97	29
G111	12/22/2015	Other	6.5	<0.025	--	27
G111	3/16/2016	Other	6.5	<0.025	--	37

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
G111	6/14/2016	Other	6.7	0.0265	--	39
G111	9/13/2016	Other	6.8	0.0251	--	23
G111	12/6/2018	Other	6.5	0.0404	--	32
G111	3/21/2023	Other	6.56	0.047	4.71	23
G111	12/15/2016	Other	6.8	<0.025	--	13
G112C	3/8/2023	Other	6.41	4.8	85.6	822
G112C	3/22/2021	Other	6.85	4.25	68.2	532
G112C	9/28/2022	Other	6.31	4.82	99.5	682
G112C	10/26/2022	Other	6.69	4.86	84.7	820
G112C	12/14/2022	Other	6.63	4.99	87.5	791
G112C	1/18/2023	Other	6.49	4.31	84.6	769
G112C	2/15/2023	Other	6.26	5.04	88.4	797
G112C	8/30/2022	Other	6.62	4.26	85.8	726
G112C	11/17/2022	Other	6.76	4.6	85.1	764
G112D	3/8/2023	Other	6.62	0.0464	24.3	13
G112D	9/28/2022	Other	6.8	0.101	26	<8.0
G112D	10/26/2022	Other	6.97	0.0457	24.3	<8.0
G112D	12/14/2022	Other	6.81	<0.0092	24.7	<6.0
G112D	1/18/2023	Other	6.71	0.0268	24.3	11
G112D	2/15/2023	Other	6.49	<0.0092	25.4	13
G112D	8/30/2022	Other	6.89	0.0367	24.8	<9.0
G112D	11/17/2022	Other	6.95	<0.012	24	<8.0
G112DD	3/8/2023	Other	7.03	0.104	17.7	10
G112DD	9/28/2022	Other	7.24	0.162	21	12
G112DD	10/26/2022	Other	7.42	0.12	18.6	13
G112DD	12/14/2022	Other	8.06	0.116	18.3	10
G112DD	8/30/2022	Other	7.31	0.109	19.9	12
G112DD	11/17/2022	Other	7.41	0.135	17.5	11
G113	3/7/2023	Other	6.53	<0.013	55.2	386
G113	3/22/2021	Other	6.86	<0.02	51.3	292
G113	9/28/2022	Other	6.36	0.0258	65.8	289
G113	10/26/2022	Other	6.57	0.0919	56.7	288
G113	9/1/2022	Other	6.6	<0.022	58.2	316
G113	11/16/2022	Other	6.58	<0.014	54.1	296
G113	12/15/2022	Other	6.38	<0.0092	57.1	314
G113	2/15/2023	Other	6.21	<0.0092	56.1	346
G113	1/19/2023	Other	6.32	<0.0092	54.2	327
TPZ114	3/10/2023	Other	6.15	<0.024	6.82	20
TPZ114	3/22/2021	Other	7.42	0.177	15.4	19



Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
TPZ114	9/1/2022	Other	6.32	0.0746	7.86	13
TPZ114	9/27/2022	Other	6.02	0.0451	7.95	19
TPZ114	11/16/2022	Other	6.51	0.0269	8.71	21
TPZ114	12/15/2022	Other	6.22	<0.0092	7.5	24
TPZ114	2/15/2023	Other	6.09	0.0254	6.36	24
TPZ114	1/19/2023	Other	6.26	<0.0092	6.42	19
TPZ114	10/27/2022	Other	6.21	0.0251	6.52	21
TPZ115	3/8/2023	Other	6.96	<0.015	38.4	197
TPZ115	1/18/2023	Other	6.93	<0.0092	36.6	178
TPZ115	9/27/2022	Other	6.91	0.0383	34.2	147
TPZ115	12/15/2022	Other	6.87	<0.0092	38.1	180
TPZ115	2/15/2023	Other	6.68	<0.0092	37.6	179
TPZ115	8/30/2022	Other	7.12	0.0354	31.2	135
TPZ115	11/17/2022	Other	7.16	<0.013	35.5	181
TPZ115	10/27/2022	Other	6.93	0.0267	39.6	170
TPZ115D	3/8/2023	Other	7.11	0.356	21.8	37
TPZ115D	1/18/2023	Other	7.13	0.349	20.8	37
TPZ115D	9/27/2022	Other	7.24	0.467	22.5	35
TPZ115D	12/15/2022	Other	7.1	0.387	22.4	39
TPZ115D	2/15/2023	Other	6.79	0.4	22.3	37
TPZ115D	8/30/2022	Other	7.13	0.382	21.9	38
TPZ115D	11/17/2022	Other	7.37	0.387	20.9	37
TPZ115D	10/27/2022	Other	7.13	0.421	22.6	36
TPZ115DD	3/8/2023	Other	7.18	0.0915	17	13
TPZ115DD	9/27/2022	Other	7.34	0.0563	17.6	11
TPZ115DD	12/15/2022	Other	7.2	0.0657	19.2	12
TPZ115DD	8/30/2022	Other	7.36	0.0423	17.7	<8.0
TPZ115DD	11/17/2022	Other	7.36	0.0684	16.4	11
TPZ115DD	10/27/2022	Other	7.24	0.0847	18.3	11
TPZ116	3/22/2021	Other	6.99	<0.02	13.6	24
TPZ117	3/22/2021	Other	6.67	<0.02	18.8	32
TPZ117D	3/7/2023	Other	6.54	0.724	29.3	228
TPZ117D	7/27/2022	Other	7.56	0.409	36.3	134
TPZ117D	3/22/2021	Other	7.09	0.0763	19.3	187
TPZ117D	11/15/2022	Other	6.7	0.36	35.6	133
TPZ117D	12/14/2022	Other	6.53	0.353	37	127
TPZ117D	1/18/2023	Other	6.48	0.495	29.8	186
TPZ117D	9/1/2022	Other	6.62	0.41	38.7	124
TPZ117D	2/15/2023	Other	6.29	0.331	35.1	126

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
TPZ117D	9/29/2022	Other	6.57	0.394	42.1	130
TPZ117D	11/4/2022	Other	6.69	0.423	35.2	135
TPZ118	3/8/2023	Western UCU	6.56	5.44	6.3	88
TPZ118	8/31/2022	Western UCU	5.97	9.54	21.6	242
TPZ118	11/15/2022	Western UCU	5.84	13.1	16.7	233
TPZ118	12/14/2022	Western UCU	5.52	14.6	19.1	263
TPZ118	10/28/2022	Western UCU	5.65	18.7	21.1	259
TPZ118	2/15/2023	Western UCU	5.04	10.9	12	250
TPZ118	1/19/2023	Western UCU	6.41	3.35	4.04	63
TPZ118	9/29/2022	Western UCU	5.99	12.1	18.6	215
TPZ118D	3/8/2023	Western UA	6.28	7.44	30.7	358
TPZ118D	8/31/2022	Western UA	6.3	5.41	32.7	351
TPZ118D	11/15/2022	Western UA	6.55	6.13	29.8	332
TPZ118D	12/14/2022	Western UA	6.6	5.85	27.1	300
TPZ118D	10/28/2022	Western UA	6.35	7.08	31.3	352
TPZ118D	2/15/2023	Western UA	6.07	7.56	30.8	329
TPZ118D	1/19/2023	Western UA	6.31	6.35	28.7	329
TPZ118D	9/29/2022	Western UA	6.17	5.74	33.6	357
TPZ118DD	3/8/2023	Western UA	7.09	0.0776	16.8	10
TPZ118DD	8/31/2022	Western UA	7.4	0.831	19.5	73
TPZ118DD	11/15/2022	Western UA	7.34	0.054	16.4	12
TPZ118DD	12/14/2022	Western UA	7.08	0.122	17.9	12
TPZ118DD	10/28/2022	Western UA	7.26	0.112	16.5	10
TPZ118DD	9/29/2022	Western UA	6.84	0.146	17.9	17
TPZ119D	3/7/2023	Western UA	6.34	4.76	33.7	175
TPZ119D	8/31/2022	Western UA	6.49	5.58	35.5	192
TPZ119D	12/14/2022	Western UA	6.44	4.59	33.6	156
TPZ119D	1/18/2023	Western UA	6.35	3.32	29	142
TPZ119D	11/16/2022	Western UA	6.48	4.35	32.4	159
TPZ119D	2/15/2023	Western UA	6.16	4.22	31.2	154
TPZ119D	9/29/2022	Western UA	6.19	4.37	35	186
TPZ119D	11/4/2022	Western UA	6.61	5.48	33.7	156
TPZ119DD	3/7/2023	Western UA	6.76	11.8	80.5	969
TPZ119DD	8/31/2022	Western UA	6.9	11.5	82	899
TPZ119DD	12/14/2022	Western UA	6.81	12.4	84.3	886
TPZ119DD	1/18/2023	Western UA	6.74	11.1	78	972
TPZ119DD	11/16/2022	Western UA	6.94	12.3	79.8	906
TPZ119DD	2/15/2023	Western UA	6.54	13.6	83.3	1030
TPZ119DD	9/29/2022	Western UA	6.88	10.9	87.6	907

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
TPZ119DD	11/4/2022	Western UA	7	14.2	85.2	906
TPZ120	3/7/2023	Western UCU	2.8	2.36	58.8	4200
TPZ120	10/26/2022	Western UCU	3.02	3.13	62.8	4600
TPZ120	9/27/2022	Western UCU	3.53	2.53	60.2	3650
TPZ120	11/16/2022	Western UCU	3.13	2.21	63.1	4530
TPZ120	12/15/2022	Western UCU	3.4	3.55	63.5	4100
TPZ120	2/15/2023	Western UCU	3.14	2.1	59.4	4550
TPZ120	8/30/2022	Western UCU	3.63	2.08	52.4	4100
TPZ120	1/19/2023	Western UCU	2.77	2.1	56.4	4280
TPZ120D	3/7/2023	Western UA	6.2	4.77	115	1020
TPZ120D	10/26/2022	Western UA	6.35	4.51	122	1020
TPZ120D	9/27/2022	Western UA	6.37	4.14	118	960
TPZ120D	11/16/2022	Western UA	6.37	4.39	118	1020
TPZ120D	12/15/2022	Western UA	6.16	5.09	121	1020
TPZ120D	2/15/2023	Western UA	6.01	5.31	112	1080
TPZ120D	8/30/2022	Western UA	6.18	3.52	126	967
TPZ120D	1/19/2023	Western UA	6.17	3.9	114	964
TPZ122	3/7/2023	Other	6.77	5.15	27	214
TPZ122	8/31/2022	Other	6.52	0.806	19.7	234
TPZ122	1/18/2023	Other	6.12	1.17	22.3	379
TPZ122	9/27/2022	Other	6.46	1.16	18.2	270
TPZ122	11/16/2022	Other	6.35	0.945	23.4	332
TPZ122	12/15/2022	Other	6.2	1.32	24	367
TPZ122	2/15/2023	Other	5.73	1.34	25.8	381
TPZ122	10/27/2022	Other	6.24	0.988	23.2	325
TPZ122D	3/7/2023	Other	6.11	1.32	26.1	395
TPZ122D	8/31/2022	Other	6.95	4.66	26.4	193
TPZ122D	1/18/2023	Other	6.77	4.36	24.7	225
TPZ122D	9/27/2022	Other	6.65	5.43	25.7	193
TPZ122D	11/16/2022	Other	6.94	5.25	25.4	193
TPZ122D	12/15/2022	Other	6.76	4.92	25.9	213
TPZ122D	2/15/2023	Other	6.46	5.54	26.8	215
TPZ122D	10/27/2022	Other	6.78	6.6	27.7	191
TPZ123	3/7/2023	Western UA	6.84	<0.023	20.5	156
TPZ123	11/3/2022	Western UA	7.2	0.027	17.6	102
TPZ123	8/31/2022	Western UA	7.21	0.0691	17.1	85
TPZ123	1/18/2023	Western UA	6.93	0.0384	26	163
TPZ123	9/27/2022	Western UA	7.2	0.0934	15.9	89
TPZ123	11/16/2022	Western UA	7.11	<0.015	16.8	121



Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
TPZ123	12/15/2022	Western UA	6.95	0.0457	17.8	122
TPZ123	2/15/2023	Western UA	6.38	0.0337	20.2	166
TPZ124	3/7/2023	Western UCU	6.17	12.2	44	357
TPZ124	8/31/2022	Western UCU	6.27	8.99	30.8	219
TPZ124	11/15/2022	Western UCU	6.57	14.1	30.8	221
TPZ124	12/14/2022	Western UCU	6.25	24.7	34.4	257
TPZ124	1/18/2023	Western UCU	6.09	10	41.6	311
TPZ124	2/14/2023	Western UCU	5.71	13.6	43.6	331
TPZ124	10/28/2022	Western UCU	6.31	16	30.5	205
TPZ124	9/29/2022	Western UCU	6.35	15.2	34.7	202
TPZ124D	3/7/2023	Western UA	6.77	2.88	45.8	394
TPZ124D	8/31/2022	Western UA	7.04	1.31	37.8	238
TPZ124D	11/15/2022	Western UA	7.07	2.21	42.5	321
TPZ124D	12/14/2022	Western UA	6.88	2.22	43.6	314
TPZ124D	1/18/2023	Western UA	6.8	2.41	44.7	313
TPZ124D	2/14/2023	Western UA	6.4	2.59	45.4	341
TPZ124D	10/28/2022	Western UA	6.84	2.46	43.9	306
TPZ124D	9/29/2022	Western UA	6.91	2.34	44.9	303
XPW01	7/21/2021	Eastern Porewater	7.27	10.1	0.917	328
XPW02	3/21/2023	Eastern Porewater	7.6	--	--	--
XPW02	5/3/2023	Eastern Porewater	7.72	13.4	12.3	2650
XPW02	3/15/2022	Eastern Porewater	7.74	16	10.7	2590
XPW02	7/21/2021	Eastern Porewater	7.76	12	11.1	2330
XPW02	5/12/2021	Eastern Porewater	7.85	10.8	11.8	2410
XPW02	4/14/2021	Eastern Porewater	7.9	11.5	11.3	2410
XPW01	3/5/2021	Eastern Porewater	8	10.4	2.25	345
XPW02	3/4/2021	Eastern Porewater	8	12.1	10.9	2380
XPW02	3/24/2021	Eastern Porewater	8	12.2	11.3	2830
XPW01	4/14/2021	Eastern Porewater	8.2	9.42	1.28	355
XPW01	3/15/2022	Eastern Porewater	8.33	10.4	0.443	360
XPW01	5/12/2021	Eastern Porewater	8.4	10.2	1.31	309
XPW01	3/24/2021	Eastern Porewater	8.4	9.58	1.7	355
XPW01	5/3/2023	Eastern Porewater	8.41	10.6	0.405	345
XPW01	3/8/2023	Eastern Porewater	8.47	8.79	0.254	414
XPW03	7/21/2021	Eastern Porewater	9.97	11.6	<0.05	148
XPW03	3/4/2021	Eastern Porewater	10.5	12.2	<0.05	133
XPW03	3/15/2022	Eastern Porewater	10.5	11.1	<0.05	152
XPW03	4/14/2021	Eastern Porewater	10.5	9.3	<0.05	152
XPW03	3/24/2021	Eastern Porewater	10.6	11.6	<0.05	138

Appendix D-1. Supporting groundwater analytical data for Table 1 and Attachments 3 and 4.

Well ID	Date	Well Type	pH (field) (SU)	Boron, total (mg/L)	Magnesium, total (mg/L)	Sulfate, total (mg/L)
XPW03	3/9/2023	Eastern Porewater	10.7	8.06	<0.021	142
XPW03	5/3/2023	Eastern Porewater	10.7	9.22	<0.03	144
XPW03	5/12/2021	Eastern Porewater	10.7	11.7	<0.1	155
XPW02	3/8/2023	Eastern Porewater	--	10.8	8.75	2450
XTPW01	3/10/2023	Western Porewater	10.8	34.3	0.0986	420
XTPW01	3/22/2021	Western Porewater	11.13	27	0.122	387
XTPW01	9/28/2022	Western Porewater	10.71	32.1	0.29	395
XTPW01	9/1/2022	Western Porewater	11.03	29.5	0.292	402
XTPW01	10/27/2022	Western Porewater	10.95	32.7	4.36	403
XTPW02	3/8/2023	Western Porewater	10.6	17.8	0.123	462
XTPW02	9/28/2022	Western Porewater	10.65	22.3	0.7	427
XTPW02	10/26/2022	Western Porewater	10.91	21.9	0.381	478
XTPW02	9/1/2022	Western Porewater	10.56	21.4	1.1	461
XTPW03	3/7/2023	Western Porewater	6.76	4.02	27.8	89
XTPW03	9/28/2022	Western Porewater	7.33	16.4	18.9	269
XTPW03	9/1/2022	Western Porewater	7.5	16.2	20.4	234
XTPW03	10/27/2022	Western Porewater	7.42	23.3	17.2	356
XTPW04	3/8/2023	Western Porewater	7.09	11.3	17	452
XTPW04	9/28/2022	Western Porewater	9.58	18.3	10	658
XTPW04	10/26/2022	Western Porewater	9.77	24.2	6.91	907
XTPW04	9/1/2022	Western Porewater	8.73	16.2	14.4	539

Notes:

mg/L = milligrams per liter

SU= standard units

< = less than analytical detection limit; data not included in Attachment 3 and 4 analyses.

-- = data not measured

Well Type: Western and Eastern as defined in main text, UA=uppermost aquifer, UCU= upper confining unit

Attachment 3: pH, boron, and magnesium data from March 2021 to May 2023. See Attachment 3 legend for full list of included wells.

Attachment 4: Magnesium and sulfate data for all sampling dates and all wells listed here.

Table 1: Inline Table 1 presents pH, boron, and magnesium data for G11, G51D, CCR Porewater, Western Groundwater, Eastern Groundwater, and TPZ120. G11, G51D, and TPZ120 data are from from March 2021 to May 2023 for those individual wells. For the same time frame, CCR Porewater includes both eastern and western porewater; Western Groundwater includes all Western UA and UCU wells except TPZ120; Eastern Groundwater includes all Eastern Compliance and Background Wells.

Appendix D-2. Supporting groundwater analytical data for Attachment 6A.

Well ID	Date	Iron (mg/L)	Oxidation Reduction Potential (mV)
G11	2021/07/06	0.071	78
G11	2021/04/14	0.084	100
G11	2021/07/20	0.036	135
G11	2023/05/03	3.35	207
G11	2021/06/01	0.086	159
G11	2021/06/14	0.052	149
G11	2023/03/08	--	166
G11	2021/03/04	0.51	69.0
G11	2021/03/24	<0.025	154
G11	2021/05/12	<0.1	194
G11	2022/07/23	0.16	122
G51D	2023/03/08	--	167
G51D	2021/03/24	--	136
G51D	2022/07/25	0.41	178
G51D	2022/03/15	--	165
G51D	2020/03/30	--	261
G51D	2023/05/03	0.82	214
G51D	2017/07/20	--	180
G51D	2019/09/09	--	157
G51D	2021/09/20	--	238
G51D	2022/09/20	--	215
G51D	2016/09/14	--	231
G51D	2017/06/15	--	168
G51D	2017/11/30	--	168
G51D	2018/06/19	--	247
G51D	2019/03/27	--	130
G51D	2020/09/23	--	292
G51D	2016/06/15	--	213
G51D	2016/12/14	--	134
G51D	2016/03/15	--	122
G51D	2018/09/05	--	217
G51D	2015/12/03	--	133
G51D	2017/03/08	--	282
TPZ118DD	2022/09/29	0.97	-65.5
TPZ118DD	2022/12/14	2.07	<-300.0
TPZ118DD	2023/03/08	2.11	-36.2
TPZ118DD	2022/10/28	1.88	-103
TPZ118DD	2022/11/15	1.60	-168



Appendix D-2. Supporting groundwater analytical data for Attachment 6A.

Well ID	Date	Iron (mg/L)	Oxidation Reduction Potential (mV)
TPZ118DD	2022/08/31	1.70	-124
TPZ119D	2023/02/15	0.10	217
TPZ119D	2022/09/29	0.12	90.1
TPZ119D	2023/03/07	0.051	104
TPZ119D	2023/01/18	0.12	76.0
TPZ119D	2022/12/14	0.095	96.0
TPZ119D	2022/11/16	0.086	38.0
TPZ119D	2022/08/31	0.80	123
TPZ119D	2022/11/04	--	196
TPZ120D	2023/02/15	0.89	123
TPZ120D	2022/12/15	1.30	212
TPZ120D	2023/01/19	1.30	178
TPZ120D	2022/08/30	16.5	-59.2
TPZ120D	2023/03/07	1.30	83.1
TPZ120D	2022/10/26	1.51	32.0
TPZ120D	2022/11/16	1.32	-3.20
TPZ120D	2022/09/27	2.68	43.2
TPZ123	2022/08/31	31.9	-78.4
TPZ123	2022/11/03	--	-89.2
TPZ123	2022/09/27	5.11	-81.7
TPZ123	2023/03/07	2.74	-24.2
TPZ123	2023/01/18	102	-116
TPZ123	2022/11/16	2.46	-116
TPZ123	2022/12/15	5.56	-64.0
TPZ123	2023/02/15	2.17	21.0
TPZ124D	2023/02/14	0.40	35.0
TPZ124D	2023/03/07	0.32	11.6
TPZ124D	2023/01/18	0.32	-8.00
TPZ124D	2022/10/28	1.13	-32.9
TPZ124D	2022/12/14	0.76	-24.0
TPZ124D	2022/09/29	1.71	-42.7
TPZ124D	2022/08/31	3.14	-63.7
TPZ124D	2022/11/15	0.82	-106
G01D	2017/03/07	--	80.0
G01D	2021/07/06	1.79	139
G01D	2023/05/02	4.09	145

Appendix D-2. Supporting groundwater analytical data for Attachment 6A.

Well ID	Date	Iron (mg/L)	Oxidation Reduction Potential (mV)
G01D	2021/06/01	1.92	164
G01D	2021/07/21	1.35	122
G01D	2022/03/14	--	117
G01D	2019/09/09	--	193
G01D	2021/06/14	0.83	160
G01D	2021/03/24	1.15	160
G01D	2021/05/12	0.65	180
G01D	2022/09/20	--	173
G01D	2021/09/20	--	170
G01D	2023/03/07	--	195
G01D	2021/03/03	1.09	145
G01D	2023/01/24	7.38	114
G01D	2016/03/15	--	-103
G01D	2017/06/15	--	123
G01D	2015/12/03	--	60.0
G01D	2019/03/27	--	118
G01D	2021/04/14	0.70	134
G01D	2020/09/23	--	202
G01D	2016/09/14	--	-26.0
G01D	2017/11/30	--	21.0
G01D	2016/12/14	--	113
G01D	2018/06/19	--	29.0
G01D	2017/07/20	--	102
G01D	2020/03/30	--	138
G01D	2016/06/15	--	-110
G01D	2018/09/05	--	131
G01D	2022/07/26	1.85	15.5
G02D	2021/07/06	<0.025	128
G02D	2021/07/21	0.059	100
G02D	2021/06/01	0.043	140
G02D	2017/06/14	--	95.0
G02D	2021/04/14	<0.025	151
G02D	2016/12/14	--	218
G02D	2021/09/20	--	191
G02D	2021/03/24	0.026	175
G02D	2021/05/12	<0.1	183

Appendix D-2. Supporting groundwater analytical data for Attachment 6A.

Well ID	Date	Iron (mg/L)	Oxidation Reduction Potential (mV)
G02D	2021/06/14	0.071	169
G02D	2023/05/03	0.049	182
G02D	2022/03/14	--	138
G02D	2022/09/21	--	199
G02D	2021/03/03	0.11	151
G02D	2019/09/09	--	186
G02D	2023/03/08	--	49.1
G02D	2020/03/30	--	179
G02D	2016/03/15	--	28.0
G02D	2016/09/14	--	69.0
G02D	2018/09/05	--	169
G02D	2019/03/27	--	130
G02D	2020/09/23	--	246
G02D	2023/01/24	<0.0115	109.8
G02D	2015/12/03	--	146
G02D	2018/06/19	--	187
G02D	2017/07/20	--	132
G02D	2016/06/15	--	82.0
G02D	2017/03/08	--	254
G02D	2017/11/30	--	70.0
G02D	2022/07/27	0.03	97.3
XTPW03	2023/03/07	0.49	50.0
XTPW03	2022/09/28	12.8	-69.5
XTPW03	2022/10/27	5.64	-136
XTPW03	2022/09/01	18.7	-174

Notes:

mg/L = milligrams per liter

mV = millivolts ; V = volts

Italicized samples not included in average iron presented in Attachment 6a due to turbidity >10NTU

WAP: West ash pond, represented by data from XTPW03

Background: Represented by data from G01D and G02D



Appendix D-3. Supporting groundwater analytical data for Attachment 6B.

Well ID	Date	pH (SU)	Temperature (Celcius)	Oxidation Reduction Potential (mV)	Eh (V)
G11	3/4/2021	5.90	16.30	69.0	0.276
G11	3/24/2021	5.90	16.50	154	0.361
G11	4/14/2021	5.80	16.10	100	0.307
G11	5/12/2021	5.90	16.50	194	0.401
G11	6/1/2021	5.82	16.40	159	0.366
G11	6/14/2021	5.86	16.60	149	0.355
G11	7/6/2021	5.78	16.70	78.0	0.284
G11	7/20/2021	5.82	16.90	135	0.341
G11	7/23/2022	6.33	17.32	122	0.328
G11	3/8/2023	5.87	16.00	166	0.373
G11	5/3/2023	5.82	16.50	207	0.414
G51D	7/20/2017	5.90	18.92	180	0.384
G51D	3/30/2020	5.62	16.40	261	0.468
G51D	3/24/2021	5.56	17.00	136	0.342
G51D	9/20/2021	5.46	17.70	238	0.443
G51D	3/15/2022	5.57	16.10	165	0.372
G51D	7/25/2022	6.92	18.07	178	0.383
G51D	3/8/2023	5.49	15.90	167	0.374
G51D	5/3/2023	5.57	16.30	214	0.421
TPZ118DD	8/31/2022	7.40	15.94	-124	0.083
TPZ118DD	9/29/2022	6.84	15.83	-65.5	0.142
TPZ118DD	10/28/2022	7.26	15.70	-103	0.104
TPZ118DD	11/15/2022	7.34	14.77	-168	0.040
TPZ118DD	12/14/2022	7.08	14.80	-300	-0.092
TPZ118DD	3/8/2023	7.09	14.70	-36.2	0.172
TPZ119D	8/31/2022	6.49	16.55	123	0.329
TPZ119D	9/29/2022	6.19	16.92	90.1	0.296
TPZ119D	11/4/2022	6.61	16.12	196	0.403
TPZ119D	11/16/2022	6.48	14.41	38.0	0.246
TPZ119D	12/14/2022	6.44	14.80	96.0	0.304
TPZ119D	1/18/2023	6.35	14.30	76.0	0.285
TPZ119D	2/15/2023	6.16	15.10	217	0.425
TPZ119D	3/7/2023	6.34	14.90	104	0.312
TPZ119DD	8/31/2022	6.90	17.25	-1.3	0.205
TPZ119DD	9/29/2022	6.88	18.56	-3.0	0.202
TPZ119DD	11/4/2022	7.00	17.05	131	0.337
TPZ119DD	11/16/2022	6.94	12.75	-54.0	0.156
TPZ119DD	12/14/2022	6.81	14.60	76.0	0.284
TPZ119DD	1/18/2023	6.74	14.00	32.0	0.241

Appendix D-3. Supporting groundwater analytical data for Attachment 6B.

Well ID	Date	pH (SU)	Temperature (Celcius)	Oxidation Reduction Potential (mV)	Eh (V)
TPZ119DD	2/15/2023	6.54	14.90	36.0	0.244
TPZ119DD	3/7/2023	6.76	14.60	2.0	0.210
TPZ120D	8/30/2022	6.18	16.31	-59.2	0.148
TPZ120D	9/27/2022	6.37	17.00	43.2	0.249
TPZ120D	10/26/2022	6.35	17.60	32.0	0.238
TPZ120D	11/16/2022	6.37	15.23	-3.2	0.204
TPZ120D	12/15/2022	6.16	14.70	212	0.420
TPZ120D	1/19/2023	6.17	14.80	178	0.386
TPZ120D	2/15/2023	6.01	15.50	123	0.330
TPZ120D	3/7/2023	6.20	14.90	83.1	0.291
TPZ123	8/31/2022	7.21	17.13	-78.4	0.128
TPZ123	9/27/2022	7.20	16.42	-81.7	0.125
TPZ123	11/3/2022	7.20	19.43	-89.2	0.115
TPZ123	11/16/2022	7.11	13.87	-116	0.093
TPZ123	12/15/2022	6.95	14.70	-64.0	0.144
TPZ123	1/18/2023	6.93	14.30	-116	0.093
TPZ123	2/15/2023	6.38	14.70	21.0	0.229
TPZ123	3/7/2023	6.84	14.60	-24.2	0.184
TPZ124D	8/31/2022	7.04	16.98	-63.7	0.142
TPZ124D	9/29/2022	6.91	16.40	-42.7	0.164
TPZ124D	10/28/2022	6.84	14.80	-32.9	0.175
TPZ124D	11/15/2022	7.07	13.82	-106	0.103
TPZ124D	12/14/2022	6.88	14.50	-24.0	0.184
TPZ124D	1/18/2023	6.80	14.00	-8.0	0.201
TPZ124D	2/14/2023	6.40	14.00	35.0	0.244
TPZ124D	3/7/2023	6.77	14.40	11.6	0.220
XTPW01	3/10/2023	10.80	14.00	-156	0.053
XTPW02	3/8/2023	10.60	13.90	-182	0.027
XTPW03	10/27/2022	7.42	14.40	-136	0.072
XTPW04	3/8/2023	7.09	13.50	-118	0.091

Notes:

SU= standard units

mV = millivolts ; V = volts



Electric Energy, Inc.  
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November 6, 2023

VIA E-MAIL  
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Re: Alternative Source Demonstration (“ASD”) for Joppa Power Plant East Ash Pond

To Whom It May Concern:

On October 21, 2023, Electric Energy, Inc. (“EEI”) submitted an ASD for the Joppa Power Plant East Ash Pond (“Joppa EAP”) to the Illinois Environmental Protection Agency (“IEPA”) pursuant to 35 Ill. Admin. Code 845.650(e). On October 23, 2023, IEPA provided notice to its listserv regarding the posting of the ASD submittal, triggering a 14-day period for written comments on the ASD submittal pursuant to 35 Ill Admin. Code 845.650(e)(3). After submittal of the Joppa EAP ASD, EEI and IEPA engaged in communications regarding the Joppa EAP ASD submittal. EEI submits this letter and its attachments, within the 14-day period for written comments, to provide additional information to IEPA in response to those communications. As explained below and in the attached materials, EEI’s October 21 ASD submittal was comprehensive in scope and used scientifically supported, industry standard methodologies.

IEPA requested certain additional data as part of its communications with EEI. While EEI does not agree that any additional data is necessary in support of the ASD submittal, EEI has compiled and is providing, as Attachment 1 to this letter, the hydraulic conductivity and boring log data requested by IEPA. No specific boring locations were referenced by IEPA in its request, therefore, boring logs for subject wells G05, G11, and G151/G51D and borings from which solid samples were collected (G03, G07, G08, G09M, and G11) have been included. Attachment 1 also includes hydraulic conductivity data referenced and provided in the October 2017 Hydrogeologic Monitoring Plan for the Joppa EAP. All of the information in Attachment 1 was previously provided or referenced in the Joppa EAP operating permit application and/or construction permit application. Additional site characterization data can also be found in the previously provided April 2023 supplemental site investigation report for the Joppa EAP. Because the supplemental site investigation report, operating permit application and construction permit application were used and relied upon in preparing the Joppa EAP ASD and all contain information IEPA has sought in connection with its review of the ASD, EEI (with this letter) is incorporating by reference the entirety of its April 2023 supplemental site investigation report, October 25, 2021 operating permit application and July 28, 2022 construction permit application for the Joppa EAP into its Joppa EAP ASD submittal.



In its communications with EEI, IEPA also requested (1) source characterization of CCR that includes total solids sampling, analysis and reporting in accordance with SW-846 leach testing methods and (2) sampling and analysis in accordance with 35 Ill. Admin. Code 845.640 of the alternative source. Collecting this information would be a considerable undertaking that EEI would not be able to complete prior to the decision deadline or within the comment period for the Joppa EAP ASD. Additionally, this information is not required by law and is unnecessary to support the Joppa EAP ASD. First, there is no requirement under Part 845 that source characterization of CCR be conducted in accordance with SW-846. While Part 845.150 incorporates by reference SW-846, that incorporation does not create an affirmative obligation to analyze all samples in accordance with SW-846. As set forth in Chapter 2 of SW-846, the methods are not “mandatory” unless specifically specified in the regulation. Groundwater samples taken under Part 845 are the only samples specifically required by Part 845 to be analyzed using SW-846. In particular, Part 845.640(e) requires groundwater samples taken under a groundwater monitoring program be analyzed in accordance with SW-846. Notably, samples collected under the Joppa EAP’s groundwater monitoring program have been analyzed in accordance with SW-846 (and were otherwise collected and analyzed in accordance with 35 Ill. Admin. Code 845.640). Attachment 2 to this letter explains how CCR source characterization was conducted for the Joppa EAP ASD and explains why the methodology used is more appropriate than SW-846 leach testing methods for characterizing the source material.

Second, there is no requirement under 35 Ill Admin. Code 845.640, 35 Ill. Admin. Code 845.650 or elsewhere in Part 845 to identify, sample or analyze an alternative source. Section 845.650(e), which governs alternative source demonstrations, simply requires a determination that a source other than the CCR surface impoundment caused the contamination and that the CCR surface impoundment did not contribute to the contamination. As described in Attachment 2, this demonstration is made through a multiple lines of evidence analysis in the Joppa EAP ASD submittal. The multiple lines of evidence analysis for the Joppa EAP ASD demonstrates, among other findings, that the cobalt contamination in well G05 is likely from naturally occurring cobalt in soil and that pH exceedances in wells G11 and G51D are consistent with iron oxidization. However, identification and a full characterization of an alternative source is not required for the ASD or necessary to determine that a source other than the Joppa EAP caused the cobalt contamination in well G05 and pH contamination in wells G11 and G51D, and that the Joppa EAP did not contribute to that contamination.

Finally, given that this submittal responds to questions and requests raised by IEPA regarding the Joppa EAP ASD, EEI hereby incorporates this letter and its attachments (including the references set forth in those attachments) into its Joppa EAP submittal.

Should you have any questions regarding the information contained in this letter or its attachments, please feel free to reach out.

Sincerely,

A handwritten signature in blue ink that reads "Dianna Tickner". The signature is written in a cursive, flowing style.

Dianna Tickner  
Sr. Director – Decommission and Demolition

## Attachments

**ATTACHMENT 1  
ADDITIONAL INFORMATION REQUESTED BY IEPA**



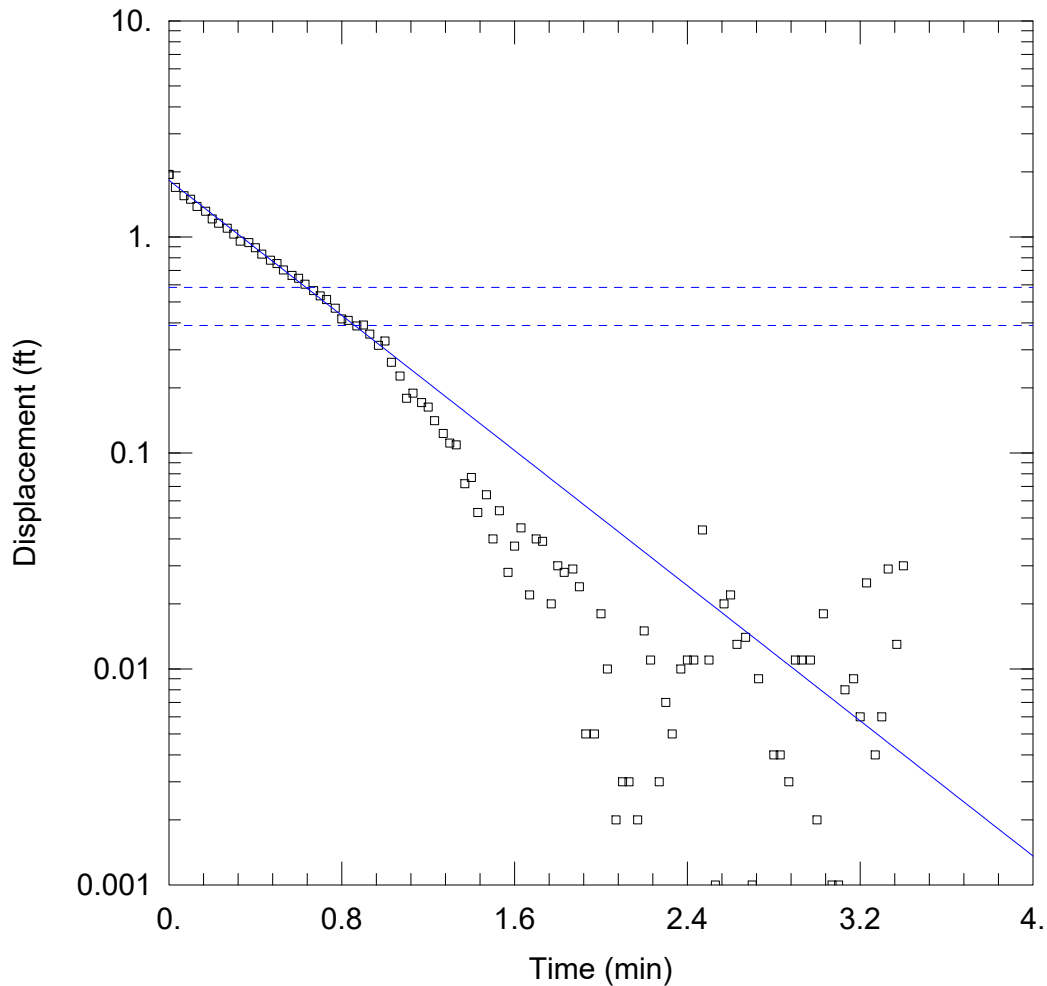
**FIELD HYDRAULIC CONDUCTIVITY TABLE AND  
SOFTWARE REPORTS**

**TABLE 3-3. FIELD HYDRAULIC CONDUCTIVITIES**  
 HYDROGEOLOGIC SITE CHARACTERIZATION REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, ILLINOIS

Well ID	Gradient Position	Bottom of Screen Elevation (ft NAVD88)	Screen Length <sup>1</sup> (ft)	Field Identified Screened Material	Slug Type	Analysis Method	Falling Head (Slug In) K (cm/s)			Rising Head (Slug Out) K (cm/s)			Average Hydraulic Conductivity (cm/s)	Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
							1	2	3	1	2	3				
<b>Uppermost Aquifer</b>																
G06	D	267.60	10.0	Gravelly Silty Clay	Solid	Bouwer-Rice	1.20E-03	1.02E-03	---	1.03E-03	8.14E-04	---	1.02E-03	4.84E-04	1.18E-02	3.10E-03
G07	D	290.34	10.0	Sand	Solid	Bouwer-Rice	6.96E-03	1.18E-02	8.98E-03	8.22E-03	1.05E-02	1.02E-02	9.45E-03			
G08	D	256.72	10.0	Sand	Solid	Bouwer-Rice	5.51E-03	5.82E-03	---	2.92E-03	3.69E-03	---	4.49E-03			
G09	D	279.19	10.0	Sandy Gravel	Solid	Bouwer-Rice	2.62E-03	---	---	1.55E-03	---	---	2.08E-03			
G10	D	280.45	10.0	Sand and Sandy Gravel	Solid	Bouwer-Rice	1.36E-03	8.69E-04	---	4.84E-04	5.25E-04	---	8.08E-04			
G11	U	297.68	10.0	Sand	Solid	Bouwer-Rice	7.15E-03	6.36E-03	---	6.72E-03	7.23E-03	---	6.86E-03			
<b>Lower Aquifer Unit</b>																
G09M	D	193.60	10.0	Bedrock	Solid	Bouwer-Rice	2.73E-04	5.82E-04	---	3.78E-04	4.16E-04	---	4.12E-04	2.73E-04	5.82E-04	3.97E-04
<b>CCR Fill</b>																
XPW-02	NA	343.53	5.0	Ash	Solid	Bouwer-Rice	9.82E-03	9.25E-03	---	4.46E-03	5.39E-03	---	7.23E-03	4.46E-03	1.65E-01	1.29E-02
XPW-03	NA	341.95	5.0	Ash	Solid	Springer-Gelhar	---	---	---	1.65E-01	---	---	1.65E-01			

Notes:  
<sup>1</sup> All wells are constructed from 2 inch PVC with 0.01 inch slotted screens.  
 --- = Test not analyzed/performed  
 CCR = coal combustion residuals  
 cm/s = centimeters per second  
 D = downgradient  
 ft = foot/feet  
 NA = Not Applicable  
 NAVD88 = North American Vertical Datum of 1988  
 U = upgradient

[O: XXX MM/DD/YY; U: CJC 08/24/21; C: LDC 08/30/21]



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-06 test 1 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:36:29

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-06

AQUIFER DATA

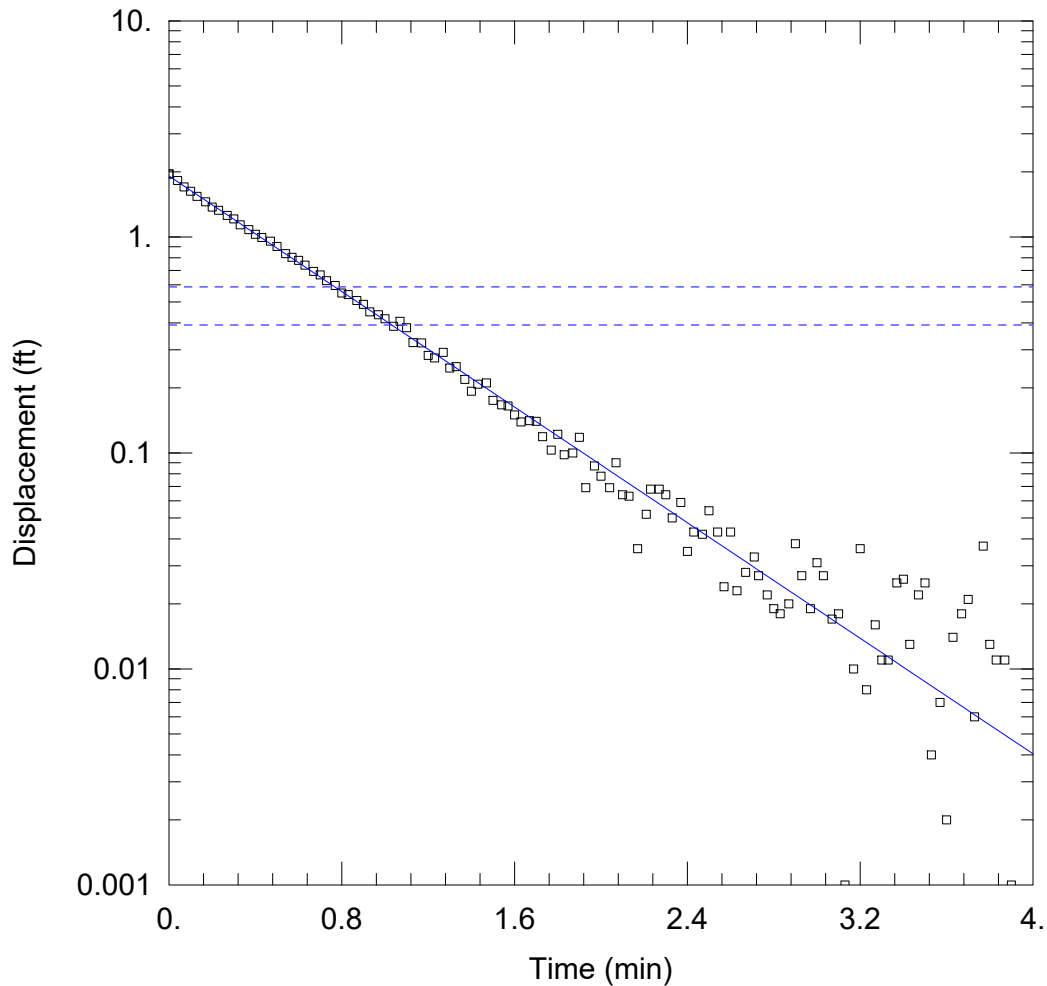
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-06 (test 1 slug in))

Initial Displacement: 1.945 ft Static Water Column Height: 52.85 ft  
 Total Well Penetration Depth: 52.85 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.001199 cm/sec y0 = 1.829 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-06 test 2 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:37:34

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-06

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio ( $K_z/K_r$ ): 0.1

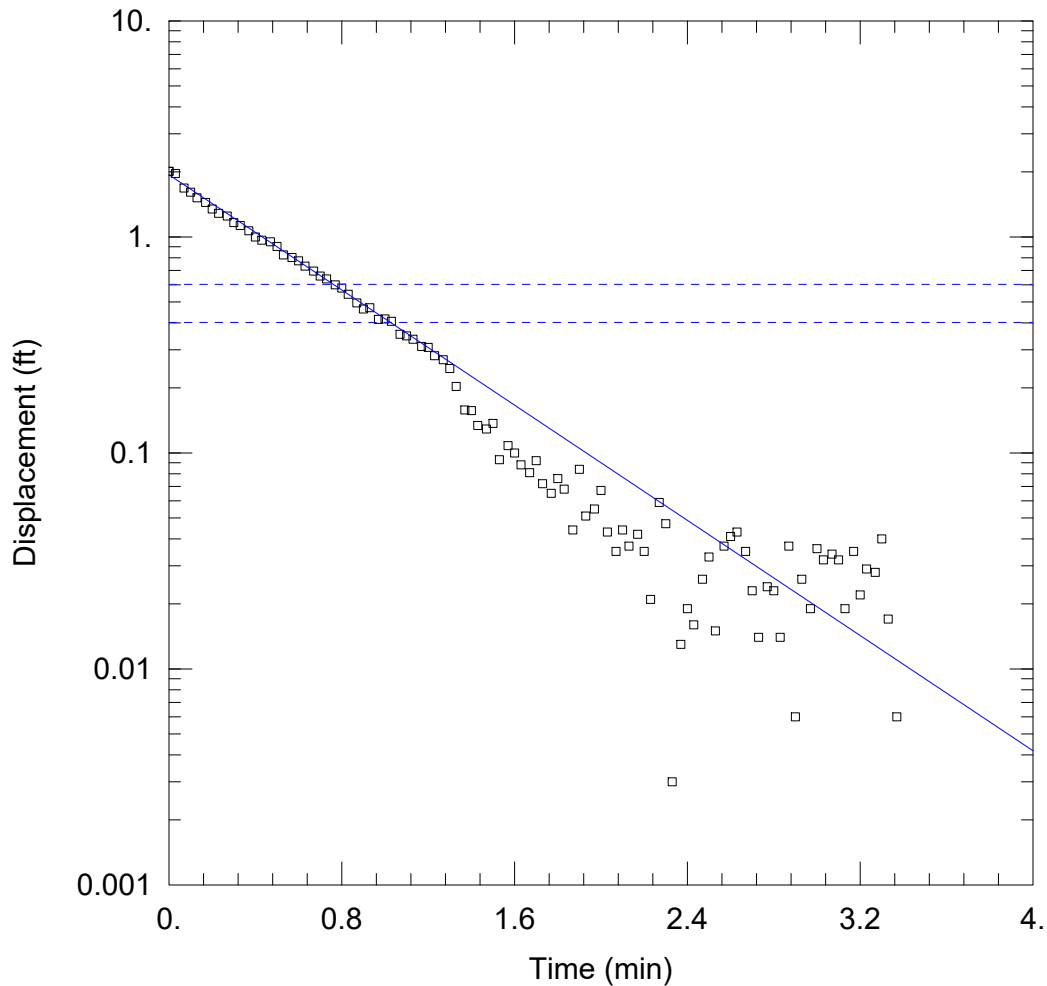
WELL DATA (G-06 (test 2 slug out))

Initial Displacement: 1.956 ft Static Water Column Height: 52.85 ft  
 Total Well Penetration Depth: 52.85 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 $K = 0.001025$  cm/sec  $y_0 = 1.915$  ft





WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-06 test 3 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:38:16

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-06

AQUIFER DATA

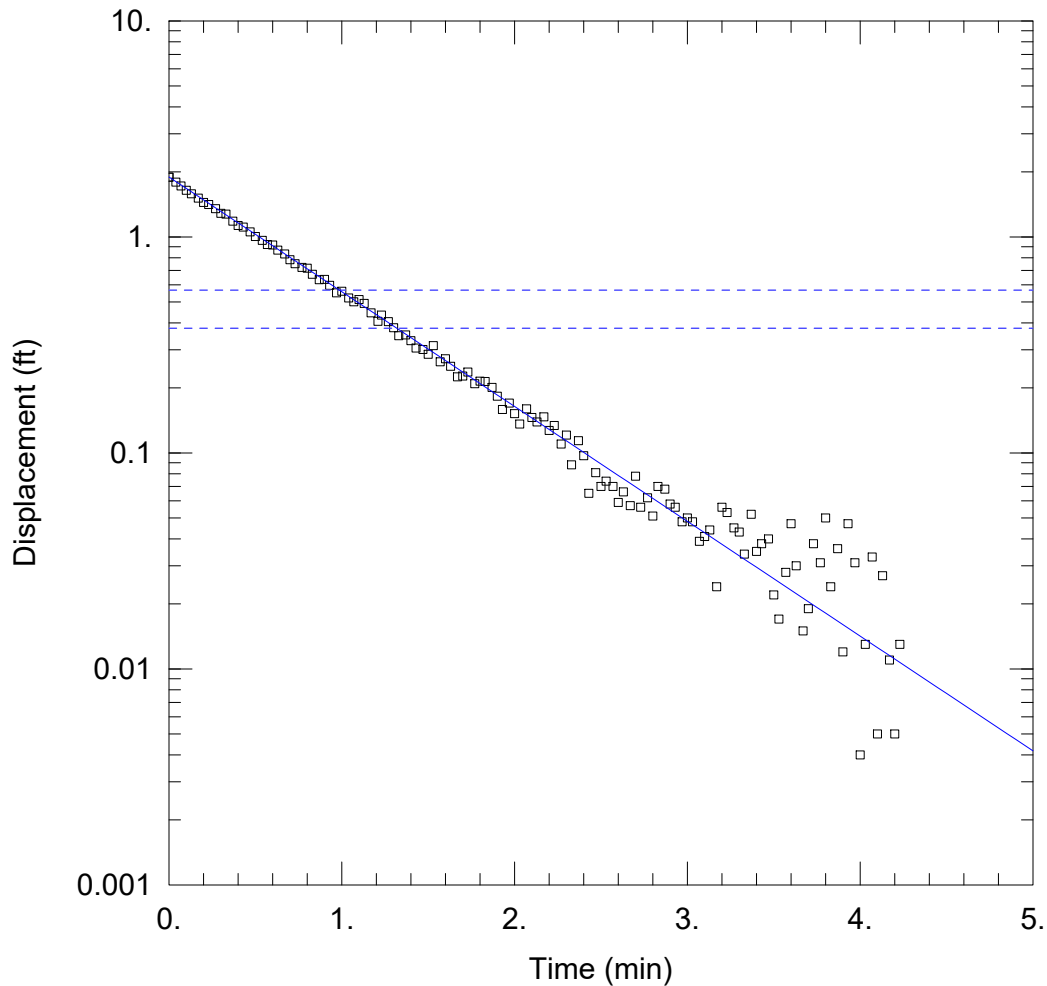
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-06 (test 3 slug in))

Initial Displacement: 2.01 ft Static Water Column Height: 52.85 ft  
 Total Well Penetration Depth: 52.85 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.001022 cm/sec  $y_0 =$  1.941 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-06 test 4 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:38:53

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-06

AQUIFER DATA

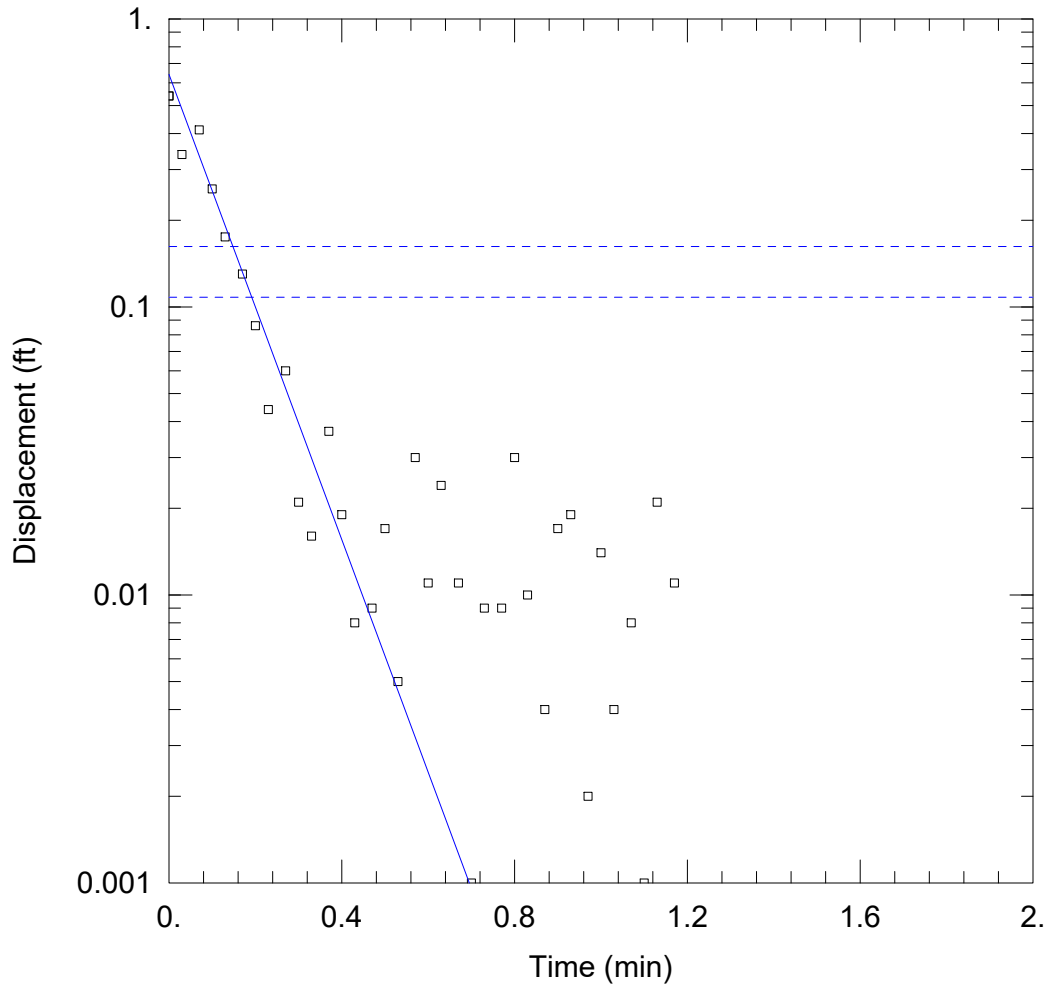
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-06 (test 4 slug out))

Initial Displacement: 1.89 ft Static Water Column Height: 52.85 ft  
 Total Well Penetration Depth: 52.85 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.0008143 cm/sec y0 = 1.895 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 1 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:41:12

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-07

AQUIFER DATA

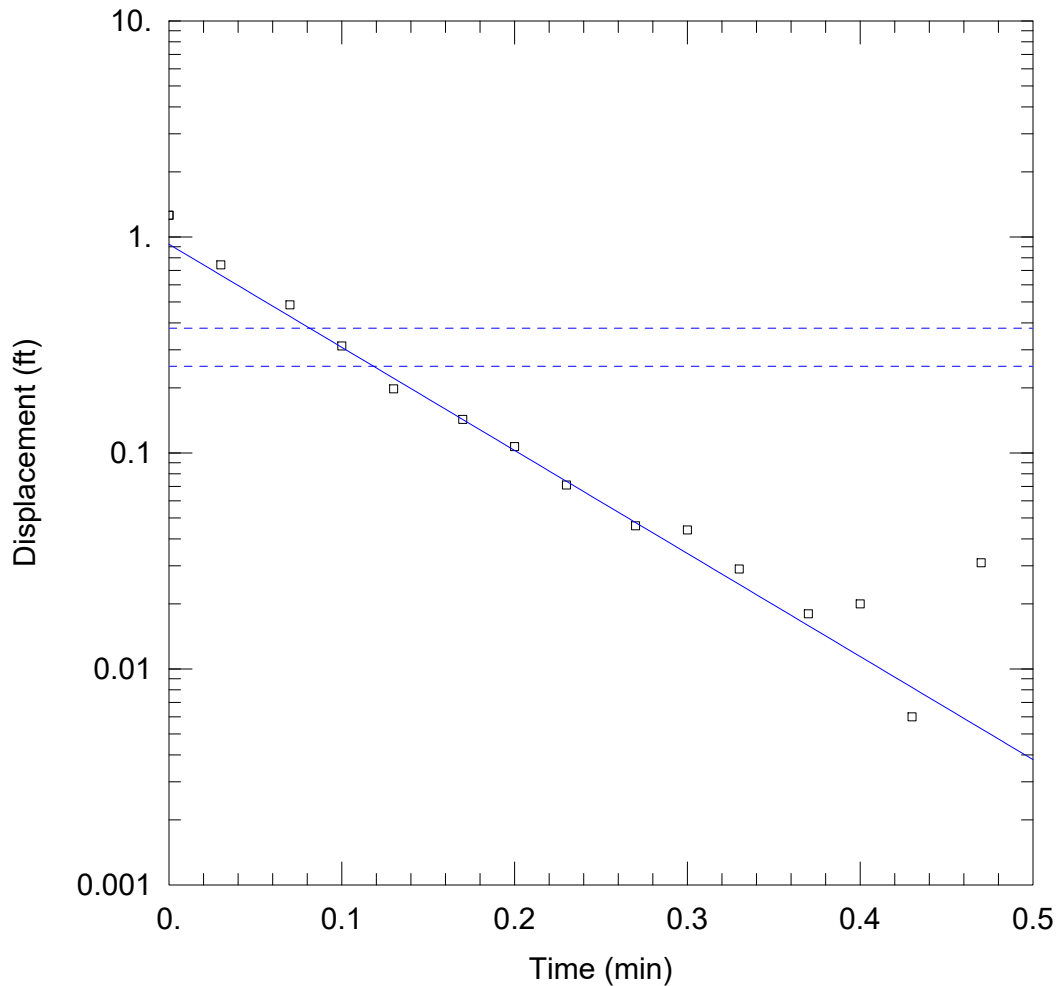
Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-07 (test 1 slug in))

Initial Displacement: 0.54 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.006959 cm/sec y0 = 0.6416 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 2 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:41:51

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: G-07

AQUIFER DATA

Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

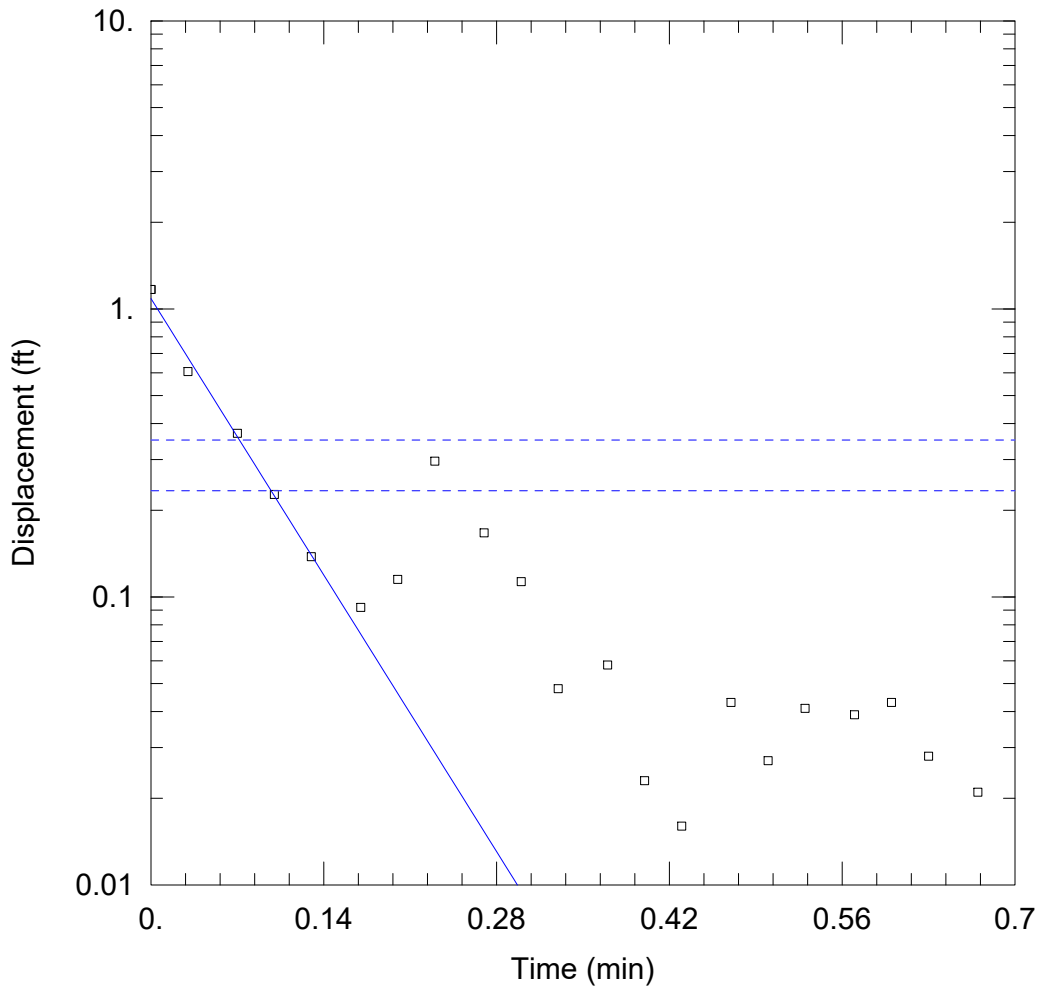
WELL DATA (G-07 (test 2 slug-out))

Initial Displacement: 1.26 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.008223 cm/sec y0 = 0.9246 ft





WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 3 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:42:56

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: G-07

AQUIFER DATA

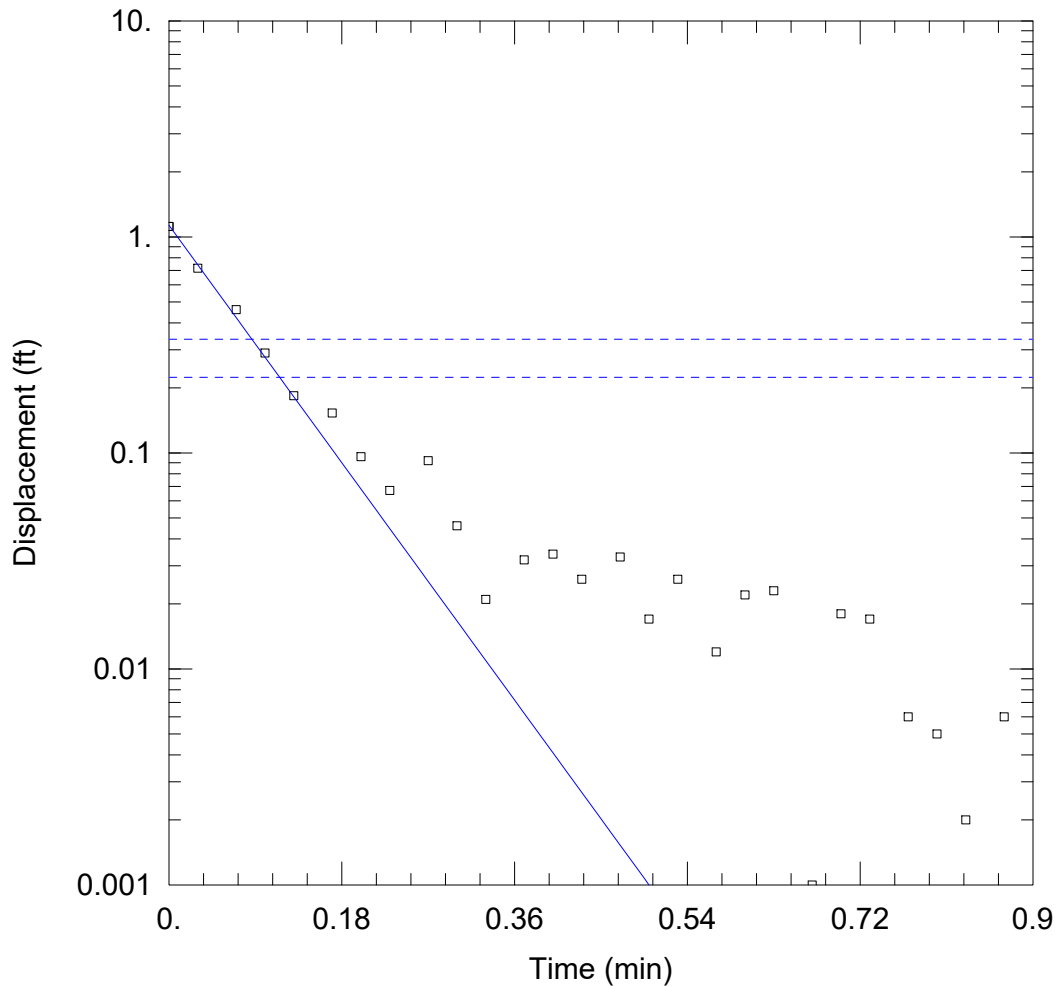
Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-07 (test 3 slug-in))

Initial Displacement: 1.168 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.01182 cm/sec  $y_0 =$  1.087 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 4 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:43:39

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-07

AQUIFER DATA

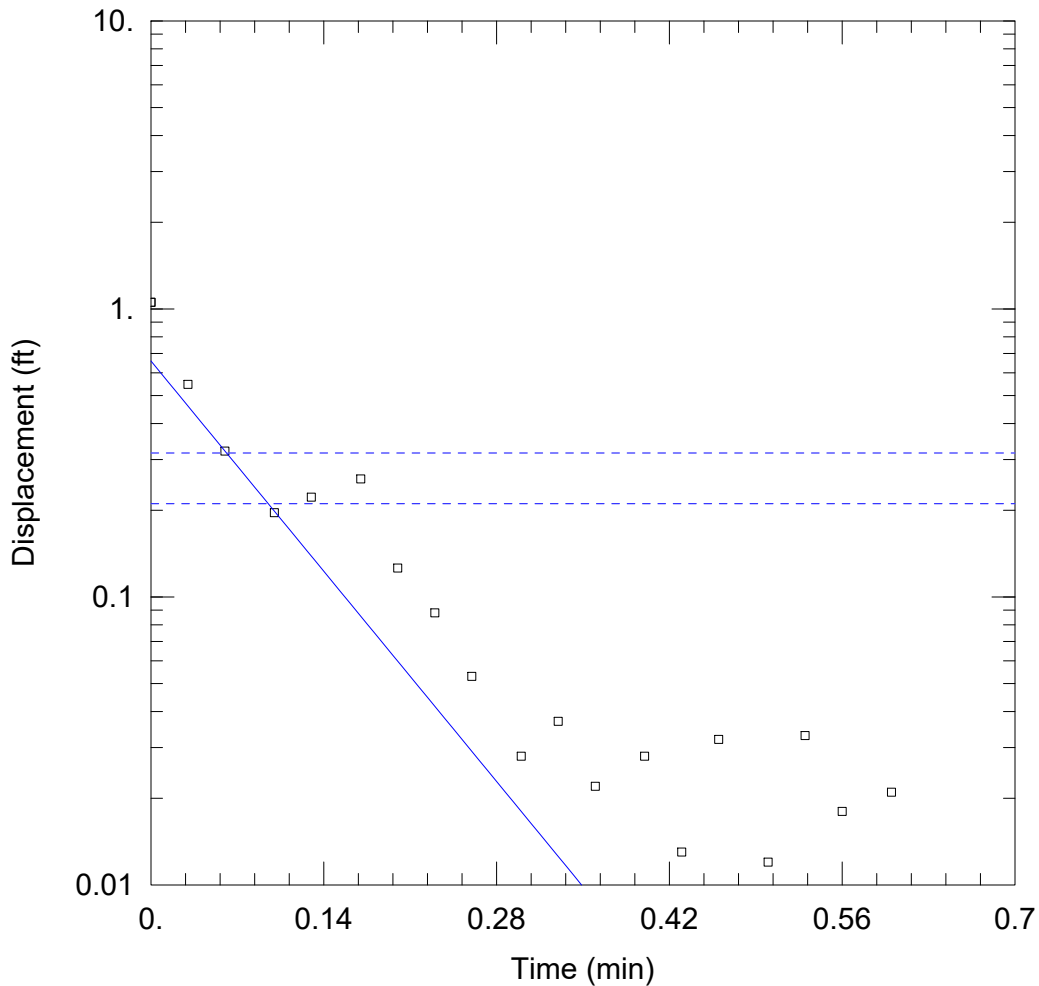
Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-07 (test 4 slug-out))

Initial Displacement: 1.119 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.01052 cm/sec y0 = 1.132 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 5 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:44:38

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-07

AQUIFER DATA

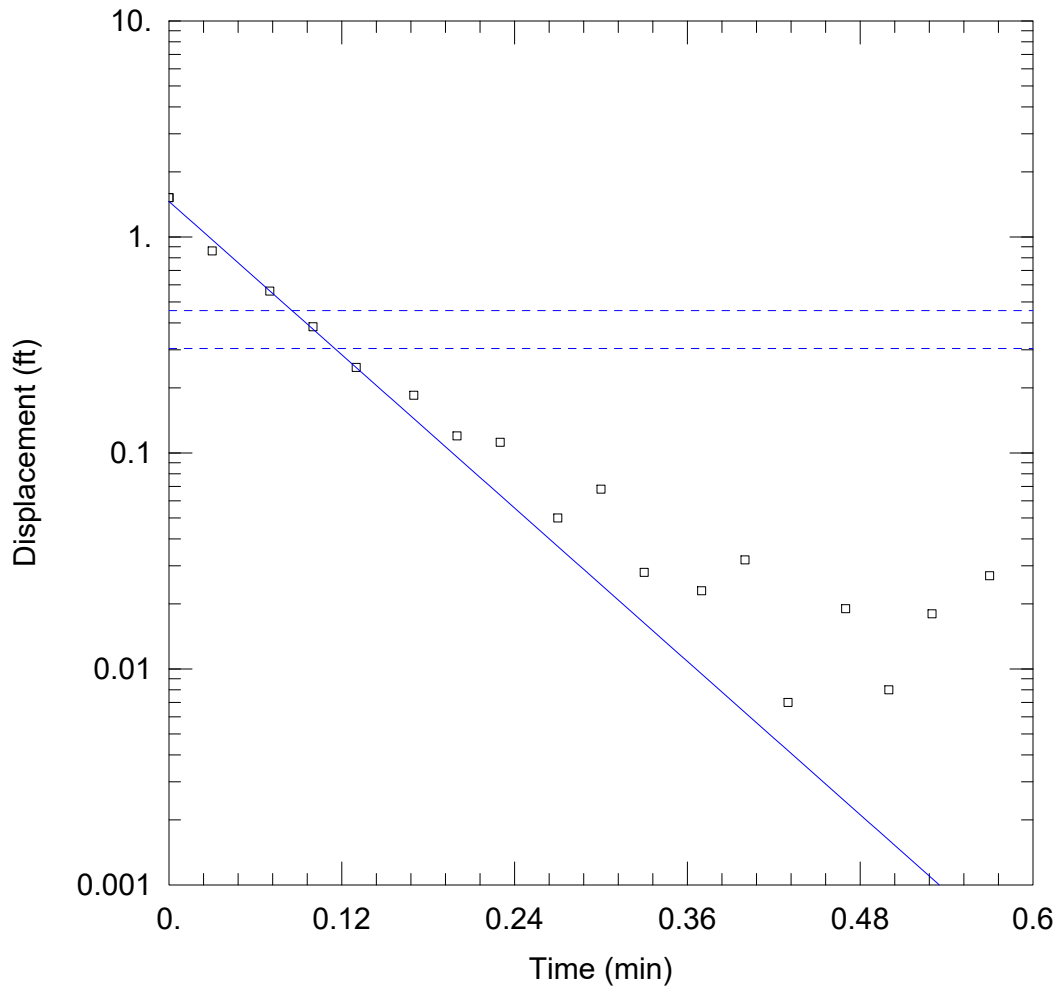
Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-07 (test 5 slug-out))

Initial Displacement: 1.054 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.008984 cm/sec y0 = 0.6591 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G-07 test 6 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:45:44

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa  
 Test Well: G-07

AQUIFER DATA

Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 0.1

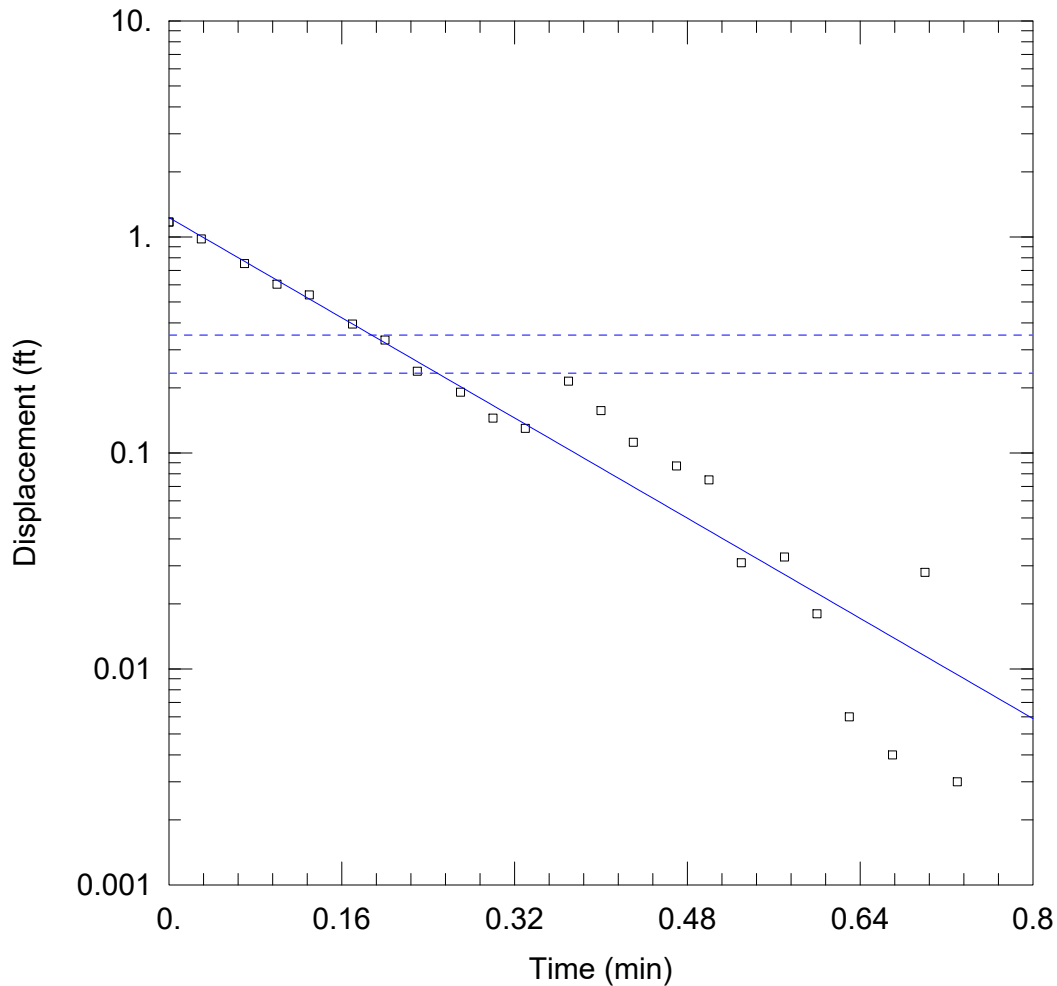
WELL DATA (G-07 (test 6 slug-out))

Initial Displacement: 1.521 ft Static Water Column Height: 23.39 ft  
 Total Well Penetration Depth: 23.39 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice  
 K = 0.01019 cm/sec  $y_0 =$  1.46 ft





WELL TEST ANALYSIS

Data Set: P:\...\G-8 test 1 (slug-in) BR.aqt  
 Date: 04/09/21

Time: 16:26:39

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-8

AQUIFER DATA

Saturated Thickness: 48. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-8 (test 1 slug-in))

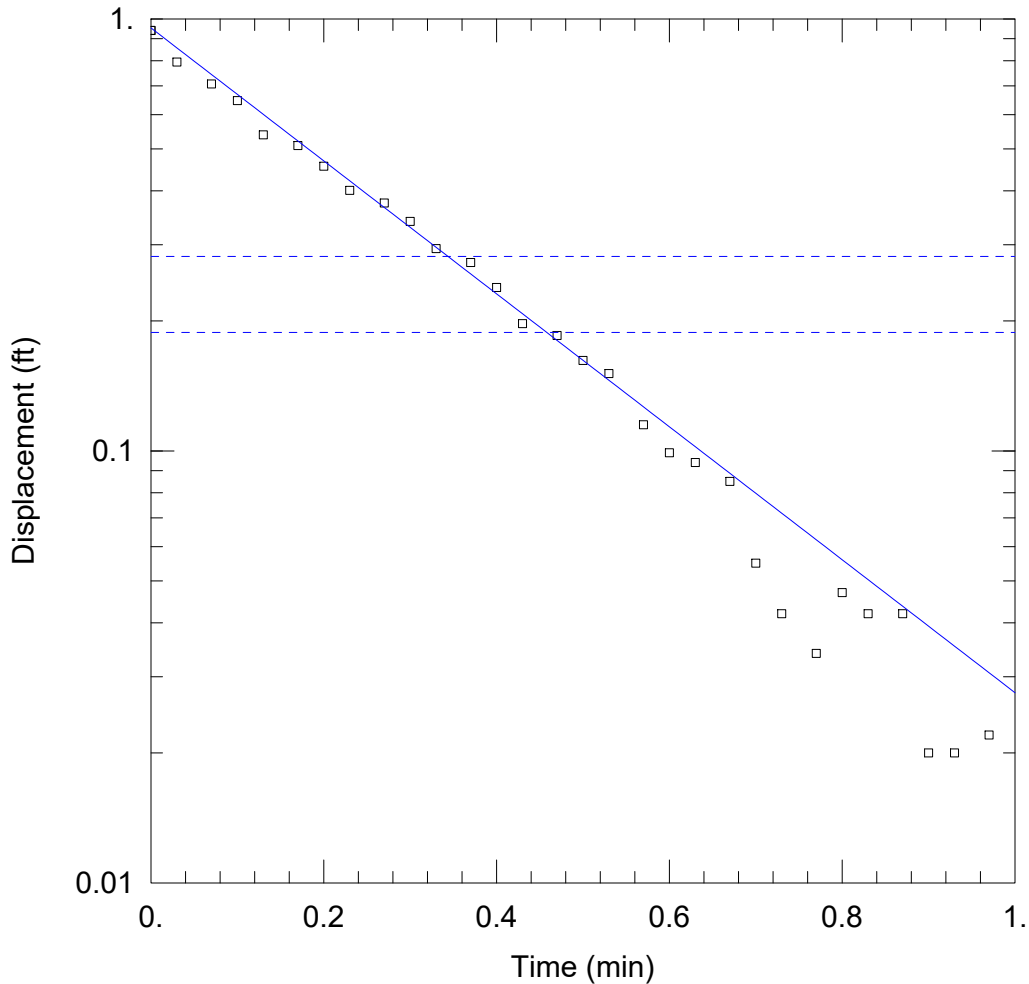
Initial Displacement: 1.17 ft  
 Total Well Penetration Depth: 48. ft  
 Casing Radius: 0.083 ft

Static Water Column Height: 60.85 ft  
 Screen Length: 10. ft  
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.005507 cm/sec

Solution Method: Bower-Rice  
 y0 = 1.229 ft



WELL TEST ANALYSIS

Data Set: P:\...\G-8 test 2 (slug-out) BR.aqt  
 Date: 04/09/21

Time: 16:29:24

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-8

AQUIFER DATA

Saturated Thickness: 48. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-8 (test 2 slug-out))

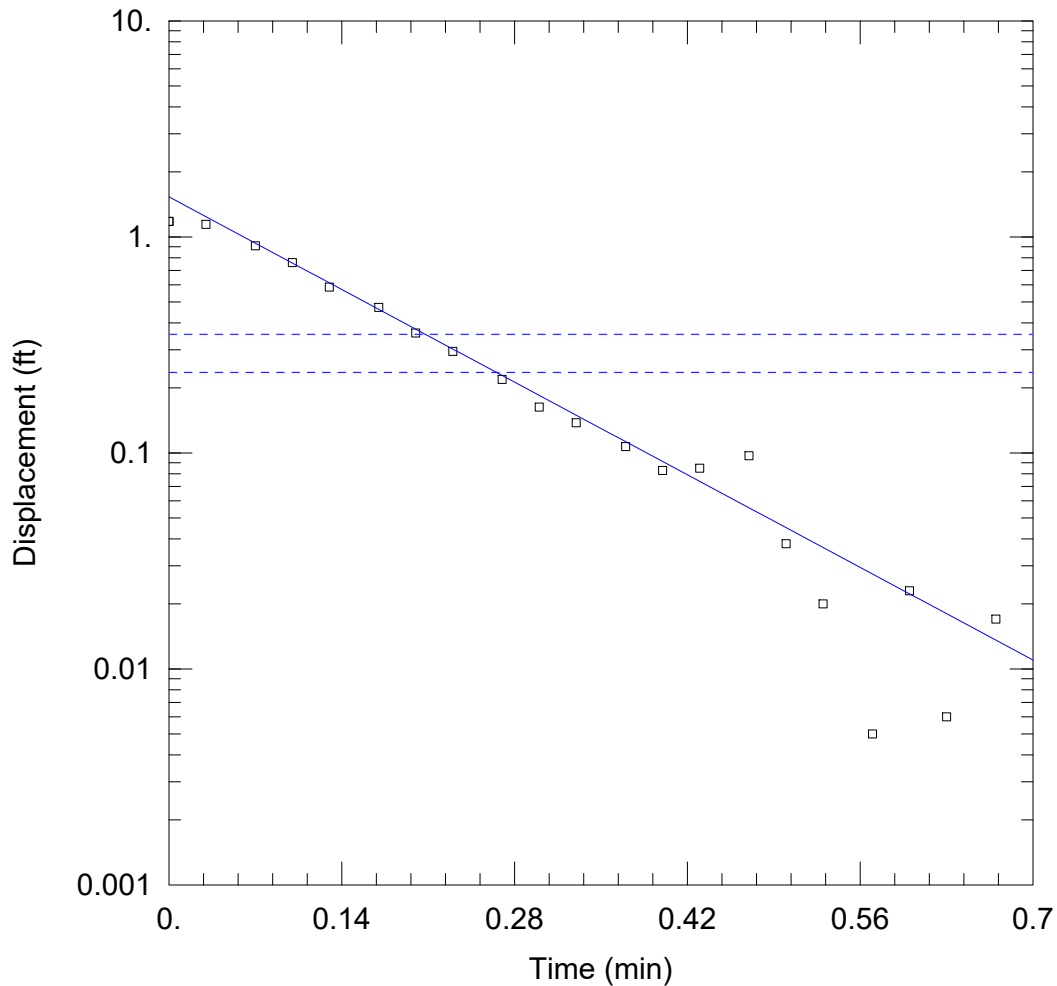
Initial Displacement: 0.94 ft  
 Total Well Penetration Depth: 48. ft  
 Casing Radius: 0.083 ft

Static Water Column Height: 60.85 ft  
 Screen Length: 10. ft  
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined  
 $K = 0.002923$  cm/sec

Solution Method: Bowser-Rice  
 $y_0 = 0.953$  ft



WELL TEST ANALYSIS

Data Set: P:\...\G-8 test 3 (slug-in) BR.aqt  
 Date: 04/09/21

Time: 16:31:33

PROJECT INFORMATION

Company: Geosyntec  
 Client: Visra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-8

AQUIFER DATA

Saturated Thickness: 48. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-8 (test 2 slug-out))

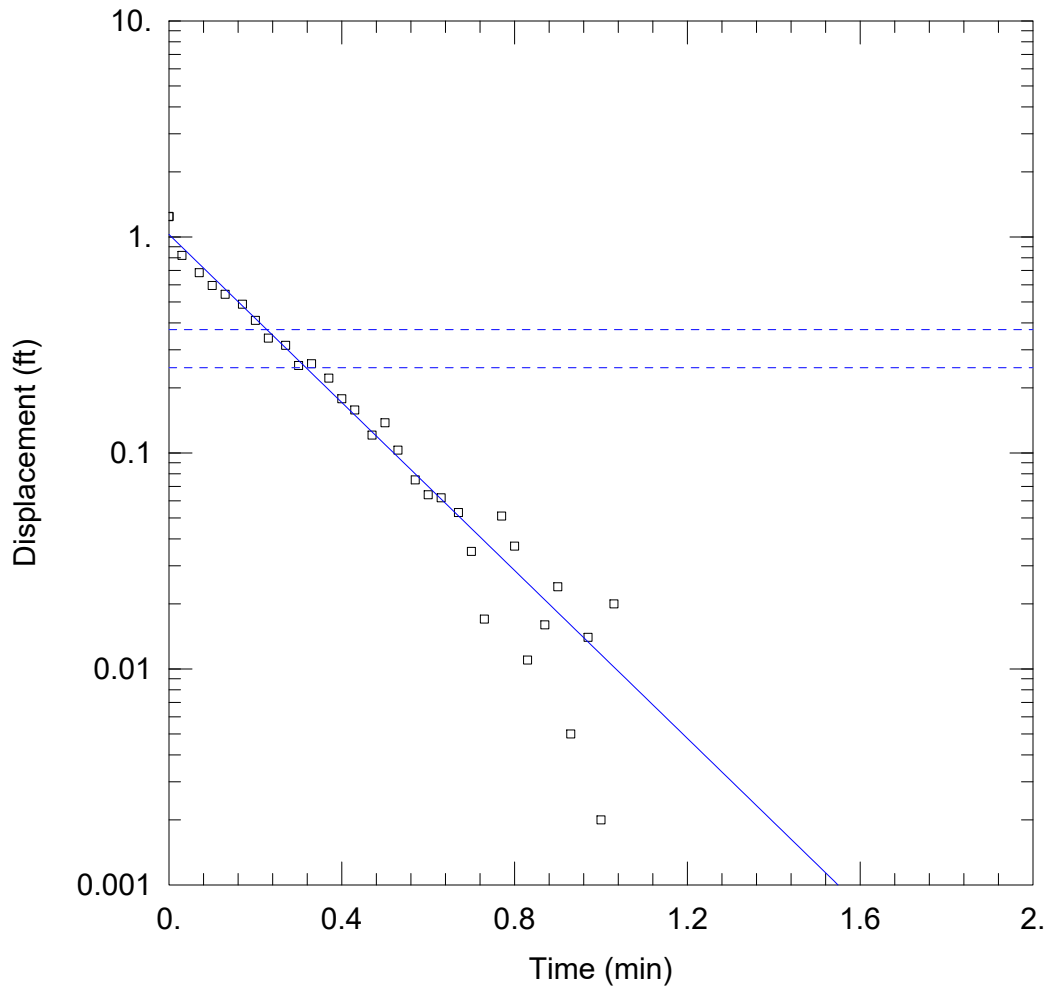
Initial Displacement: 1.18 ft  
 Total Well Penetration Depth: 48. ft  
 Casing Radius: 0.083 ft

Static Water Column Height: 60.85 ft  
 Screen Length: 10. ft  
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.005818 cm/sec

Solution Method: Bower-Rice  
 y0 = 1.532 ft



### WELL TEST ANALYSIS

Data Set: P:\...\G-8 test 4 (slug-out) BR.aqt

Date: 04/09/21

Time: 16:33:50

### PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-8

### AQUIFER DATA

Saturated Thickness: 48. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

### WELL DATA (G-8 (test 4 slug-out))

Initial Displacement: 1.24 ft

Static Water Column Height: 60.85 ft

Total Well Penetration Depth: 48. ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

### SOLUTION

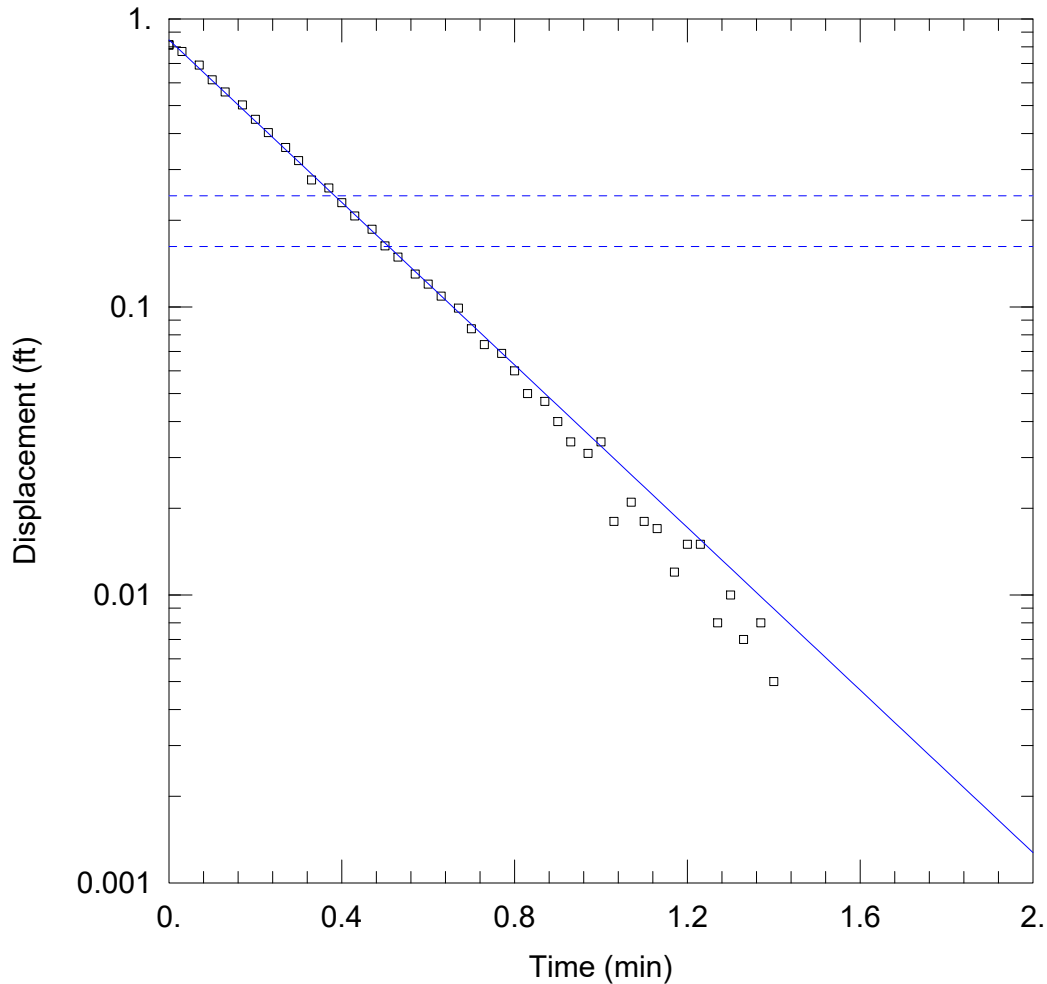
Aquifer Model: Confined

Solution Method: Bouwer-Rice

$K = 0.003693$  cm/sec

$y_0 = 1.026$  ft





WELL TEST ANALYSIS

Data Set: P:\...\G-9 test 1 (slug-in) BR.aqt  
 Date: 04/09/21

Time: 15:43:53

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-9

AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-9 (test 1 slug-in))

Initial Displacement: 0.81 ft

Static Water Column Height: 40.03 ft

Total Well Penetration Depth: 40.03 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

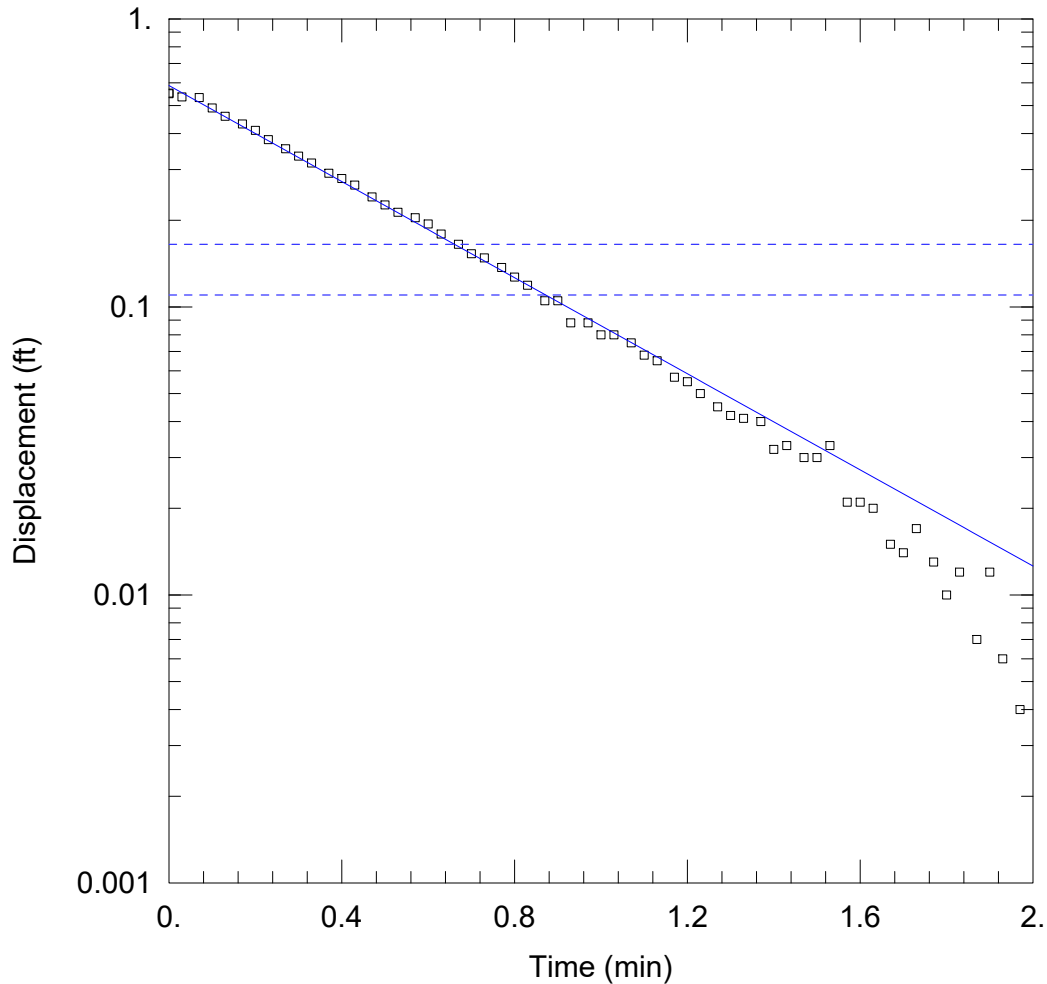
SOLUTION

Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.002618$  cm/sec

$y_0 = 0.8457$  ft



### WELL TEST ANALYSIS

Data Set: P:\...\G-9 test 2 (slug-out) BR.aqt

Date: 04/09/21

Time: 15:46:36

### PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-9

### AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

### WELL DATA (G-9 (test 2 slug-out))

Initial Displacement: 0.55 ft

Static Water Column Height: 40.03 ft

Total Well Penetration Depth: 40.03 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

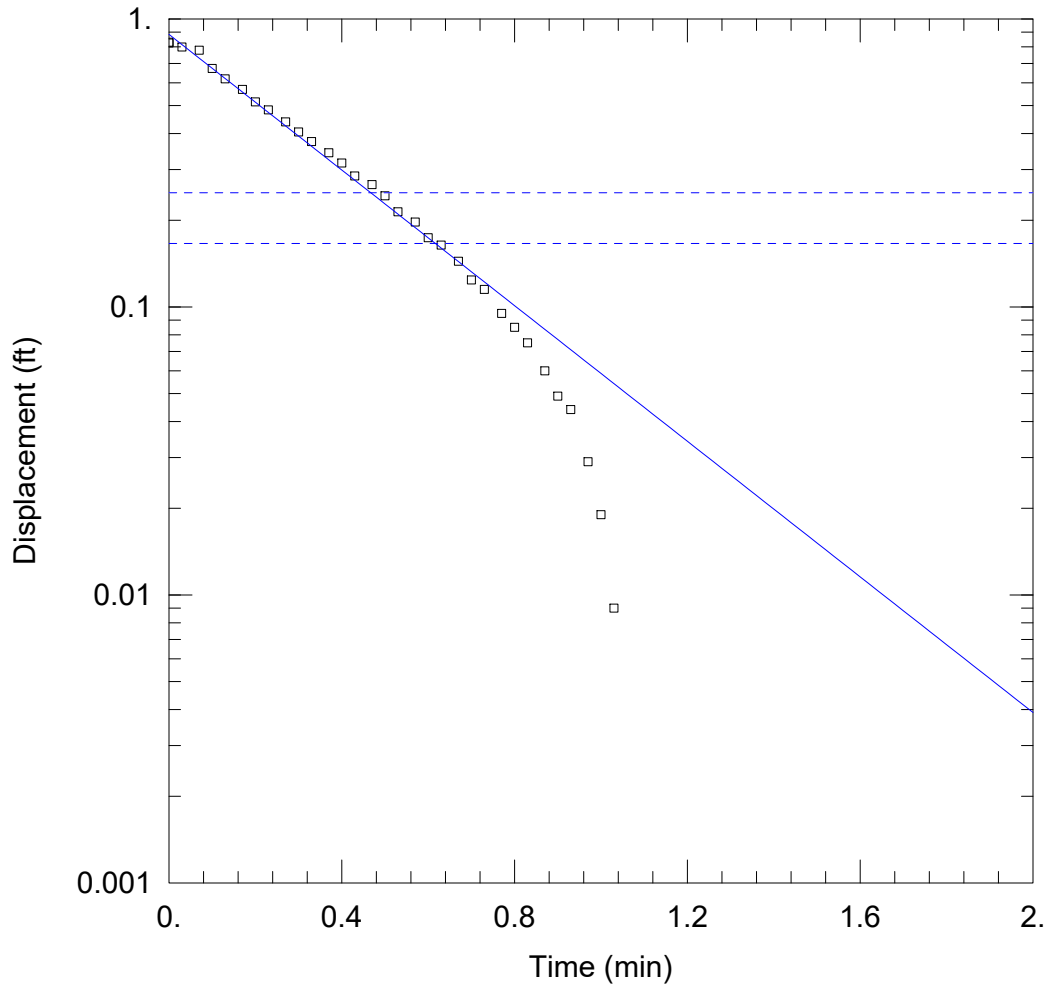
### SOLUTION

Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.001548$  cm/sec

$y_0 = 0.5873$  ft



WELL TEST ANALYSIS

Data Set: P:\...\G-10 test 1 (slug-in) BR.aqt  
 Date: 04/09/21

Time: 14:40:34

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-10

AQUIFER DATA

Saturated Thickness: 10. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-10 (test 1 slug-in))

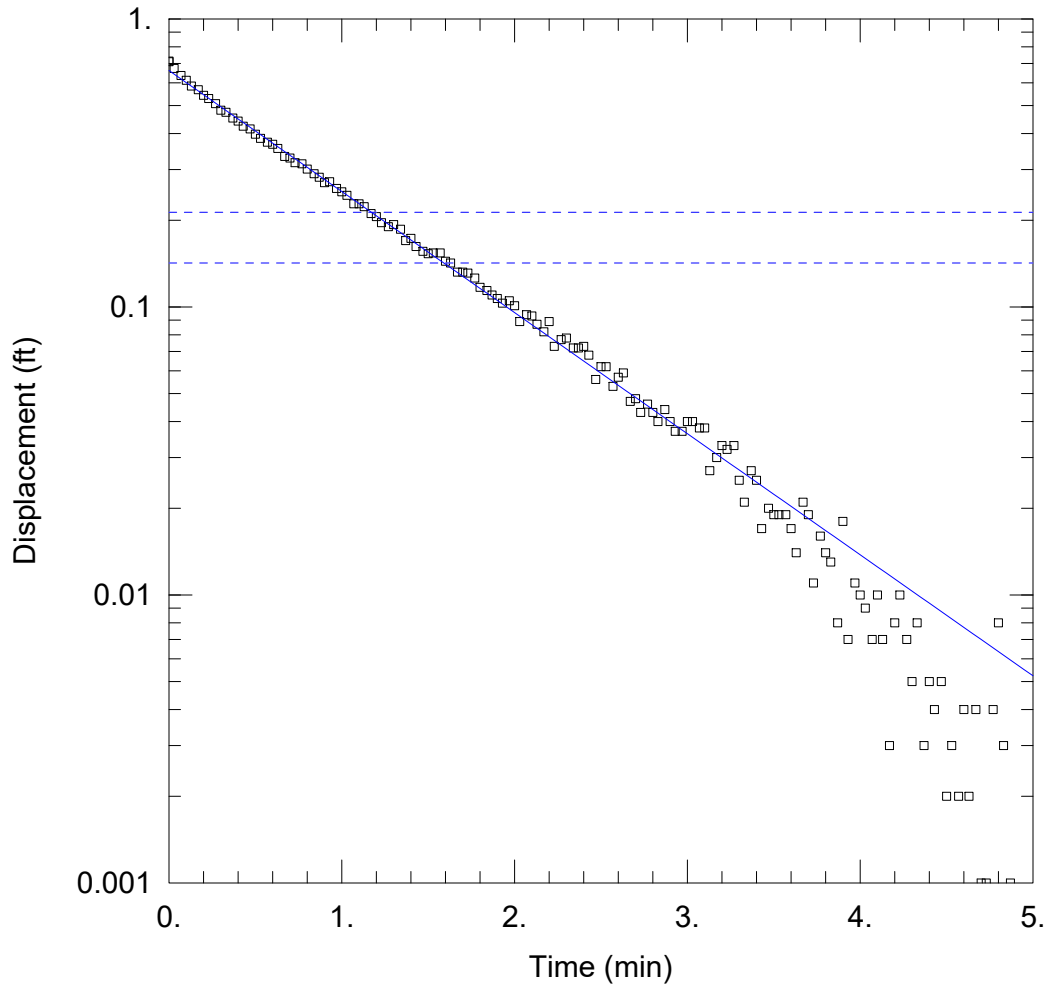
Initial Displacement: 0.83 ft  
 Total Well Penetration Depth: 10.73 ft  
 Casing Radius: 0.083 ft

Static Water Column Height: 10.73 ft  
 Screen Length: 10. ft  
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.001355 cm/sec

Solution Method: Bower-Rice  
 $y_0$  = 0.8835 ft



WELL TEST ANALYSIS

Data Set: P:\...\G-10 test 2 (slug-out) BR.aqt

Date: 04/09/21

Time: 14:42:40

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-10

AQUIFER DATA

Saturated Thickness: 10. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-10 (test 2 slug-out))

Initial Displacement: 0.71 ft

Static Water Column Height: 10.73 ft

Total Well Penetration Depth: 10.73 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

SOLUTION

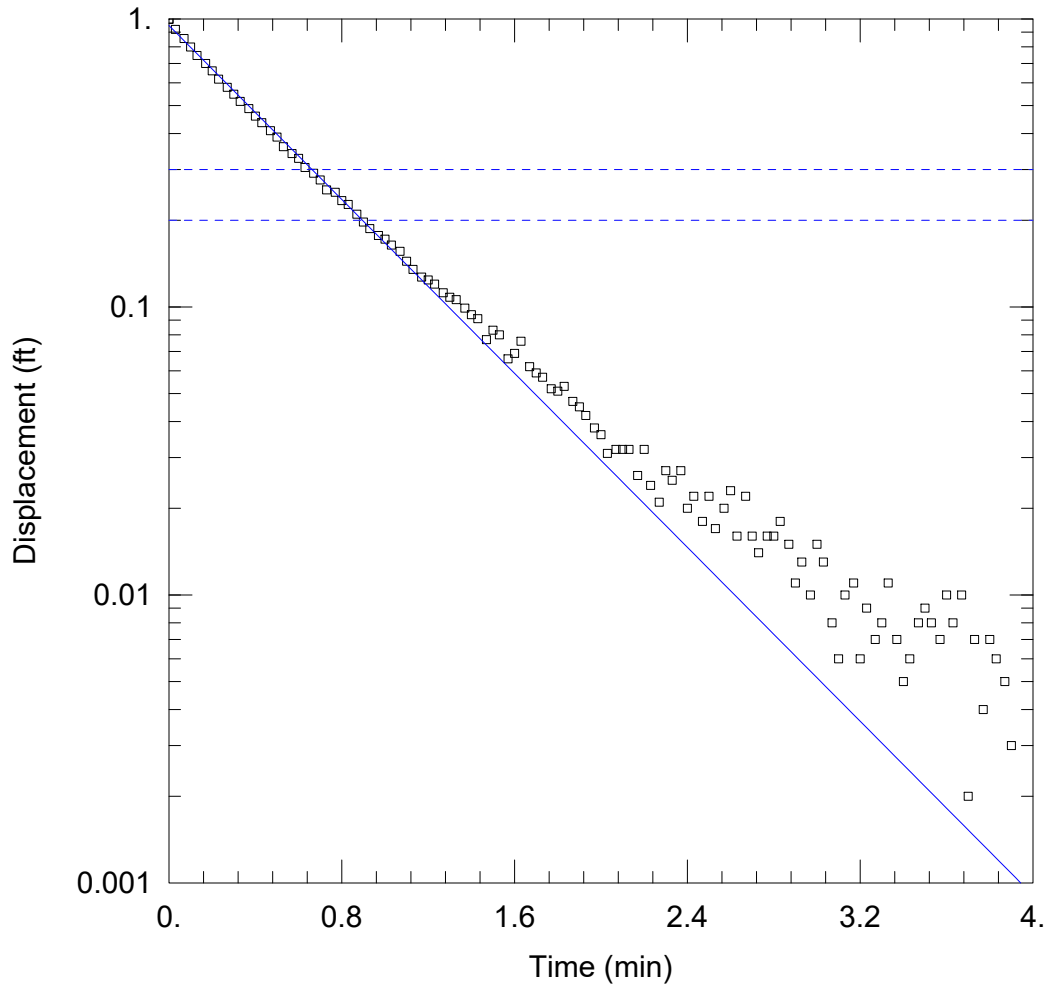
Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.0004838$  cm/sec

$y_0 = 0.662$  ft





WELL TEST ANALYSIS

Data Set: P:\...\G-10 test 3 (slug-in) BR.aqt

Date: 04/09/21

Time: 14:44:50

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-10

AQUIFER DATA

Saturated Thickness: 10. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-10 (test 3 slug-in))

Initial Displacement: 1. ft

Static Water Column Height: 10.73 ft

Total Well Penetration Depth: 10.73 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

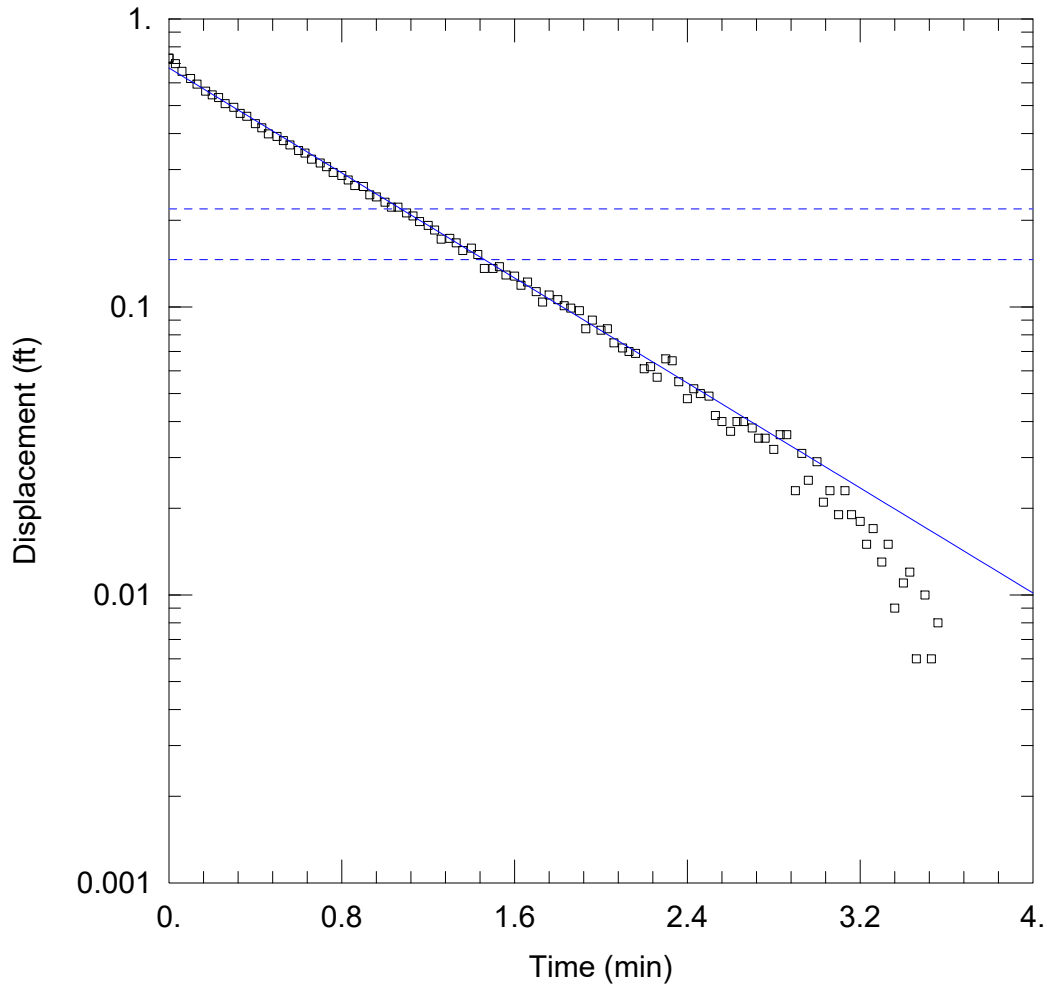
SOLUTION

Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.0008689$  cm/sec

$y_0 = 0.9483$  ft



### WELL TEST ANALYSIS

Data Set: P:\...\G-10 test 4 (slug-out) BR.aqt

Date: 04/09/21

Time: 14:46:31

### PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-10

### AQUIFER DATA

Saturated Thickness: 10. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

### WELL DATA (G-10 (test 4 slug-out))

Initial Displacement: 0.73 ft

Static Water Column Height: 10.73 ft

Total Well Penetration Depth: 10.73 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

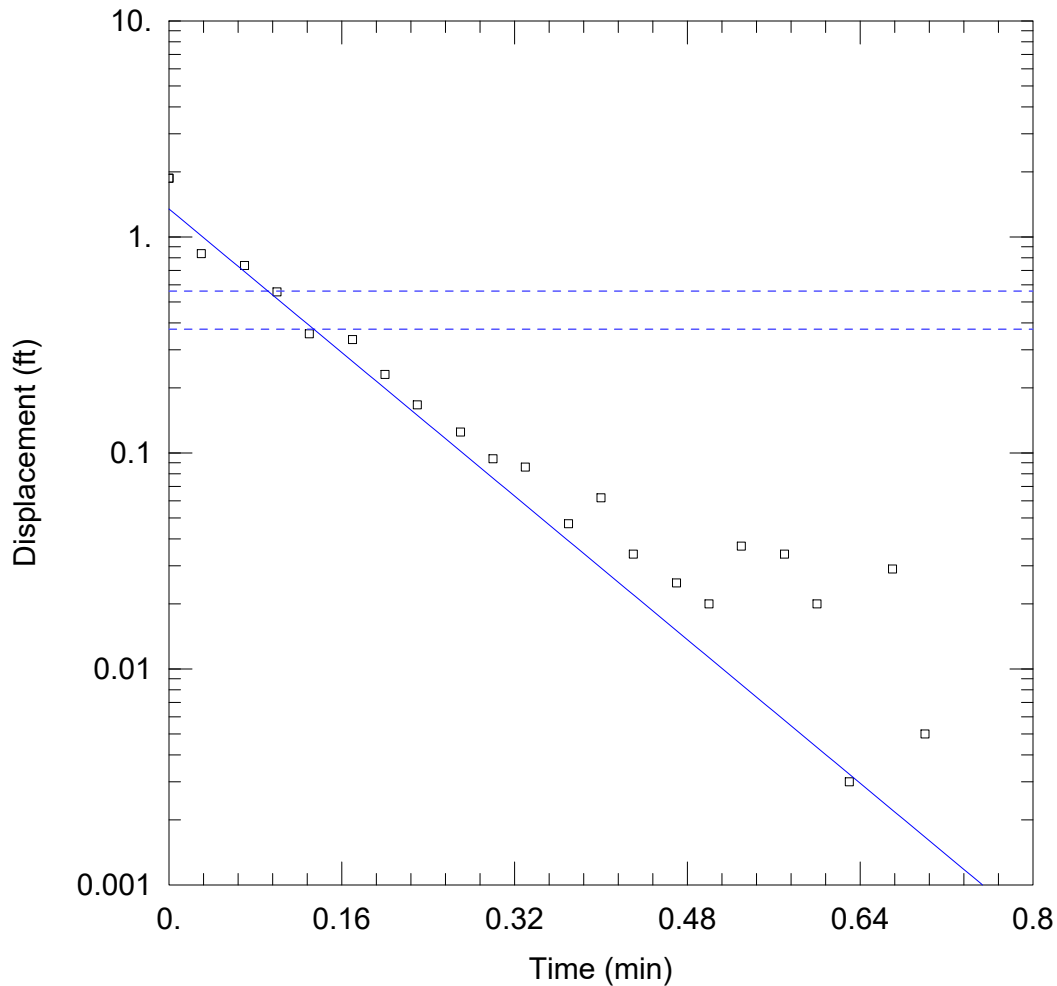
### SOLUTION

Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.0005246$  cm/sec

$y_0 = 0.6756$  ft



WELL TEST ANALYSIS

Data Set: P:\...\G-11 test 1 (slug-in) BR.aqt

Date: 04/09/21

Time: 15:09:34

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-11

AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-11 (test 1 slug-in))

Initial Displacement: 1.87 ft

Static Water Column Height: 23.2 ft

Total Well Penetration Depth: 23.2 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

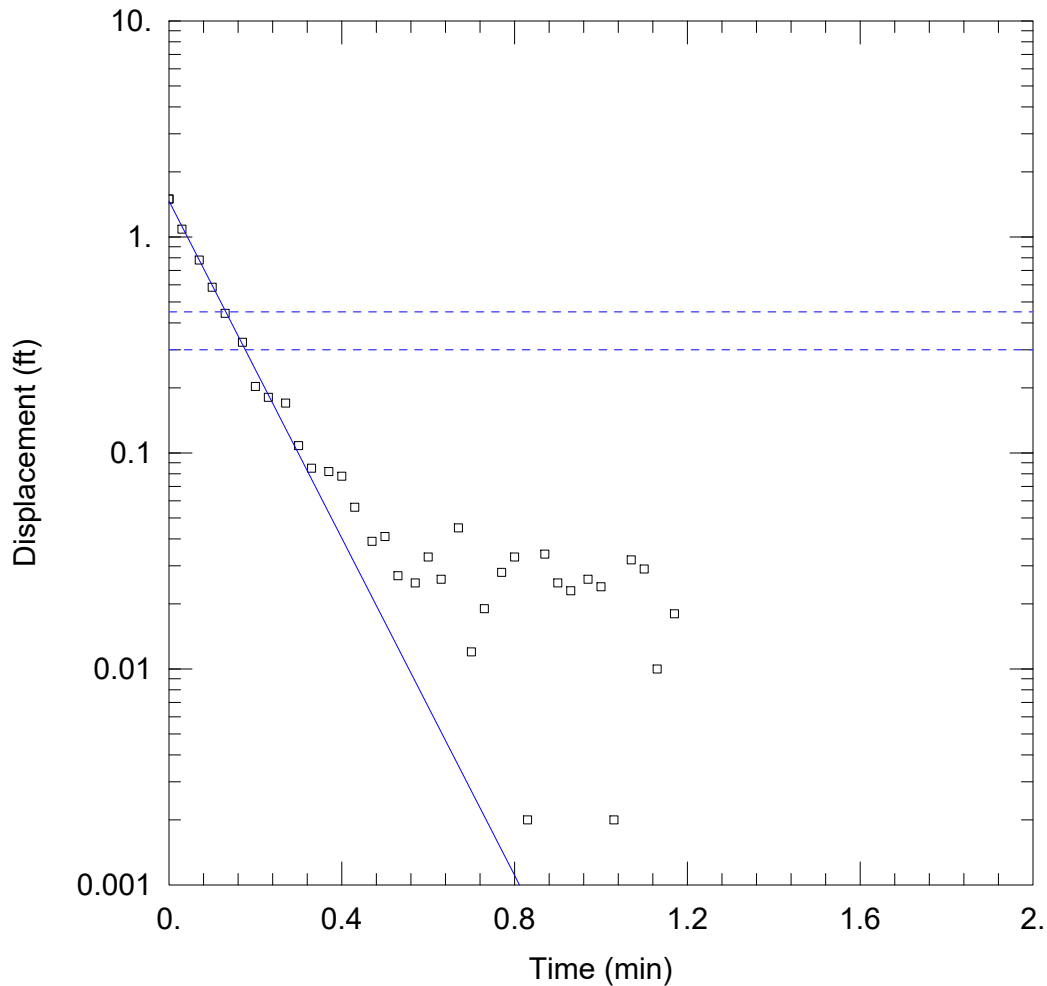
SOLUTION

Aquifer Model: Confined

Solution Method: Bowser-Rice

$K = 0.007151$  cm/sec

$y_0 = 1.348$  ft



### WELL TEST ANALYSIS

Data Set: P:\...\G-11 test 2 (slug-out) BR.aqt

Date: 04/09/21

Time: 15:11:32

### PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-11

### AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

### WELL DATA (G-11 (test 2 slug-out))

Initial Displacement: 1.5 ft

Static Water Column Height: 23.2 ft

Total Well Penetration Depth: 23.2 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

### SOLUTION

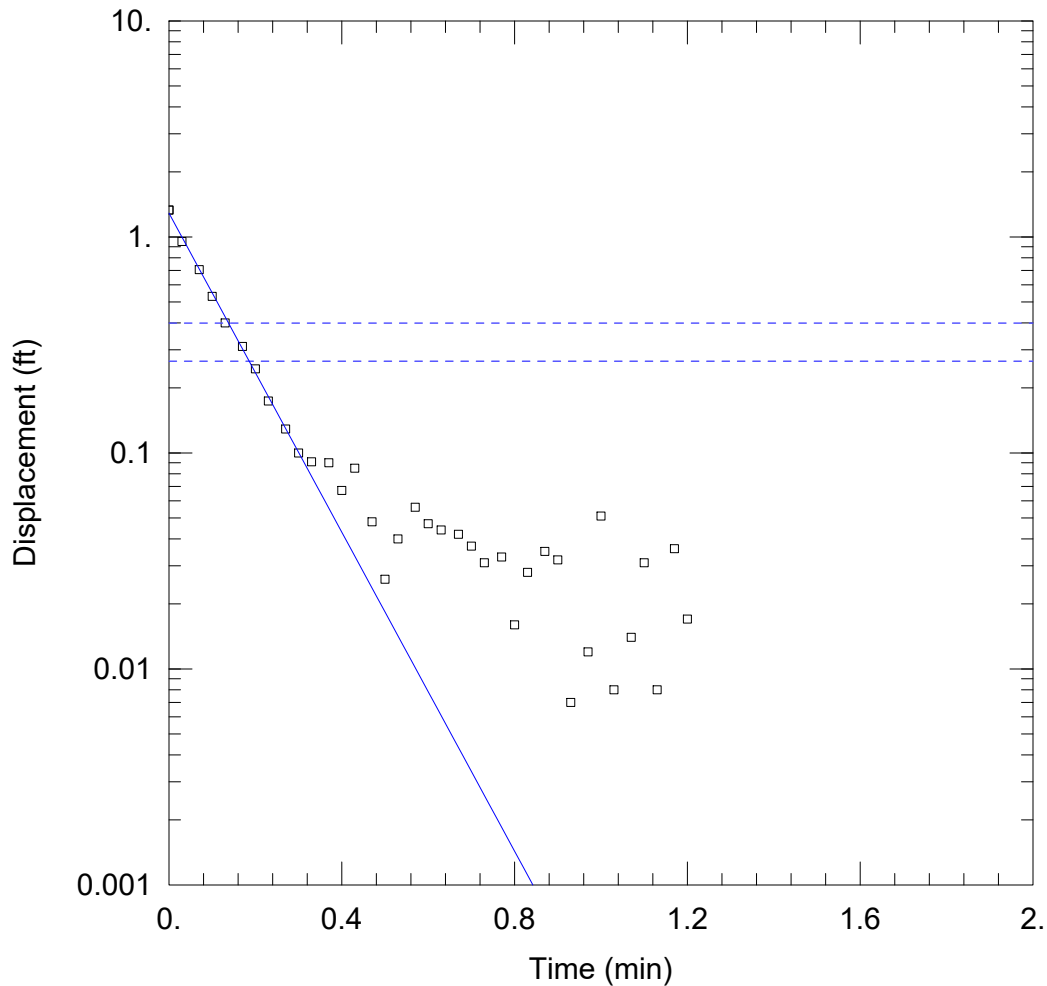
Aquifer Model: Confined

Solution Method: Bower-Rice

$K = 0.006716$  cm/sec

$y_0 = 1.466$  ft





WELL TEST ANALYSIS

Data Set: P:\...\G-11 test 3 (slug-in) BR.aqt  
 Date: 04/09/21

Time: 15:15:17

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa Ash Pond  
 Test Well: G-11

AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (G-11 (test 3 slug-in))

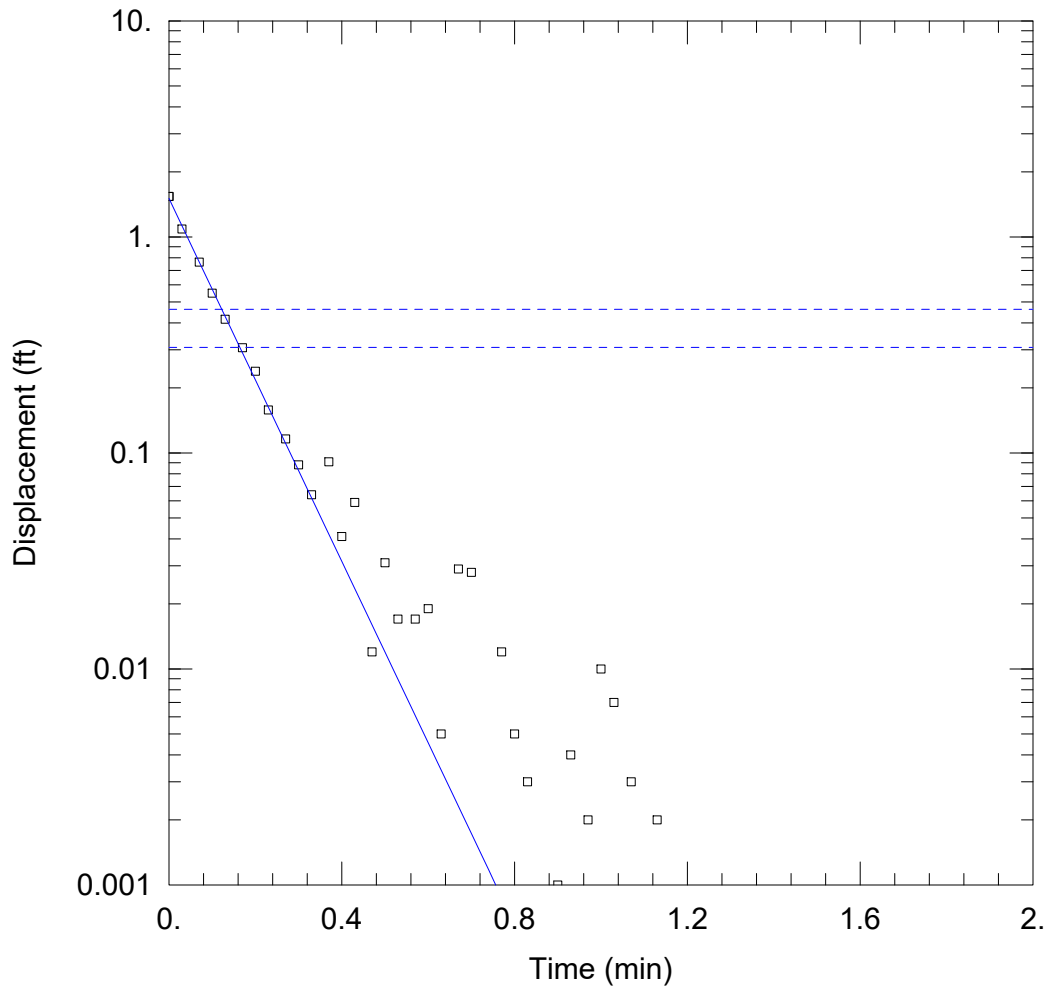
Initial Displacement: 1.33 ft  
 Total Well Penetration Depth: 23.2 ft  
 Casing Radius: 0.083 ft

Static Water Column Height: 23.2 ft  
 Screen Length: 10. ft  
 Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined  
 $K = 0.006355$  cm/sec

Solution Method: Bower-Rice  
 $y_0 = 1.288$  ft



WELL TEST ANALYSIS

Data Set: P:\...\G-11 test 4 (slug-out) BR.aqt

Date: 04/09/21

Time: 15:19:03

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: G-11

AQUIFER DATA

Saturated Thickness: 13. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (G-11 (test 4 slug-out))

Initial Displacement: 1.54 ft

Static Water Column Height: 23.2 ft

Total Well Penetration Depth: 23.2 ft

Screen Length: 10. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

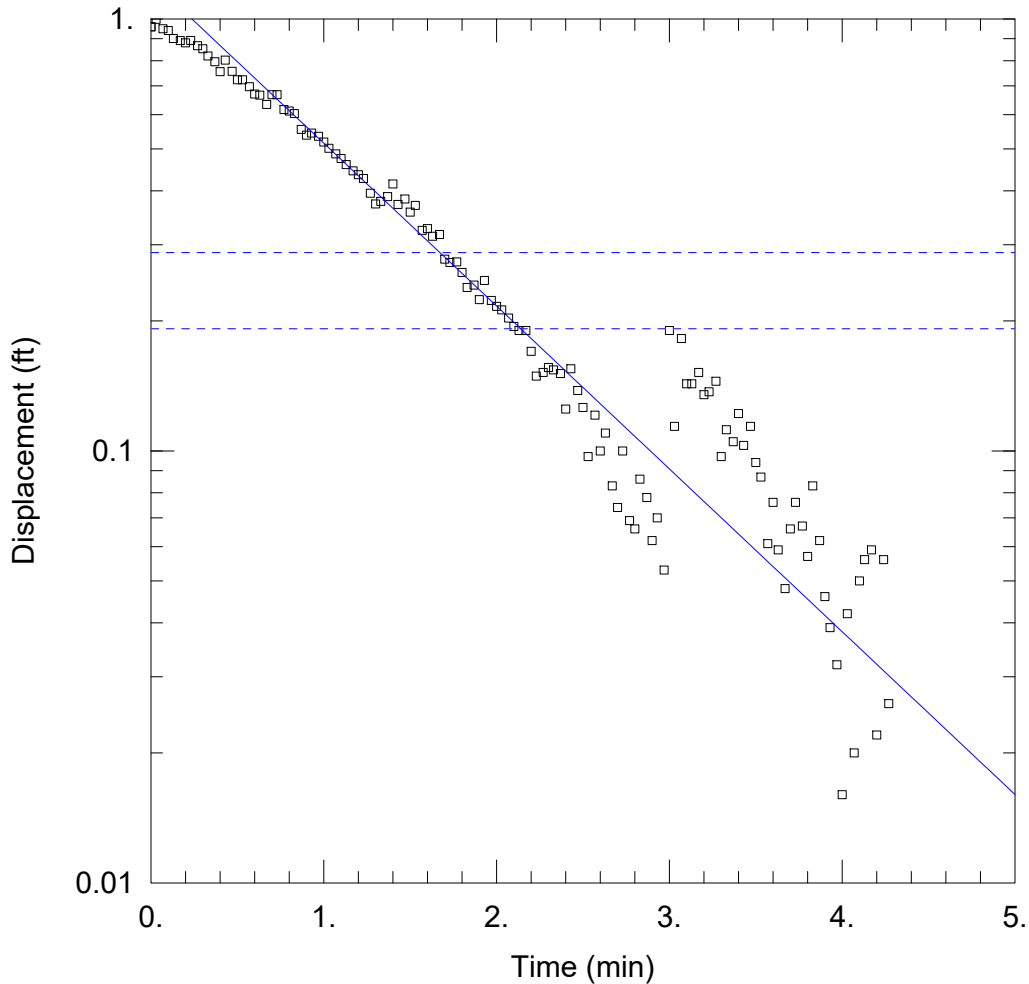
SOLUTION

Aquifer Model: Confined

Solution Method: Bower-Rice

K = 0.007229 cm/sec

y0 = 1.506 ft



TEST 1 SLUG IN

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G09M test 1 (Slug-in).aqt  
 Date: 03/31/21 Time: 08:32:59

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa, IL  
 Test Well: G09M  
 Test Date: 2/26/2021

AQUIFER DATA

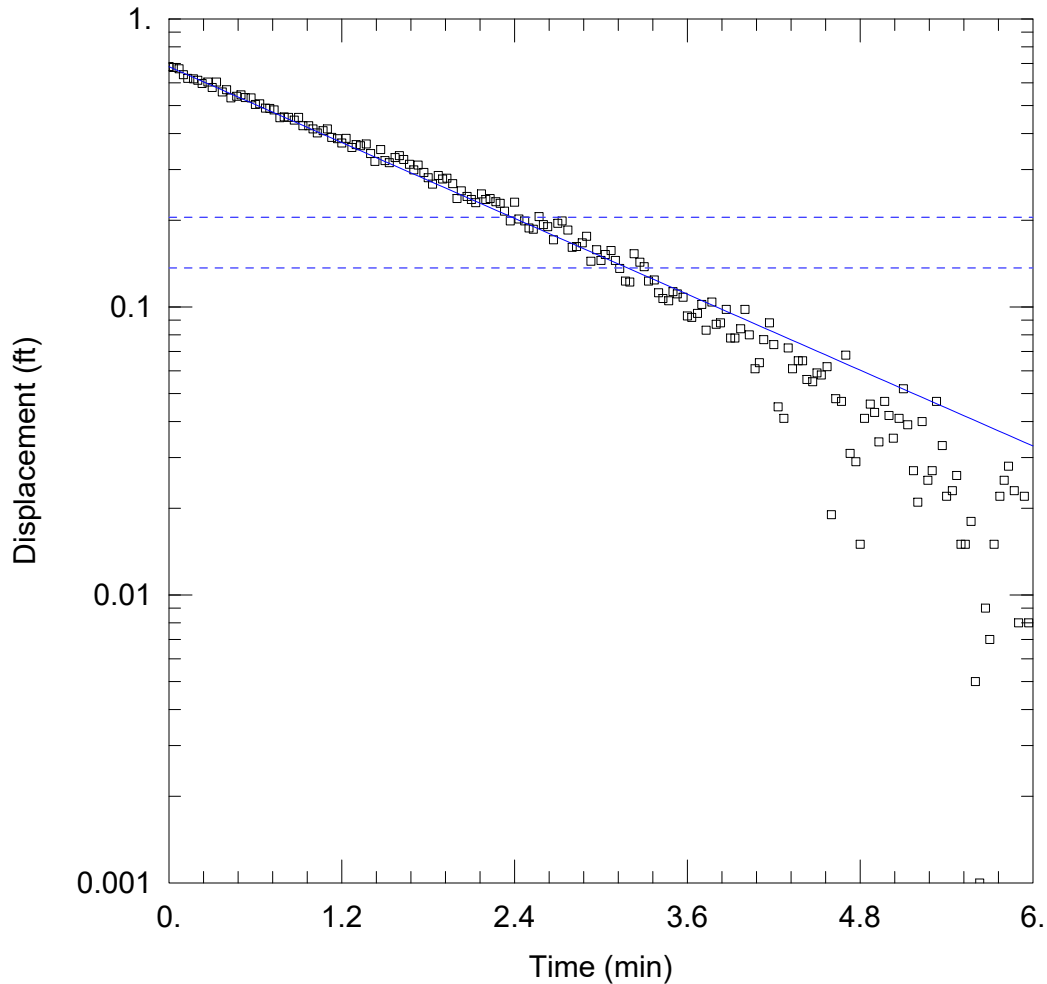
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G09M test 1 (Slug in))

Initial Displacement: 0.959 ft Static Water Column Height: 127.8 ft  
 Total Well Penetration Depth: 127.8 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 1. ft

SOLUTION

Aquifer Model: Confined Solution Method: Bower-Rice  
 K = 0.0002725 cm/sec y0 = 1.228 ft



TEST 1 SLUG IN

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G09M test 2 (Slug-out).aqt  
 Date: 03/31/21 Time: 08:41:16

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa, IL  
 Test Well: G09M  
 Test Date: 2/26/2021

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio ( $K_z/K_r$ ): 1.

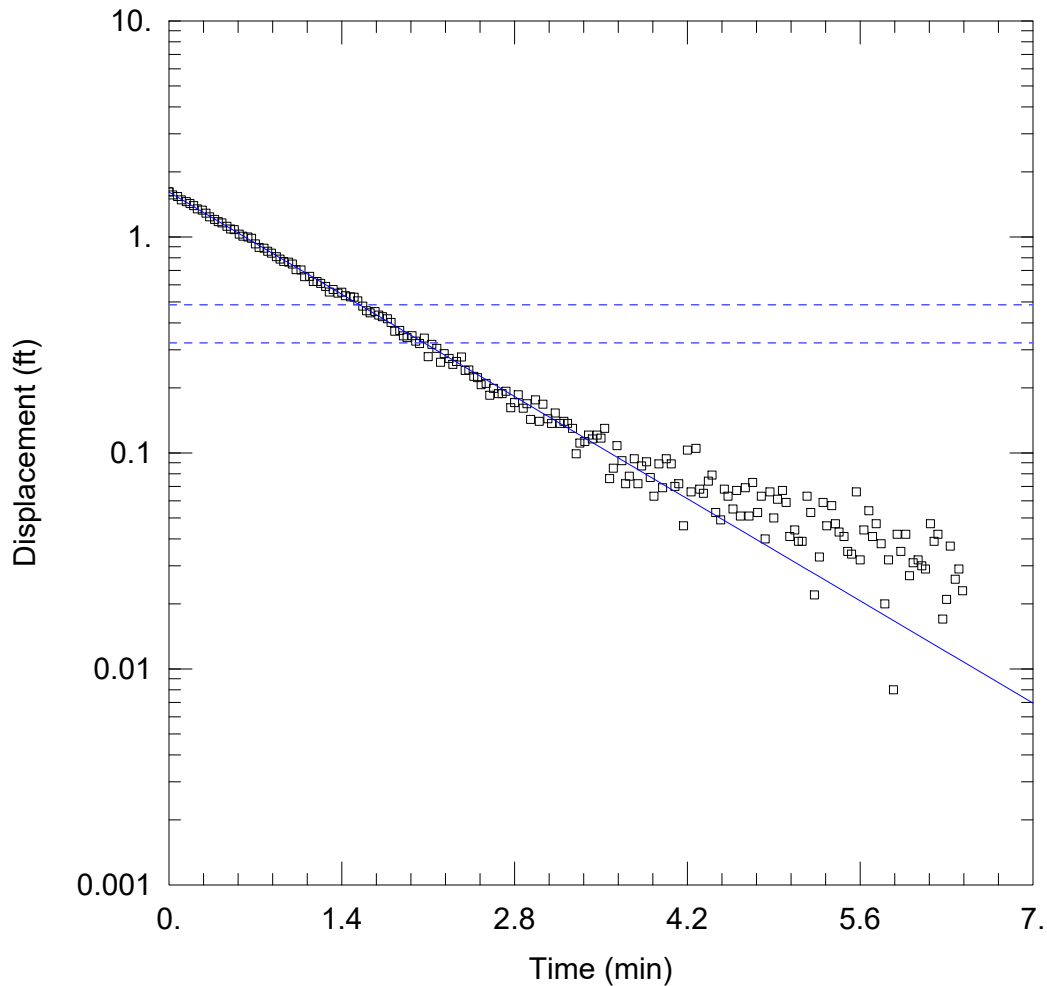
WELL DATA (G09M test 2 (Slug out))

Initial Displacement: 0.683 ft Static Water Column Height: 127.8 ft  
 Total Well Penetration Depth: 127.8 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bower-Rice  
 $K = 0.0003783$  cm/sec  $y_0 = 0.6827$  ft





TEST 1 SLUG IN

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G09M test 3 (Slug-in).aqt  
 Date: 03/31/21 Time: 08:44:06

PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa, IL  
 Test Well: G09M  
 Test Date: 2/26/2021

AQUIFER DATA

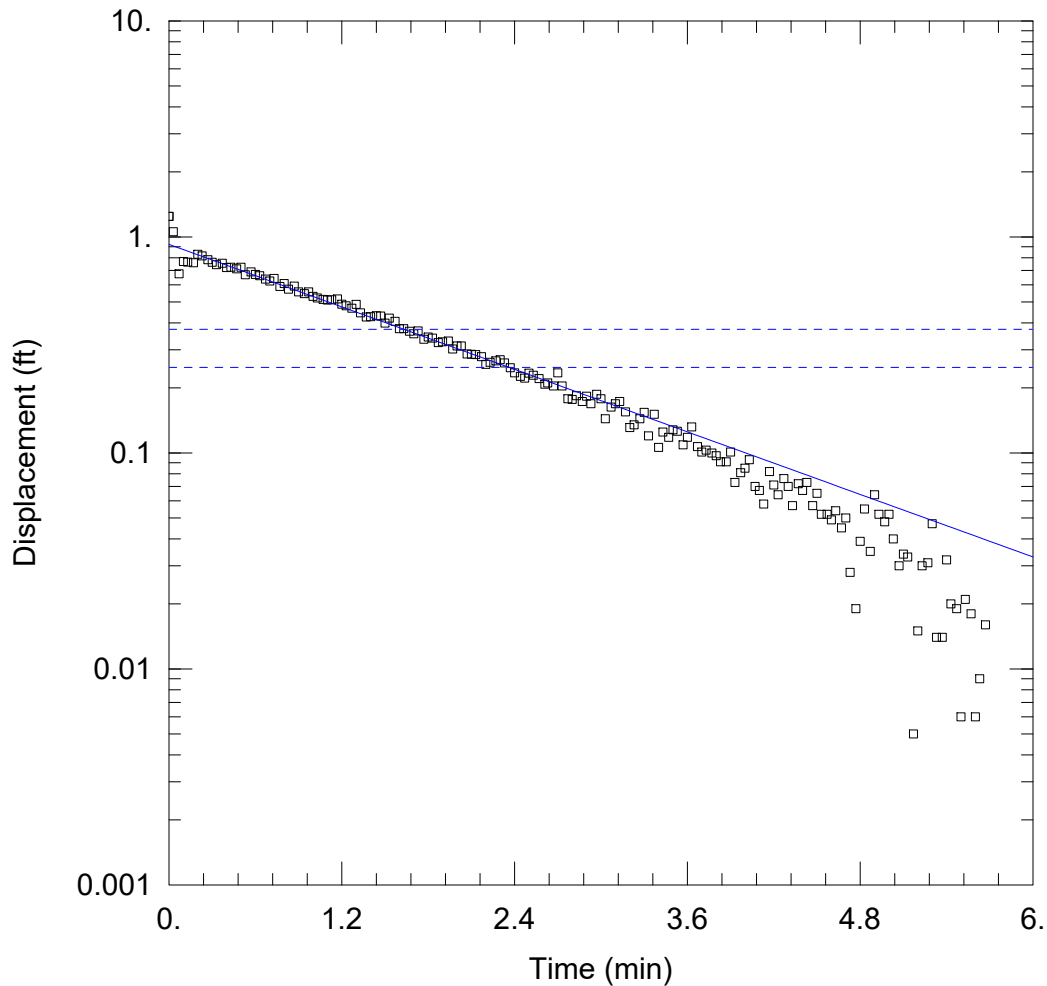
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G09M test 3 (Slug in))

Initial Displacement: 1.615 ft Static Water Column Height: 127.8 ft  
 Total Well Penetration Depth: 127.8 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bower-Rice  
 K = 0.0005824 cm/sec y0 = 1.613 ft



### TEST 1 SLUG IN

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\G09M test 4 (Slug-out).aqt  
 Date: 03/31/21 Time: 08:48:06

### PROJECT INFORMATION

Company: Geosyntec  
 Client: Vistra  
 Project: GLP8021  
 Location: Joppa, IL  
 Test Well: G09M  
 Test Date: 2/26/2021

### AQUIFER DATA

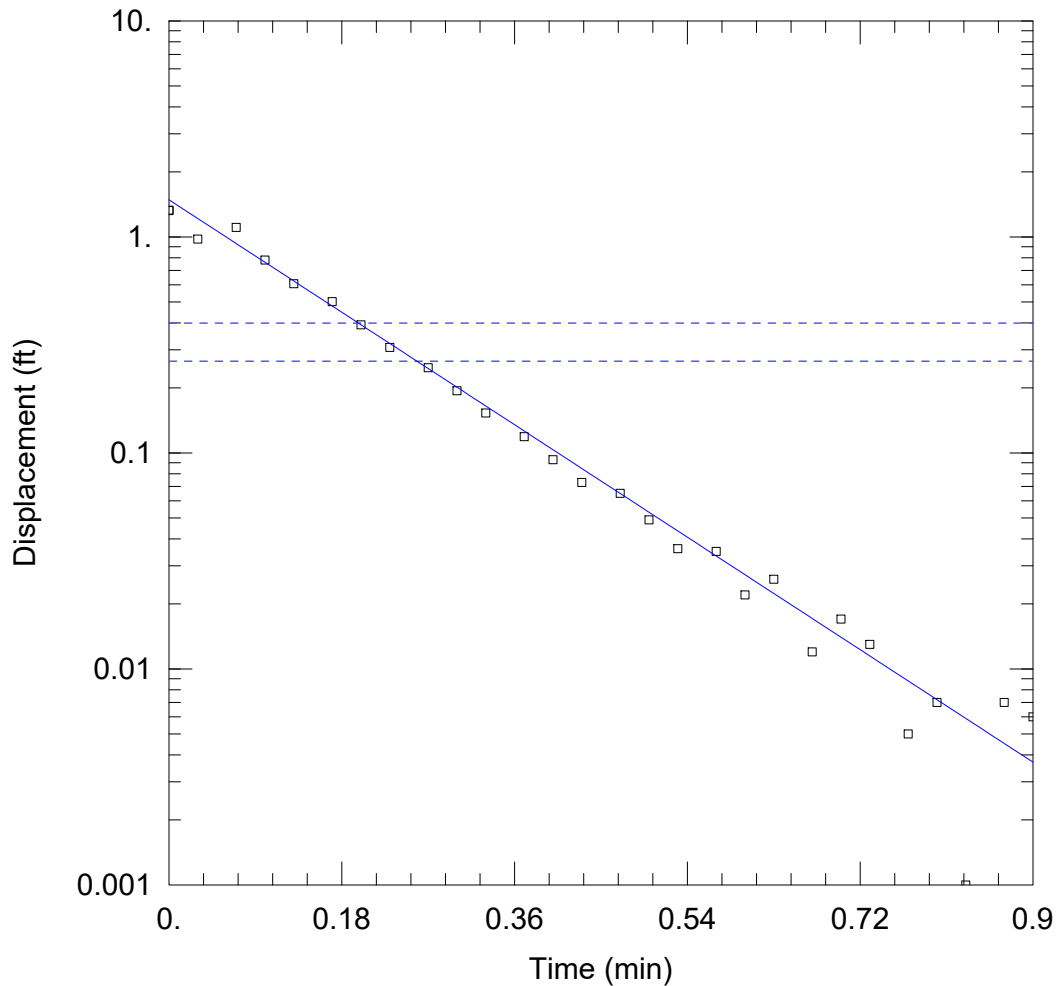
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA (G09M test 4 (Slug out))

Initial Displacement: 1.244 ft Static Water Column Height: 127.8 ft  
 Total Well Penetration Depth: 127.8 ft Screen Length: 10. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

### SOLUTION

Aquifer Model: Confined Solution Method: Bower-Rice  
 K = 0.0004155 cm/sec y0 = 0.9235 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\XPW-02 test 1 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:03:08

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: XPW-02

AQUIFER DATA

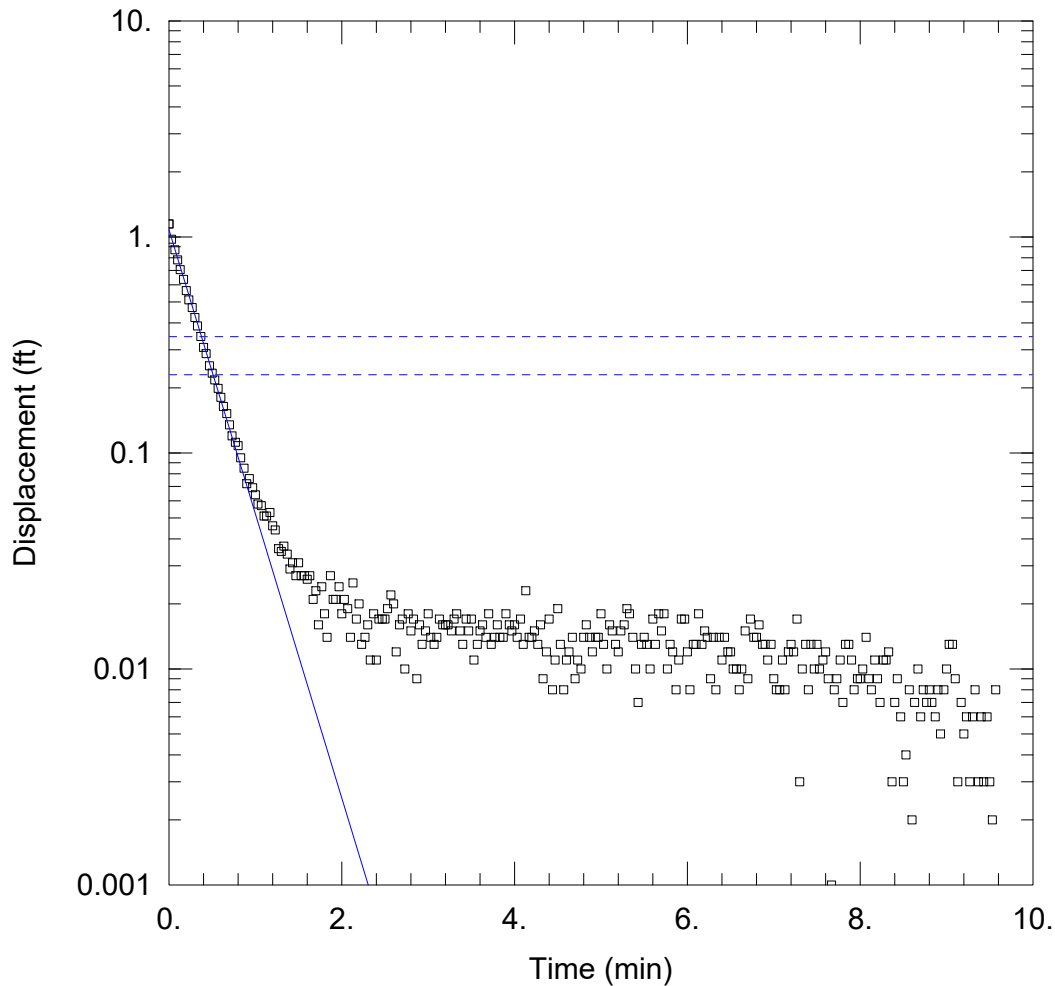
Saturated Thickness: 25. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (XPW-02 ((test 1 slug-in))

Initial Displacement: 1.33 ft Static Water Column Height: 27.13 ft  
 Total Well Penetration Depth: 27.13 ft Screen Length: 5. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice  
 K = 0.009817 cm/sec y0 = 1.486 ft



WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\XPW-02 test 2 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:19:01

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: XPW-02

AQUIFER DATA

Saturated Thickness: 25. ft Anisotropy Ratio (Kz/Kr): 0.1

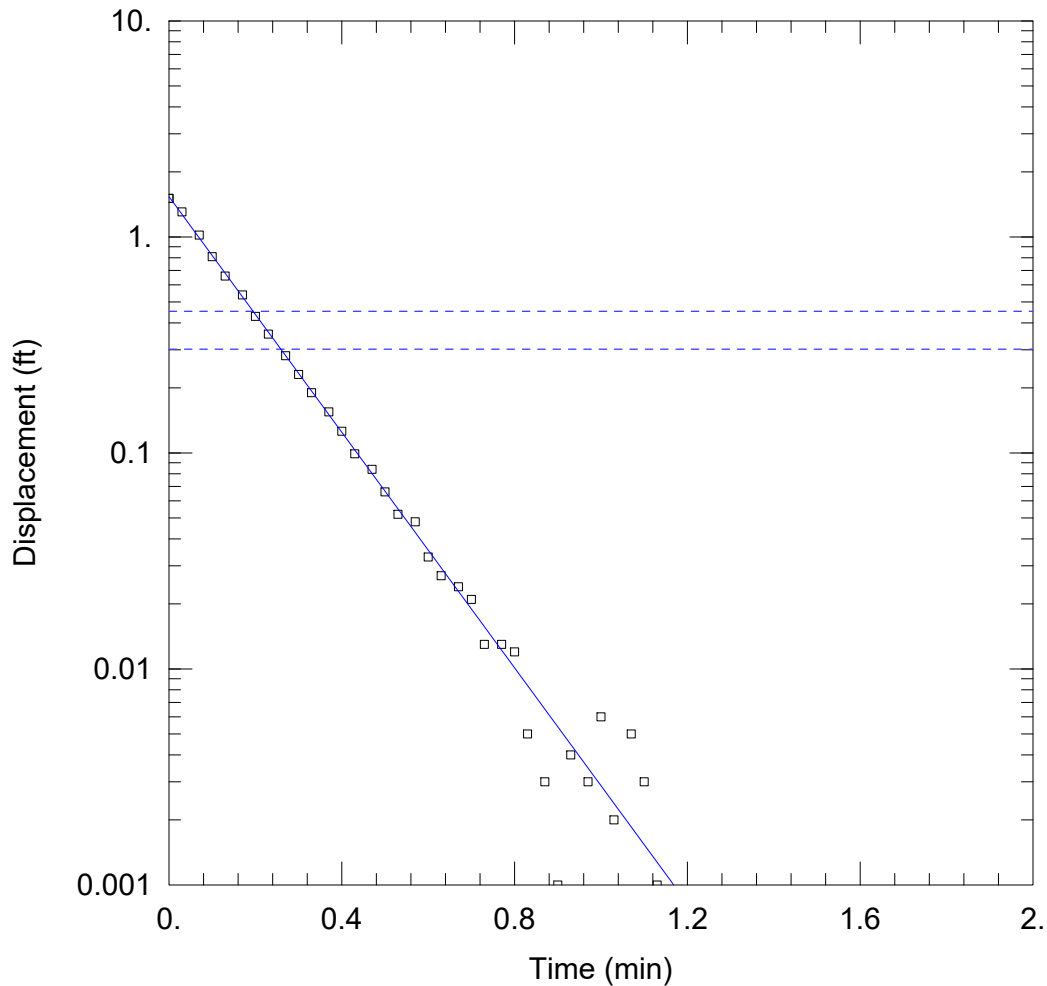
WELL DATA (XPW-02 ((test 2 slug-out))

Initial Displacement: 1.15 ft Static Water Column Height: 27.13 ft  
 Total Well Penetration Depth: 27.13 ft Screen Length: 5. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice  
 K = 0.004464 cm/sec y0 = 1.079 ft





WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\XPW-02 test 3 (slug-in) BR.aqt  
 Date: 03/31/21 Time: 11:22:08

PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: XPW-02

AQUIFER DATA

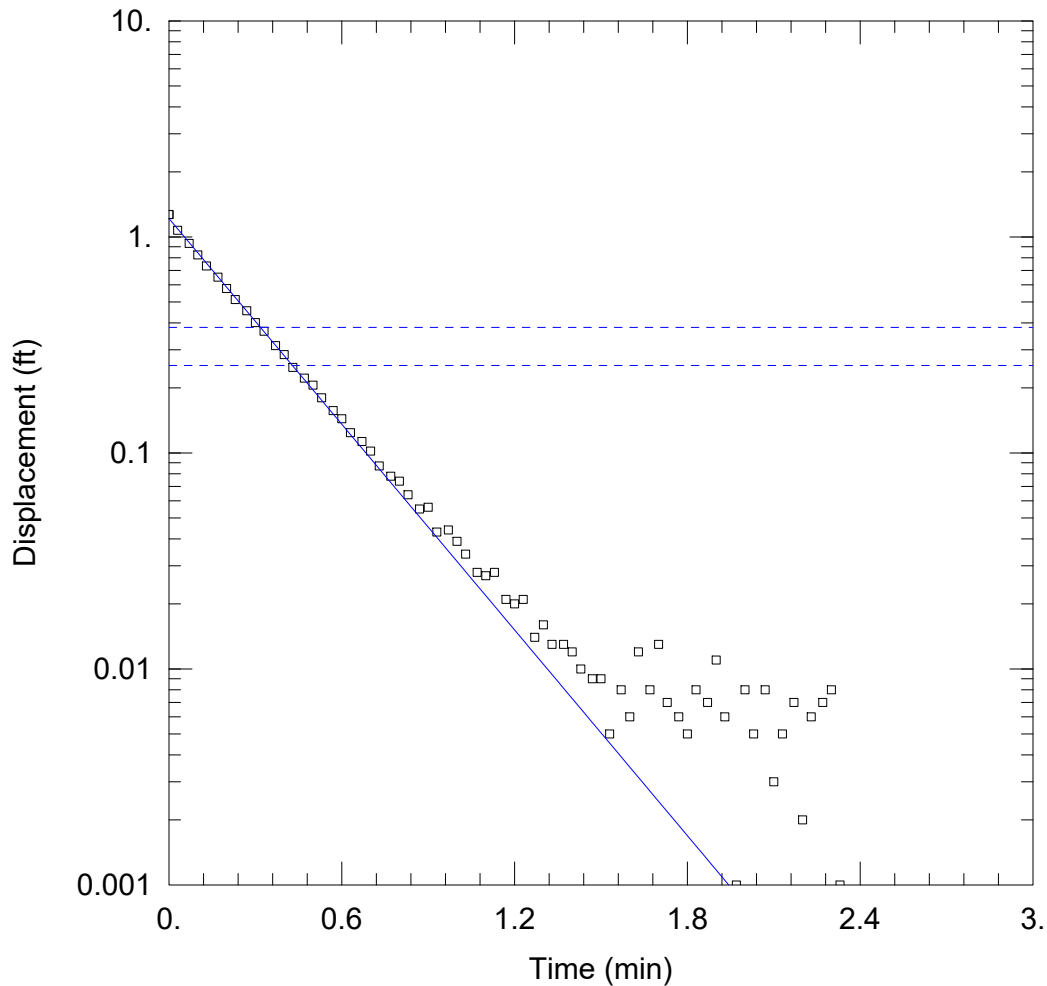
Saturated Thickness: 25. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (XPW-02 ((test 3 slug-in))

Initial Displacement: 1.51 ft Static Water Column Height: 27.13 ft  
 Total Well Penetration Depth: 27.13 ft Screen Length: 5. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice  
 K = 0.009254 cm/sec y0 = 1.537 ft



### WELL TEST ANALYSIS

Data Set: C:\Users\kcarlton\Desktop\Joppa Slug Tests\XPW-02 test 4 (slug-out) BR.aqt  
 Date: 03/31/21 Time: 11:24:39

### PROJECT INFORMATION

Company: Geosyntec  
 Location: Joppa Ash Pond  
 Test Well: XPW-02

### AQUIFER DATA

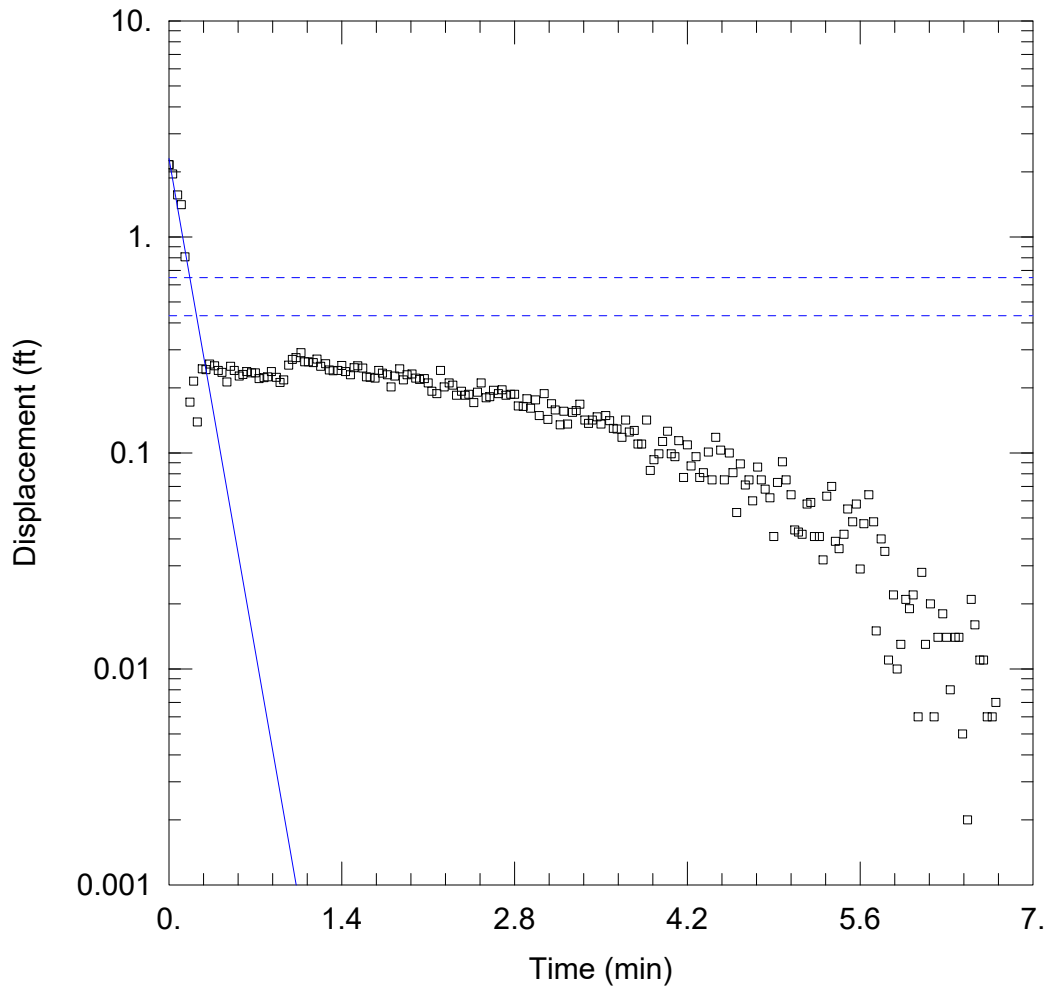
Saturated Thickness: 25. ft Anisotropy Ratio (Kz/Kr): 0.1

### WELL DATA (XPW-02 ((test 4 slug-out))

Initial Displacement: 1.27 ft Static Water Column Height: 27.13 ft  
 Total Well Penetration Depth: 27.13 ft Screen Length: 5. ft  
 Casing Radius: 0.083 ft Well Radius: 0.25 ft

### SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice  
 K = 0.005386 cm/sec y0 = 1.217 ft



WELL TEST ANALYSIS

Data Set: P:\...\XPW-03 test 1 (slug-in) BR.aqt

Date: 04/09/21

Time: 13:57:26

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: XPW-03

AQUIFER DATA

Saturated Thickness: 31. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (XPW-03 (test 1 slug-in))

Initial Displacement: 2.159 ft

Static Water Column Height: 31.43 ft

Total Well Penetration Depth: 31.43 ft

Screen Length: 5. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

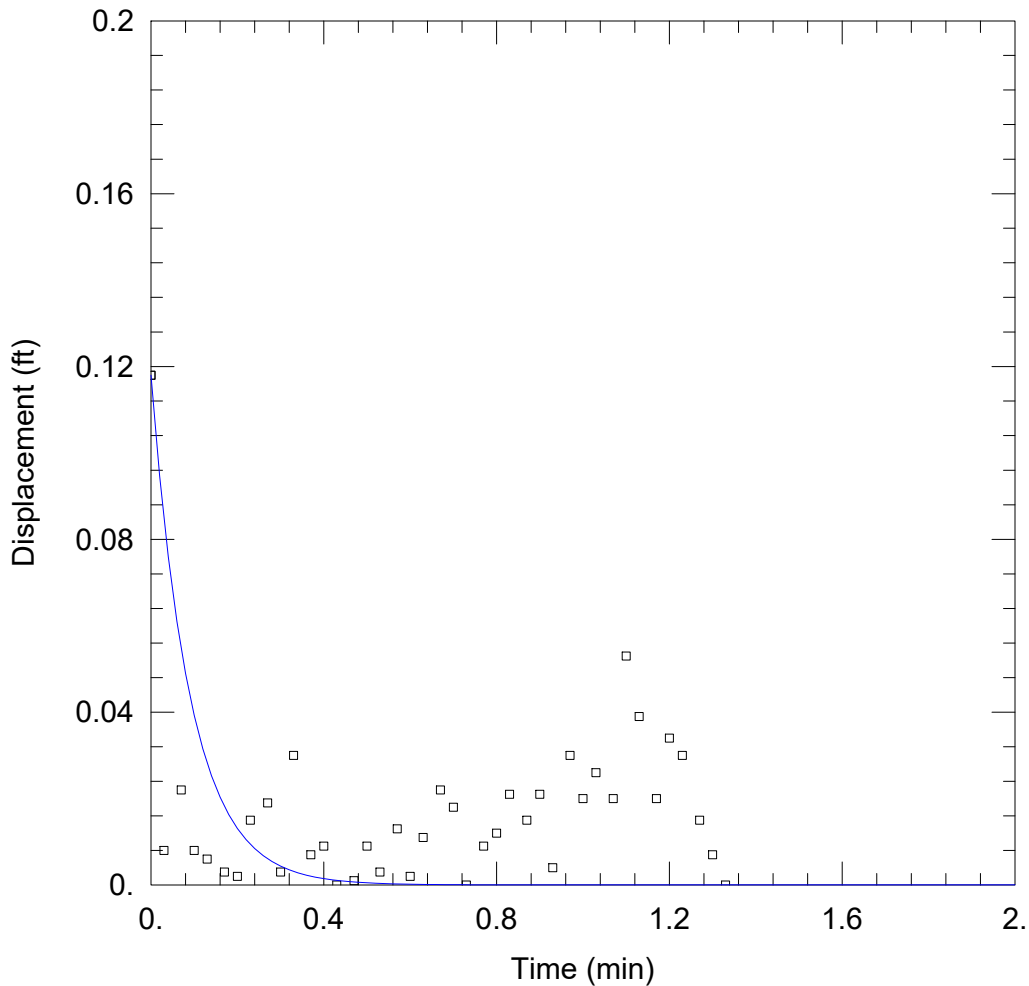
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

$K = 0.01129$  cm/sec

$y_0 = 2.303$  ft



WELL TEST ANALYSIS

Data Set: P:\...\XPW-03 test 2 (slug-out) BR.aqt

Date: 04/09/21

Time: 14:00:35

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: XPW-03

AQUIFER DATA

Saturated Thickness: 31. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (XPW-03 (test 1 slug-in))

Initial Displacement: 0.118 ft

Static Water Column Height: 31.43 ft

Total Well Penetration Depth: 31.43 ft

Screen Length: 5. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

SOLUTION

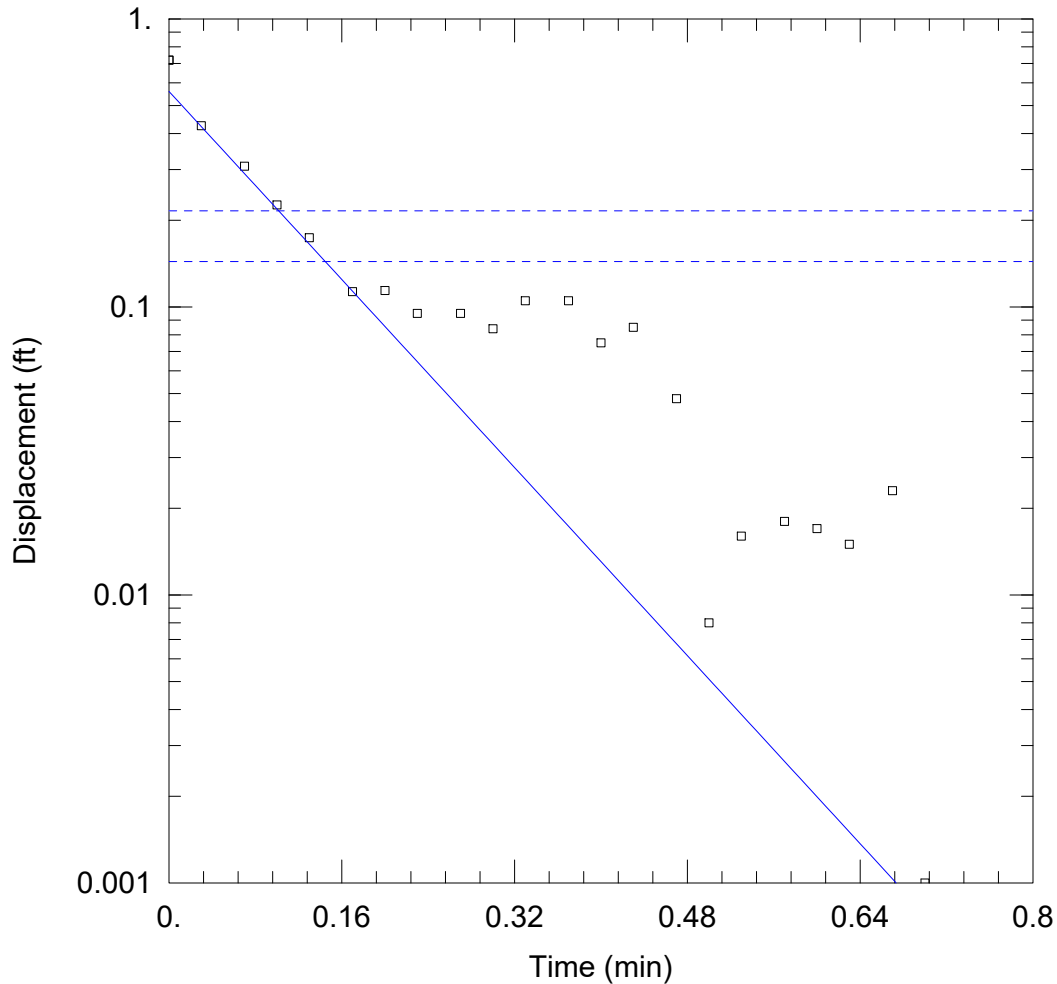
Aquifer Model: Unconfined

Solution Method: Springer-Gelhar

K = 0.01653 cm/sec

Le = 0.1 ft





WELL TEST ANALYSIS

Data Set: P:\...\XPW-03 test 3 (slug-in) BR.aqt

Date: 04/09/21

Time: 14:04:42

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: XPW-03

AQUIFER DATA

Saturated Thickness: 31. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (XPW-03 (test 3 slug-out))

Initial Displacement: 0.719 ft

Static Water Column Height: 31.43 ft

Total Well Penetration Depth: 31.43 ft

Screen Length: 5. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

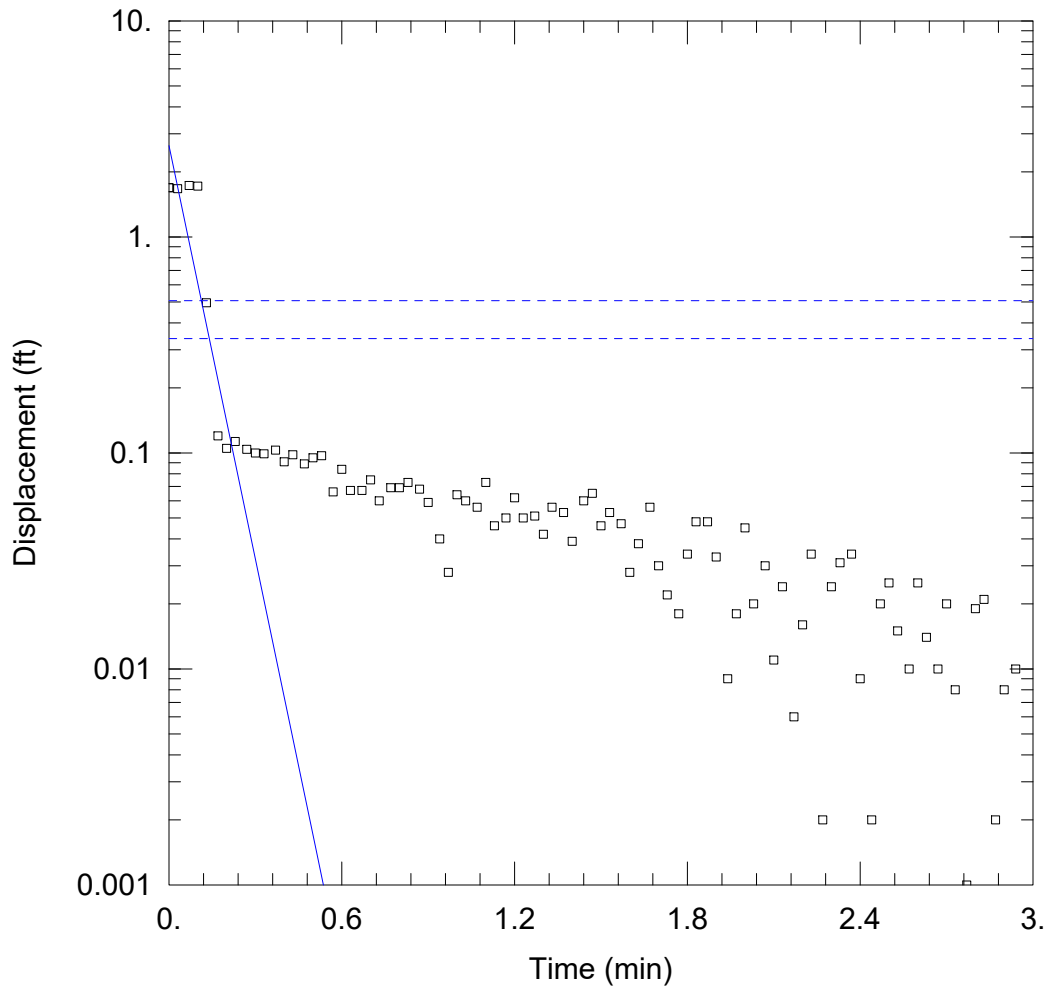
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bower-Rice

$K = 0.01413$  cm/sec

$y_0 = 0.5601$  ft



WELL TEST ANALYSIS

Data Set: P:\...\XPW-03 test 4 (slug-out) BR.aqt

Date: 04/09/21

Time: 14:07:51

PROJECT INFORMATION

Company: Geosyntec

Client: Vistra

Project: GLP8021

Location: Joppa Ash Pond

Test Well: XPW-03

AQUIFER DATA

Saturated Thickness: 31. ft

Anisotropy Ratio ( $K_z/K_r$ ): 0.1

WELL DATA (XPW-03 (test 4 slug-out))

Initial Displacement: 1.69 ft

Static Water Column Height: 31.43 ft

Total Well Penetration Depth: 31.43 ft

Screen Length: 5. ft

Casing Radius: 0.083 ft

Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined

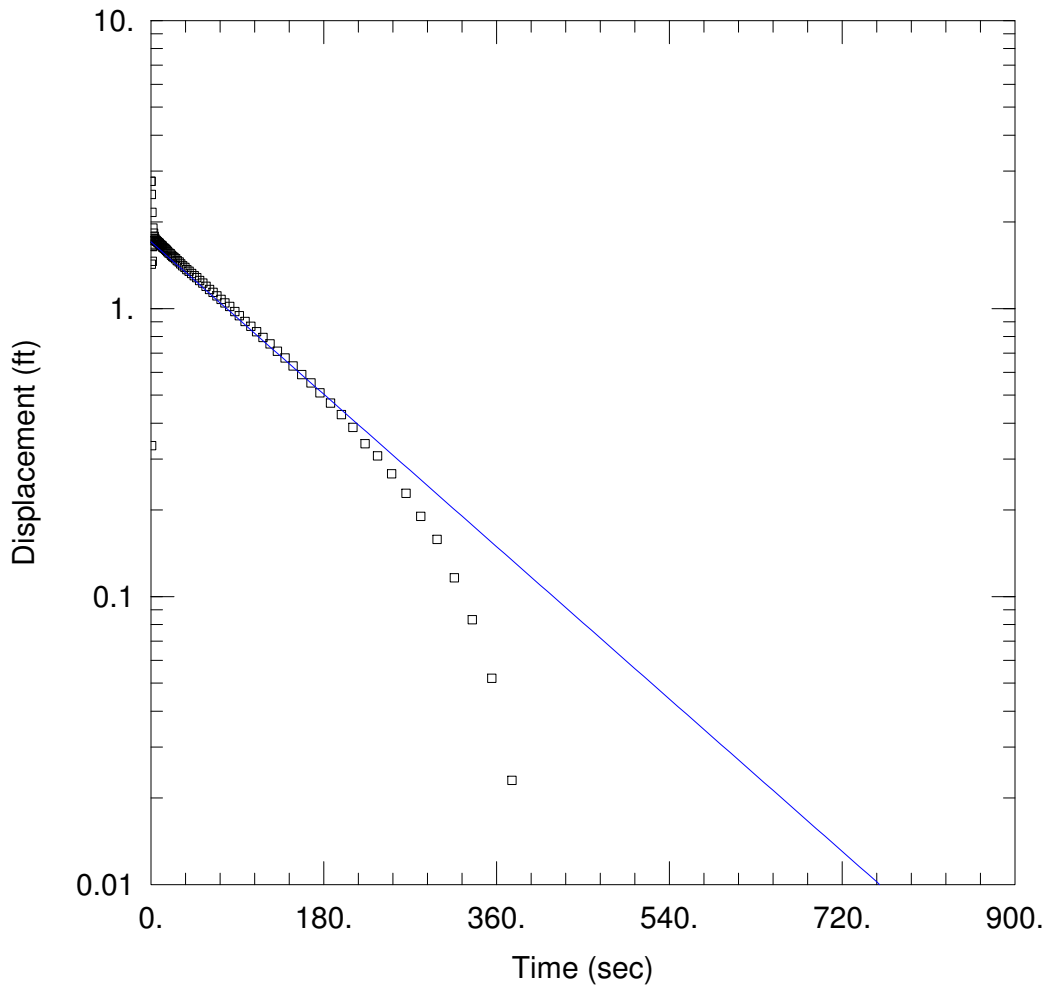
Solution Method: Bower-Rice

$K = 0.02209$  cm/sec

$y_0 = 2.648$  ft

**Table 1. Falling/Rising Head Test Results Summary**  
**Joppa East Ash Pond**  
**April 2017**  
**Hydrogeologic Monitoring Plan**

Location	Test Type	Slug Type	Number	K (cm/sec)
G01D	Falling Head	Slug In	1	1.33E-04
G01D	Rising Head	Slug Out	1	1.40E-04
G01D	Rising Head	Slug Out	2	1.08E-04
G01D	Rising Head	Slug Out	3	1.04E-04
G02D	Falling Head	Slug In	1	6.50E-04
G02D	Falling Head	Slug In	2	2.37E-05
G02D	Rising Head	Slug Out	2	7.23E-04
G02D	Rising Head	Slug Out	3	6.40E-04
G51D	Falling Head	Slug In	1	2.13E-04
G51D	Falling Head	Slug In	2	3.98E-04
G51D	Rising Head	Slug Out	1	2.35E-04
G51D	Rising Head	Slug Out	2	2.12E-04
G51D	Rising Head	Slug Out	3	2.30E-04
G52D	Rising Head	Slug Out	1	7.13E-08
G53D	Falling Head	Slug In	1	7.52E-04
G53D	Falling Head	Slug In	2	6.41E-04
G53D	Rising Head	Slug Out	1	5.17E-04
G53D	Rising Head	Slug Out	2	4.71E-04
G53D	Rising Head	Slug Out	3	4.57E-04
G54D	Falling Head	Slug In	1	9.93E-04
G54D	Falling Head	Slug In	2	9.04E-04
G54D	Rising Head	Slug Out	1	4.18E-04
G54D	Rising Head	Slug Out	2	8.93E-04
G54D	Rising Head	Slug Out	3	6.57E-04



G01D SI1

Data Set: P:\...\G01D Slug In 1.aqt  
 Date: 09/22/17

Time: 13:52:56

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G01D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 87.2 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G01D SI1)

Initial Displacement: 2.767 ft                      Static Water Column Height: 10.08 ft  
 Total Well Penetration Depth: 9.55 ft                      Screen Length: 9.55 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0001325 cm/sec                       $y_0 =$  1.704 ft



Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G01D SI1  
 Date: 09/22/17  
 Time: 13:54:26

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G01D

---

AQUIFER DATA

Saturated Thickness: 87.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G01D SI1

X Location: 831716.1 ft  
 Y Location: 202039.3 ft

Initial Displacement: 2.767 ft  
 Static Water Column Height: 10.08 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.55 ft  
 Total Well Penetration Depth: 9.55 ft

No. of Observations: 102

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.767	47.96	1.279
0.406	2.489	50.96	1.25
0.53	1.426	54.14	1.227
0.75	0.334	57.5	1.195
1.	2.158	61.1	1.164
1.406	1.646	64.7	1.137
1.53	1.457	68.9	1.106
1.75	1.639	73.1	1.075
2.	1.904	77.3	1.045
2.353	1.676	82.1	1.016
2.5	1.653	87.5	0.976
2.75	1.828	92.3	0.943
3.	1.753	98.3	0.902
3.25	1.723	104.3	0.868
3.5	1.782	110.3	0.83
3.86	1.724	116.9	0.794
4.22	1.749	124.1	0.754
4.64	1.728	131.9	0.71
5.06	1.725	139.7	0.674
5.48	1.723	148.1	0.631
5.96	1.713	157.1	0.59
6.5	1.708	166.7	0.551
6.98	1.703	176.3	0.509
7.58	1.694	187.1	0.47
8.18	1.69	198.5	0.428
8.78	1.685	210.5	0.387
9.44	1.669	223.1	0.339
10.16	1.663	236.3	0.308
10.94	1.656	250.7	0.267
11.72	1.649	265.7	0.228

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
12.56	1.631	281.3	0.19
13.46	1.622	298.1	0.158
14.42	1.615	316.1	0.116
15.38	1.602	334.7	0.083
16.46	1.591	355.1	0.052
17.6	1.576	376.1	0.023
18.8	1.559	398.3	0.
20.06	1.549	422.3	-0.026
21.38	1.53	447.5	-0.056
22.82	1.515	473.9	-0.077
24.32	1.505	502.1	-0.092
25.88	1.489	532.1	-0.111
27.56	1.465	563.9	-0.125
29.36	1.451	597.5	-0.138
31.22	1.429	633.5	-0.155
33.26	1.407	669.5	-0.162
35.36	1.389	711.5	-0.178
37.58	1.366	753.5	-0.182
39.98	1.347	795.5	-0.193
42.5	1.324	843.5	-0.195
45.14	1.3	897.5	-0.196

SOLUTION

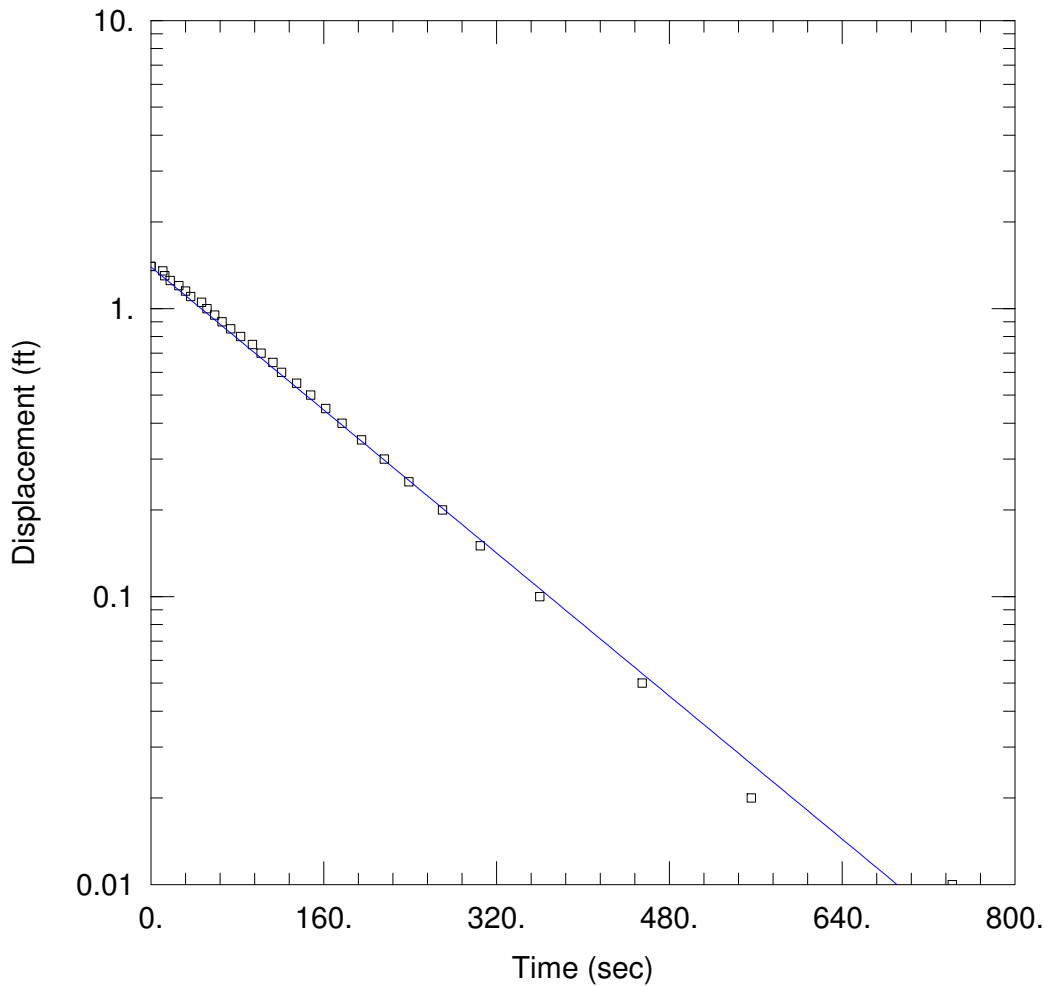
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.03

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0001325	cm/sec
y0	1.704	ft

$T = K \cdot b = 0.3522 \text{ cm}^2/\text{sec}$



G01D SO1

Data Set: P:\...\G01D Slug Out 1.aqt  
 Date: 09/22/17

Time: 13:57:51

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G01D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 87.2 ft      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G01D SO1)

Initial Displacement: 1.4 ft      Static Water Column Height: 10.08 ft  
 Total Well Penetration Depth: 9.55 ft      Screen Length: 9.55 ft  
 Casing Radius: 0.08333 ft      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined      Solution Method: Bouwer-Rice  
 K = 0.0001399 cm/sec       $y_0$  = 1.394 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G01D SO1  
 Date: 09/22/17  
 Time: 13:58:33

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G01D

---

AQUIFER DATA

Saturated Thickness: 87.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G01D SO1

X Location: 831716.1 ft  
 Y Location: 202039.3 ft

Initial Displacement: 1.4 ft  
 Static Water Column Height: 10.08 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.55 ft  
 Total Well Penetration Depth: 9.55 ft

No. of Observations: 31

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	1.4	121.	0.6
11.	1.35	135.	0.55
13.	1.3	148.	0.5
18.	1.25	162.	0.45
26.	1.2	177.	0.4
32.	1.15	195.	0.35
37.	1.1	216.	0.3
47.	1.05	239.	0.25
52.	1.	270.	0.2
59.	0.95	305.	0.15
66.	0.9	360.	0.1
74.	0.85	455.	0.05
83.	0.8	556.	0.02
94.	0.75	742.	0.01
102.	0.7	796.	0.
113.	0.65		

---

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.03

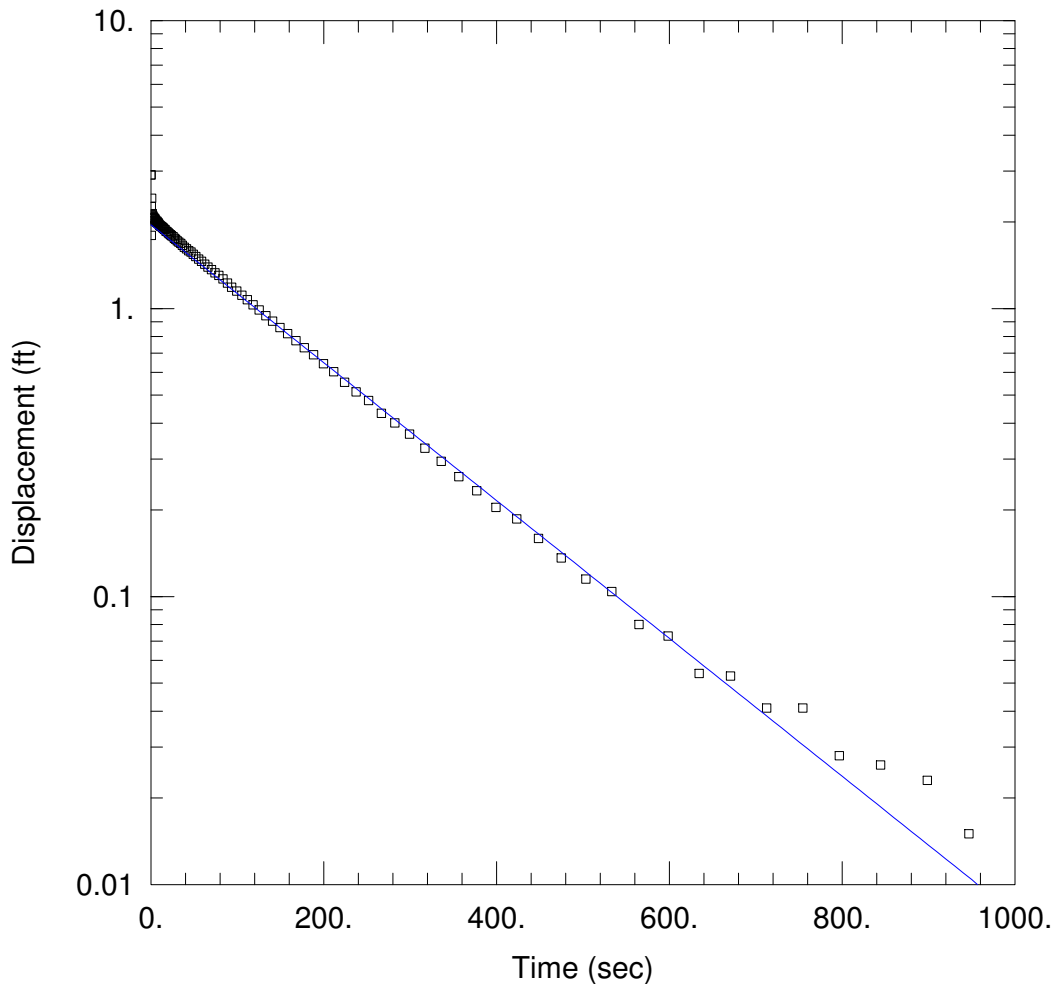
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VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0001399	cm/sec





G01D SO2

Data Set: P:\...\G01D Slug Out 2.aqt  
 Date: 09/22/17

Time: 14:02:09

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G01D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 87.2 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G01D SO2)

Initial Displacement: 2.908 ft                      Static Water Column Height: 10.08 ft  
 Total Well Penetration Depth: 9.55 ft              Screen Length: 9.55 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0001079 cm/sec                      y0 = 1.953 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G01D SO2  
 Date: 09/22/17  
 Time: 14:02:37

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G01D

---

AQUIFER DATA

Saturated Thickness: 87.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G01D SO2

X Location: 831716.1 ft  
 Y Location: 202039.3 ft

Initial Displacement: 2.908 ft  
 Static Water Column Height: 10.08 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.55 ft  
 Total Well Penetration Depth: 9.55 ft

No. of Observations: 108

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.908	43.75	1.588
0.408	1.793	46.39	1.57
0.531	2.266	49.21	1.541
0.75	2.416	52.21	1.515
1.	2.053	55.39	1.486
1.405	2.106	58.75	1.459
1.528	2.079	62.35	1.427
1.75	2.137	65.95	1.394
2.	2.073	70.15	1.366
2.405	2.1	74.35	1.329
2.528	2.071	78.55	1.303
2.75	2.073	83.35	1.267
3.	2.062	88.75	1.225
3.25	2.075	93.55	1.185
3.5	2.037	99.55	1.149
3.75	2.05	105.6	1.111
4.	2.058	111.6	1.072
4.25	2.051	118.2	1.03
4.5	2.012	125.3	0.989
4.75	2.048	133.2	0.943
5.11	2.017	140.9	0.904
5.471	2.027	149.3	0.859
5.89	2.025	158.3	0.818
6.31	2.	167.9	0.773
6.73	1.991	177.6	0.731
7.21	2.008	188.3	0.691
7.75	1.985	199.8	0.643
8.23	1.988	211.8	0.603
8.83	1.973	224.3	0.555
9.43	1.964	237.6	0.514

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.03	1.949	251.9	0.479
10.69	1.941	266.9	0.433
11.41	1.933	282.6	0.401
12.19	1.929	299.4	0.366
12.97	1.919	317.4	0.327
13.81	1.908	335.9	0.295
14.71	1.9	356.4	0.261
15.67	1.883	377.4	0.233
16.63	1.879	399.6	0.204
17.71	1.856	423.6	0.186
18.85	1.851	448.8	0.159
20.05	1.832	475.1	0.136
21.31	1.817	503.4	0.115
22.63	1.803	533.4	0.104
24.07	1.79	565.1	0.08
25.57	1.774	598.8	0.073
27.13	1.755	634.8	0.054
28.81	1.742	670.8	0.053
30.61	1.72	712.8	0.041
32.47	1.7	754.8	0.041
34.51	1.682	796.8	0.028
36.61	1.656	844.8	0.026
38.83	1.631	898.8	0.023
41.23	1.61	946.8	0.015

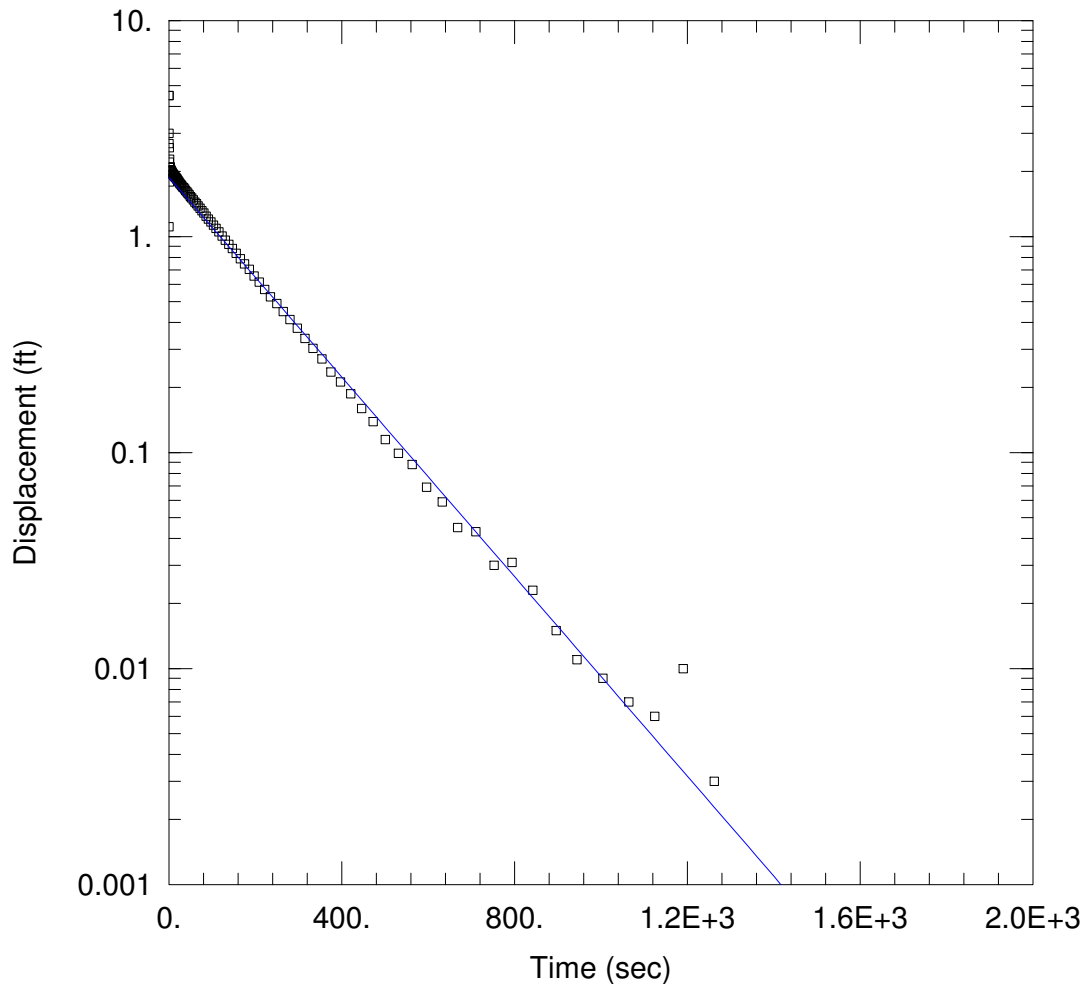
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.03

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0001079	cm/sec
y0	1.953	ft

$$T = K*b = 0.2868 \text{ cm}^2/\text{sec}$$



G01D SO3

Data Set: P:\...\G01D Slug Out 3.aqt  
 Date: 09/22/17

Time: 14:04:38

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G01D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 87.2 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G01D SO3)

Initial Displacement: 4.498 ft                      Static Water Column Height: 10.08 ft  
 Total Well Penetration Depth: 9.55 ft                      Screen Length: 9.55 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0001041 cm/sec                       $y_0 =$  1.877 ft



Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G01D SO3  
 Date: 09/22/17  
 Time: 14:05:00

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G01D

---

AQUIFER DATA

Saturated Thickness: 87.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G01D SO3

X Location: 831716.1 ft  
 Y Location: 202039.3 ft

Initial Displacement: 4.498 ft  
 Static Water Column Height: 10.08 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.55 ft  
 Total Well Penetration Depth: 9.55 ft

No. of Observations: 105

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	4.498	63.8	1.417
0.124	2.694	68.	1.387
0.345	1.11	72.19	1.351
0.595	3.005	76.39	1.316
0.993	2.208	81.19	1.283
1.117	2.576	86.59	1.242
1.345	1.786	91.39	1.205
1.595	2.278	97.39	1.166
1.845	2.	103.4	1.128
2.095	2.092	109.4	1.091
2.345	2.094	116.	1.049
2.595	2.039	123.2	1.005
2.955	2.019	131.	0.962
3.315	2.1	138.8	0.92
3.735	2.034	147.2	0.879
4.155	2.034	156.2	0.836
4.575	2.017	165.8	0.79
5.055	2.033	175.4	0.748
5.595	2.012	186.2	0.704
6.075	2.005	197.6	0.657
6.675	1.983	209.6	0.616
7.275	1.991	222.2	0.568
7.875	1.969	235.4	0.525
8.535	1.962	249.8	0.49
9.255	1.946	264.8	0.45
10.04	1.944	280.4	0.412
10.82	1.944	297.2	0.376
11.65	1.916	315.2	0.337
12.56	1.924	333.8	0.304
13.52	1.902	354.2	0.271

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
14.48	1.892	375.2	0.236
15.56	1.879	397.4	0.212
16.7	1.872	421.4	0.187
17.9	1.856	446.6	0.16
19.16	1.84	473.	0.139
20.48	1.823	501.2	0.115
21.91	1.805	531.2	0.099
23.41	1.789	563.	0.088
24.98	1.772	596.6	0.069
26.66	1.754	632.6	0.059
28.45	1.735	668.6	0.045
30.32	1.718	710.6	0.043
32.35	1.696	752.6	0.03
34.45	1.681	794.6	0.031
36.67	1.66	842.6	0.023
39.08	1.633	896.6	0.015
41.59	1.611	944.6	0.011
44.23	1.589	1004.6	0.009
47.06	1.559	1064.6	0.007
50.06	1.527	1124.6	0.006
53.23	1.506	1190.6	0.01
56.59	1.476	1262.6	0.003
60.2	1.445		

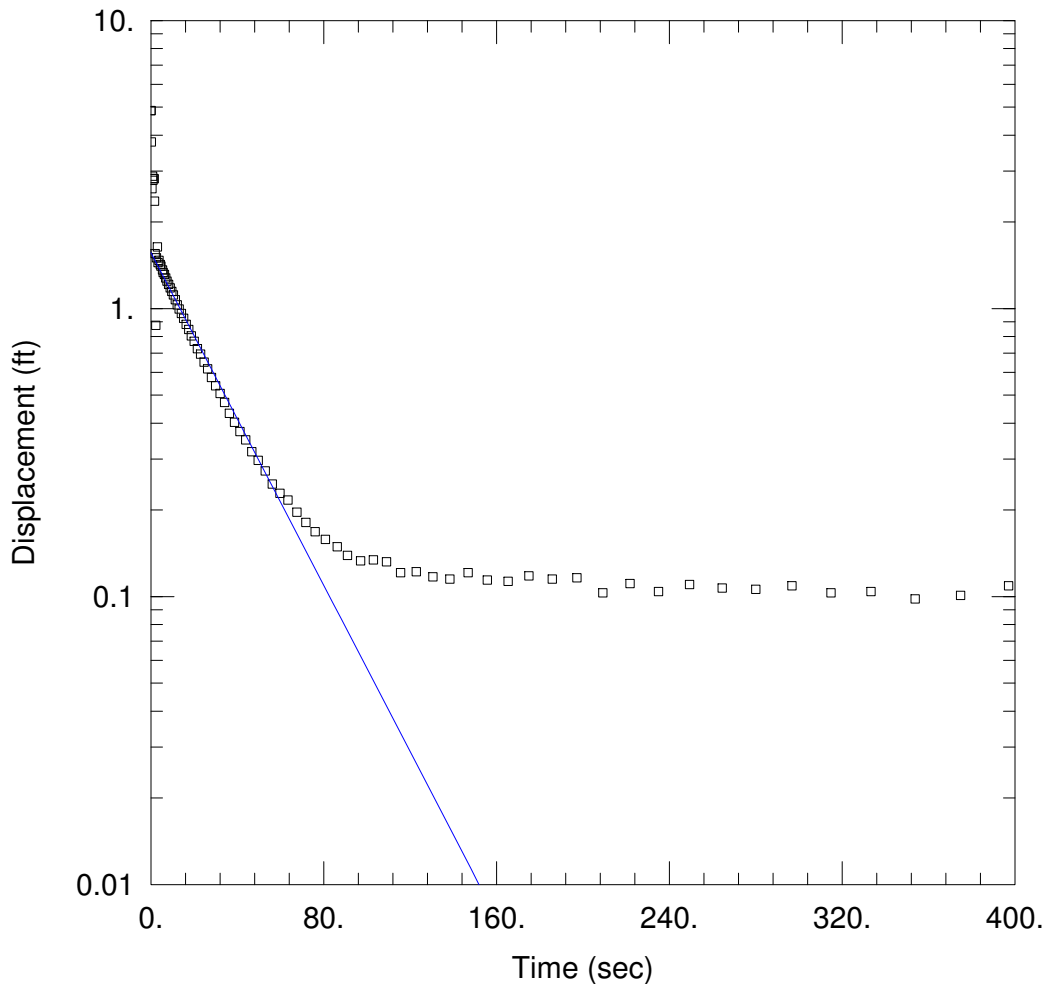
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.03

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0001041	cm/sec
y0	1.877	ft

$$T = K \cdot b = 0.2768 \text{ cm}^2/\text{sec}$$



SLUG IN 1

Data Set: P:\...\G02D Slug In 1.aqt  
 Date: 09/22/17

Time: 14:07:01

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G02D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 78.8 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G02D S11)

Initial Displacement: 4.872 ft  
 Total Well Penetration Depth: 9.63 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.34 ft  
 Screen Length: 9.63 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0006495 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.561 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 1  
 Date: 09/22/17  
 Time: 14:07:30

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G02D

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AQUIFER DATA

Saturated Thickness: 78.8 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G02D SI1

X Location: 832843. ft  
 Y Location: 202137.1 ft

Initial Displacement: 4.872 ft  
 Static Water Column Height: 10.34 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.63 ft  
 Total Well Penetration Depth: 9.63 ft

No. of Observations: 83

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	4.872	36.33	0.433
0.25	3.788	38.73	0.403
0.5	2.61	41.25	0.374
0.75	2.883	43.89	0.35
1.	2.787	46.71	0.318
1.25	2.828	49.71	0.297
1.5	2.819	52.89	0.273
1.75	2.36	56.25	0.246
2.	1.55	59.85	0.228
2.25	0.874	63.45	0.216
2.609	1.501	67.65	0.196
2.97	1.638	71.85	0.181
3.39	1.445	76.05	0.168
3.809	1.468	80.85	0.158
4.408	1.42	86.25	0.149
4.71	1.403	91.05	0.139
5.339	1.362	97.05	0.133
5.729	1.332	103.	0.134
6.329	1.312	109.	0.132
6.93	1.278	115.6	0.121
7.529	1.245	122.8	0.122
8.189	1.213	130.6	0.117
8.91	1.179	138.4	0.115
9.689	1.147	146.8	0.121
10.47	1.114	155.8	0.114
11.31	1.074	165.4	0.113
12.21	1.03	175.	0.118
13.17	0.995	185.8	0.115
14.13	0.961	197.2	0.116
15.21	0.925	209.2	0.103



<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
16.35	0.881	221.8	0.111
17.55	0.846	235.	0.104
18.81	0.804	249.4	0.11
20.13	0.769	264.4	0.107
21.57	0.726	280.	0.106
23.07	0.694	296.8	0.109
24.63	0.651	314.8	0.103
26.31	0.618	333.4	0.104
28.11	0.576	353.8	0.098
29.97	0.539	374.8	0.101
32.01	0.507	397.	0.109
34.11	0.472		

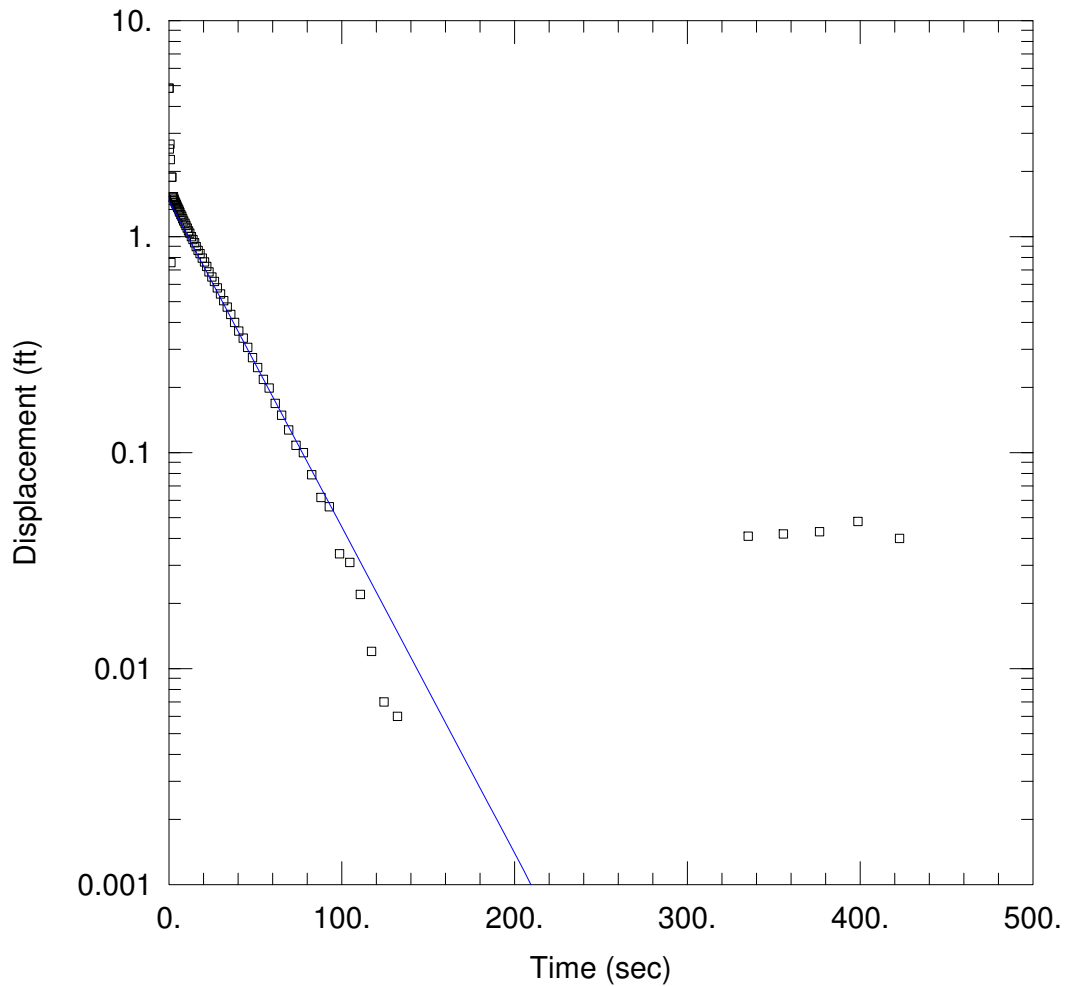
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.043

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0006495	cm/sec
y0	1.561	ft

$$T = K \cdot b = 1.56 \text{ cm}^2/\text{sec}$$



SLUG IN 2

Data Set: P:\...\G02D Slug In 2.aqt  
 Date: 09/22/17

Time: 14:09:13

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G02D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 78.8 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G02D SI2)

Initial Displacement: 4.864 ft                      Static Water Column Height: 10.34 ft  
 Total Well Penetration Depth: 9.63 ft                      Screen Length: 9.63 ft  
 Casing Radius: 0.03333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 2.373E-5 cm/sec                       $y_0 =$  1.461 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 2  
 Date: 09/22/17  
 Time: 14:09:43

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G02D

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AQUIFER DATA

Saturated Thickness: 78.8 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G02D SI2

X Location: 832843. ft  
 Y Location: 202137.1 ft

Initial Displacement: 4.864 ft  
 Static Water Column Height: 10.34 ft  
 Casing Radius: 0.03333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.63 ft  
 Total Well Penetration Depth: 9.63 ft

No. of Observations: 91

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	4.864	31.72	0.505
0.25	2.543	33.76	0.472
0.629	2.675	35.86	0.436
0.752	2.268	38.08	0.4
1.	1.396	40.48	0.365
1.25	0.756	43.	0.338
1.643	1.884	45.64	0.307
1.766	1.881	48.46	0.275
2.	1.526	51.46	0.247
2.25	1.469	54.64	0.218
2.639	1.529	58.	0.199
2.762	1.51	61.6	0.169
3.	1.488	65.2	0.149
3.251	1.468	69.41	0.127
3.5	1.46	73.6	0.108
3.75	1.435	77.8	0.1
4.	1.426	82.6	0.079
4.36	1.402	88.	0.062
4.72	1.383	92.8	0.056
5.14	1.361	98.8	0.034
5.56	1.337	104.8	0.031
5.979	1.313	110.8	0.022
6.46	1.292	117.4	0.012
7.	1.264	124.6	0.007
7.48	1.243	132.4	0.006
8.08	1.208	140.2	0.
8.68	1.18	148.6	-0.006
9.28	1.153	157.6	-0.012
9.939	1.124	167.2	-0.011
10.66	1.093	176.8	-0.011

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
11.44	1.062	187.6	-0.013
12.22	1.036	199.	-0.016
13.06	0.999	211.	-0.019
13.96	0.968	223.6	-0.023
14.92	0.937	236.8	-0.025
15.88	0.897	251.2	-0.027
16.96	0.863	266.2	-0.029
18.1	0.832	281.8	-0.029
19.3	0.795	298.6	-0.031
20.56	0.763	316.6	-0.025
21.88	0.728	335.2	0.041
23.32	0.687	355.6	0.042
24.82	0.65	376.6	0.043
26.38	0.619	398.8	0.048
28.06	0.578	422.8	0.04
29.86	0.542		

SOLUTION

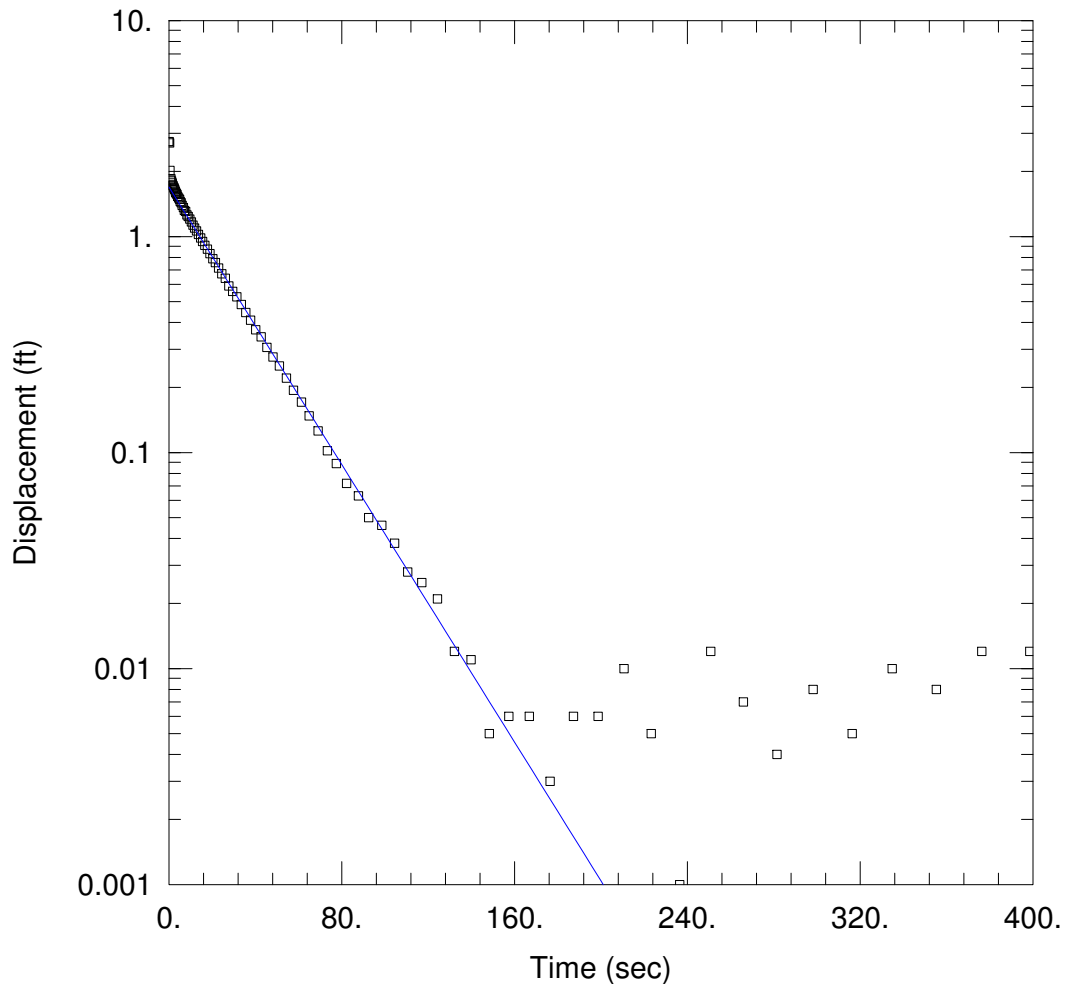
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.043

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	2.373E-5	cm/sec
y0	1.461	ft

$$T = K \cdot b = 0.05699 \text{ cm}^2/\text{sec}$$





### SLUG OUT 2

Data Set: P:\...\G02D Slug Out 2.aqt  
 Date: 09/22/17

Time: 14:12:11

### PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G02D  
 Test Date: 4/4/2017

### AQUIFER DATA

Saturated Thickness: 78.8 ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA (G02D SO1)

Initial Displacement: 2.749 ft  
 Total Well Penetration Depth: 9.63 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.34 ft  
 Screen Length: 9.63 ft  
 Well Radius: 0.3458 ft

### SOLUTION

Aquifer Model: Confined  
 K = 0.0007228 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.693 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 2  
 Date: 09/22/17  
 Time: 14:12:31

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G02D

---

AQUIFER DATA

Saturated Thickness: 78.8 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G02D SO1

X Location: 832843. ft  
 Y Location: 202137.1 ft

Initial Displacement: 2.749 ft  
 Static Water Column Height: 10.34 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.63 ft  
 Total Well Penetration Depth: 9.63 ft

No. of Observations: 89

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.749	31.47	0.525
0.336	2.709	33.51	0.485
0.5	2.02	35.61	0.445
0.75	1.827	37.83	0.41
1.	1.851	40.23	0.37
1.25	1.805	42.75	0.343
1.5	1.773	45.39	0.307
1.75	1.732	48.21	0.277
2.	1.717	51.21	0.252
2.25	1.691	54.39	0.221
2.5	1.669	57.75	0.194
2.75	1.648	61.35	0.171
3.	1.618	64.95	0.148
3.25	1.598	69.15	0.126
3.5	1.581	73.35	0.102
3.75	1.567	77.55	0.089
4.109	1.532	82.35	0.072
4.469	1.508	87.75	0.063
4.889	1.49	92.55	0.05
5.309	1.455	98.55	0.046
5.729	1.432	104.5	0.038
6.209	1.395	110.5	0.028
6.749	1.361	117.1	0.025
7.229	1.322	124.3	0.021
7.829	1.306	132.1	0.012
8.429	1.261	139.9	0.011
9.029	1.238	148.3	0.005
9.689	1.203	157.3	0.006
10.41	1.167	166.9	0.006
11.19	1.129	176.5	0.003

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
11.97	1.094	187.3	0.006
12.81	1.062	198.7	0.006
13.71	1.022	210.7	0.01
14.67	0.986	223.3	0.005
15.63	0.95	236.5	0.001
16.71	0.911	250.9	0.012
17.85	0.875	265.9	0.007
19.05	0.833	281.5	0.004
20.31	0.79	298.3	0.008
21.63	0.756	316.3	0.005
23.07	0.715	334.9	0.01
24.57	0.672	355.3	0.008
26.13	0.64	376.3	0.012
27.81	0.591	398.5	0.012
29.61	0.558		

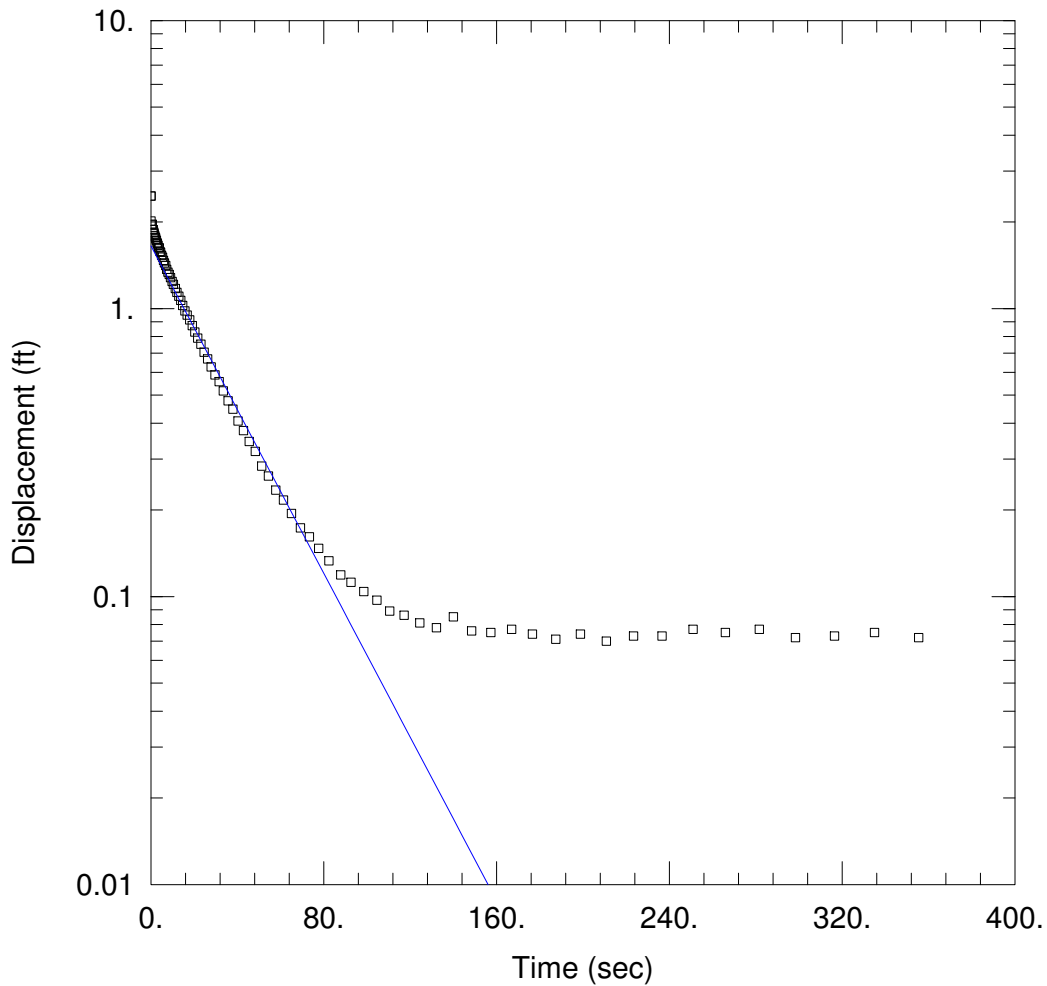
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.043

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0007228	cm/sec
y0	1.693	ft

$$T = K \cdot b = 1.736 \text{ cm}^2/\text{sec}$$



SLUG OUT 3

Data Set: P:\...\G02D Slug Out 3.aqt  
 Date: 09/22/17

Time: 14:13:36

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G02D  
 Test Date: 4/4/2017

AQUIFER DATA

Saturated Thickness: 78.8 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G02D SO3)

Initial Displacement: 2.457 ft  
 Total Well Penetration Depth: 9.63 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.34 ft  
 Screen Length: 9.63 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0006395 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.649 ft



Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 3  
 Date: 09/22/17  
 Time: 14:13:57

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/4/2017  
 Test Well: G02D

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AQUIFER DATA

Saturated Thickness: 78.8 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G02D SO3

X Location: 832843. ft  
 Y Location: 202137.1 ft

Initial Displacement: 2.457 ft  
 Static Water Column Height: 10.34 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.63 ft  
 Total Well Penetration Depth: 9.63 ft

No. of Observations: 88

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.457	27.92	0.627
0.123	2.015	29.72	0.588
0.358	1.954	31.58	0.558
0.608	1.964	33.62	0.518
1.015	1.878	35.72	0.478
1.138	1.878	37.94	0.447
1.358	1.841	40.34	0.407
1.608	1.816	42.86	0.377
1.858	1.791	45.5	0.345
2.108	1.766	48.32	0.319
2.358	1.744	51.32	0.284
2.608	1.721	54.5	0.262
2.858	1.691	57.86	0.234
3.108	1.678	61.46	0.216
3.358	1.657	65.06	0.194
3.608	1.627	69.26	0.173
3.858	1.624	73.46	0.161
4.218	1.578	77.66	0.147
4.578	1.565	82.46	0.133
4.998	1.53	87.86	0.119
5.418	1.509	92.66	0.112
5.838	1.469	98.66	0.104
6.318	1.439	104.7	0.097
6.858	1.41	110.7	0.089
7.338	1.367	117.3	0.086
7.938	1.338	124.5	0.081
8.538	1.313	132.3	0.078
9.138	1.281	140.1	0.085
9.798	1.24	148.5	0.076
10.52	1.214	157.5	0.075

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
11.3	1.172	167.1	0.077
12.08	1.137	176.7	0.074
12.92	1.103	187.5	0.071
13.82	1.067	198.9	0.074
14.78	1.024	210.9	0.07
15.74	0.982	223.5	0.073
16.82	0.95	236.7	0.073
17.96	0.913	251.1	0.077
19.16	0.871	266.1	0.075
20.42	0.829	281.7	0.077
21.74	0.789	298.5	0.072
23.18	0.751	316.5	0.073
24.68	0.706	335.1	0.075
26.24	0.668	355.5	0.072

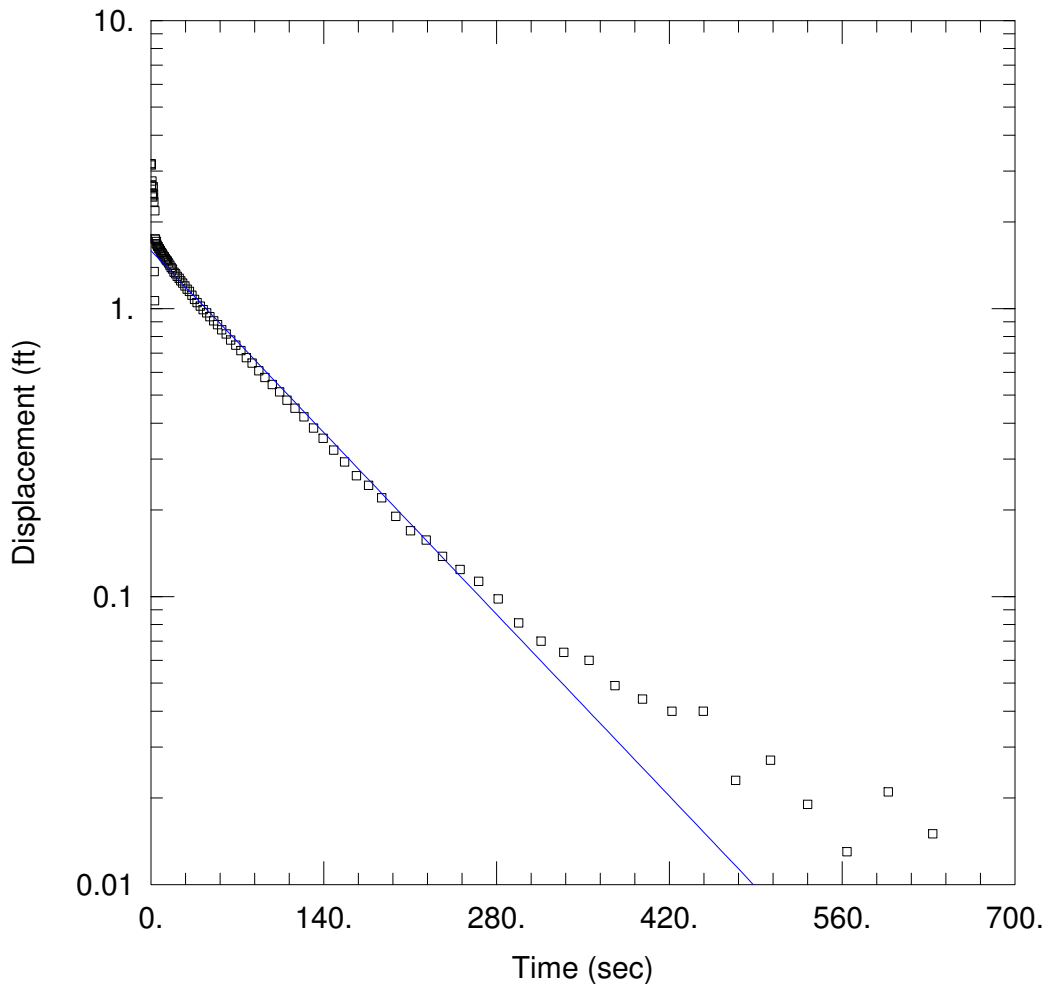
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.043

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0006395	cm/sec
y0	1.649	ft

$$T = K*b = 1.536 \text{ cm}^2/\text{sec}$$



SLUG IN 1

Data Set: P:\...\G51D Slug In 1.aqt  
 Date: 09/22/17

Time: 14:16:56

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G51D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 96.9 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G51D S11)

Initial Displacement: 3.183 ft  
 Total Well Penetration Depth: 12.97 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 15.7 ft  
 Screen Length: 9.66 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0002131 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.587 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 1  
 Date: 09/22/17  
 Time: 14:17:27

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G51D

---

AQUIFER DATA

Saturated Thickness: 96.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G51D SI1

X Location: 832151.5 ft  
 Y Location: 200430.1 ft

Initial Displacement: 3.183 ft  
 Static Water Column Height: 15.7 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.66 ft  
 Total Well Penetration Depth: 12.97 ft

No. of Observations: 96

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	3.183	39.98	1.019
0.352	2.689	42.5	0.99
0.5	3.148	45.14	0.967
0.75	2.67	47.96	0.936
1.	2.77	50.96	0.907
1.25	2.512	54.14	0.878
1.5	2.462	57.5	0.843
1.75	2.437	61.1	0.817
2.	2.645	64.7	0.778
2.25	2.499	68.9	0.746
2.5	2.349	73.1	0.715
2.75	1.343	77.3	0.676
3.	1.065	82.1	0.646
3.25	2.187	87.5	0.608
3.5	1.743	92.3	0.576
3.86	1.741	98.3	0.544
4.22	1.678	104.3	0.514
4.64	1.708	110.3	0.48
5.059	1.66	116.9	0.451
5.479	1.643	124.1	0.421
5.96	1.64	131.9	0.385
6.499	1.616	139.7	0.354
6.979	1.613	148.1	0.322
7.579	1.59	157.1	0.293
8.18	1.572	166.7	0.263
8.779	1.562	176.3	0.243
9.439	1.545	187.1	0.22
10.16	1.525	198.5	0.19
10.94	1.51	210.5	0.169
11.72	1.488	223.1	0.157



<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
12.56	1.475	236.3	0.138
13.46	1.461	250.7	0.124
14.42	1.439	265.7	0.113
15.38	1.413	281.3	0.098
16.46	1.388	298.1	0.081
17.6	1.372	316.1	0.07
18.8	1.338	334.7	0.064
20.06	1.32	355.1	0.06
21.38	1.294	376.1	0.049
22.82	1.273	398.3	0.044
24.32	1.247	422.3	0.04
25.88	1.225	447.5	0.04
27.56	1.197	473.9	0.023
29.36	1.168	502.1	0.027
31.22	1.147	532.1	0.019
33.26	1.112	563.9	0.013
35.36	1.076	597.5	0.021
37.58	1.048	633.5	0.015

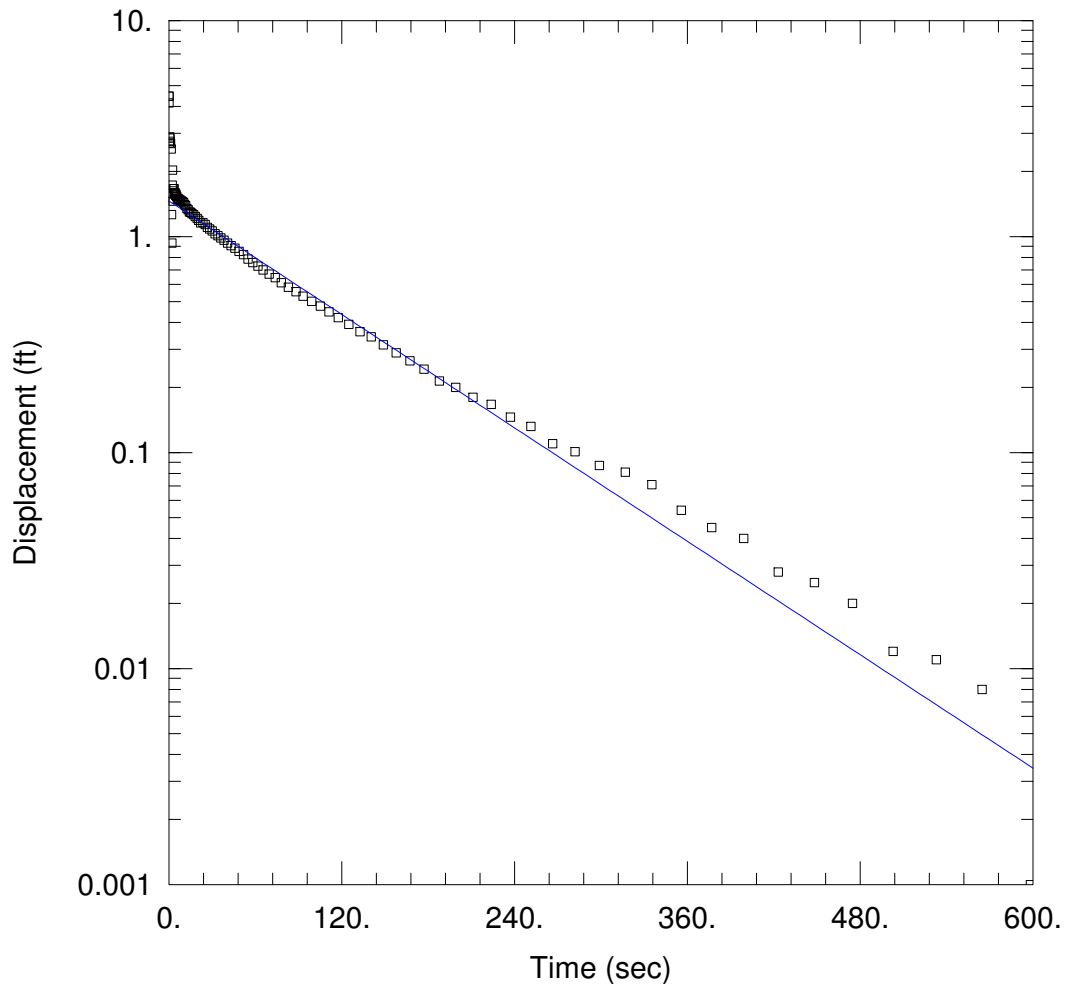
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 In(Re/rw): 2.152

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0002131	cm/sec
y0	1.587	ft

$$T = K \cdot b = 0.6293 \text{ cm}^2/\text{sec}$$



SLUG IN 2

Data Set: P:\...\G51D Slug In 2.aqt  
 Date: 09/22/17

Time: 14:18:51

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G51D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 96.9 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G51D SI2)

Initial Displacement: 4.465 ft                      Static Water Column Height: 15.7 ft  
 Total Well Penetration Depth: 12.97 ft                      Screen Length: 9.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.03458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0003975 cm/sec                       $y_0 =$  1.459 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 2  
 Date: 09/22/17  
 Time: 14:19:09

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G51D

---

AQUIFER DATA

Saturated Thickness: 96.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G51D SI2

X Location: 832151.5 ft  
 Y Location: 200430.1 ft

Initial Displacement: 4.465 ft  
 Static Water Column Height: 15.7 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.03458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.66 ft  
 Total Well Penetration Depth: 12.97 ft

No. of Observations: 99

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	4.465	36.18	0.985
0.123	4.153	38.4	0.962
0.322	2.709	40.8	0.931
0.572	2.891	43.32	0.908
0.822	2.85	45.96	0.884
1.072	2.76	48.78	0.852
1.322	2.695	51.78	0.824
1.572	2.54	54.96	0.786
1.822	1.262	58.32	0.758
2.072	0.931	61.92	0.73
2.322	1.731	65.52	0.701
2.572	2.03	69.72	0.669
2.822	1.625	73.92	0.645
3.072	1.46	78.12	0.611
3.322	1.668	82.92	0.583
3.572	1.663	88.32	0.555
3.822	1.569	93.12	0.529
4.072	1.594	99.12	0.502
4.322	1.594	105.1	0.476
4.682	1.549	111.1	0.448
5.042	1.567	117.7	0.421
5.462	1.535	124.9	0.392
5.881	1.49	132.7	0.363
6.301	1.501	140.5	0.343
6.782	1.491	148.9	0.315
7.321	1.476	157.9	0.289
7.801	1.473	167.5	0.266
8.401	1.467	177.1	0.243
9.002	1.457	187.9	0.214
9.601	1.446	199.3	0.2

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.26	1.431	211.3	0.18
10.98	1.403	223.9	0.167
11.76	1.388	237.1	0.146
12.54	1.347	251.5	0.132
13.38	1.329	266.5	0.11
14.28	1.298	282.1	0.101
15.24	1.293	298.9	0.087
16.2	1.278	316.9	0.081
17.28	1.263	335.5	0.071
18.42	1.236	355.9	0.054
19.62	1.214	376.9	0.045
20.88	1.186	399.1	0.04
22.2	1.156	423.1	0.028
23.65	1.159	448.3	0.025
25.14	1.135	474.7	0.02
26.7	1.102	502.9	0.012
28.38	1.082	532.9	0.011
30.18	1.062	564.7	0.008
32.04	1.029	598.3	0.001
34.08	1.009		

SOLUTION

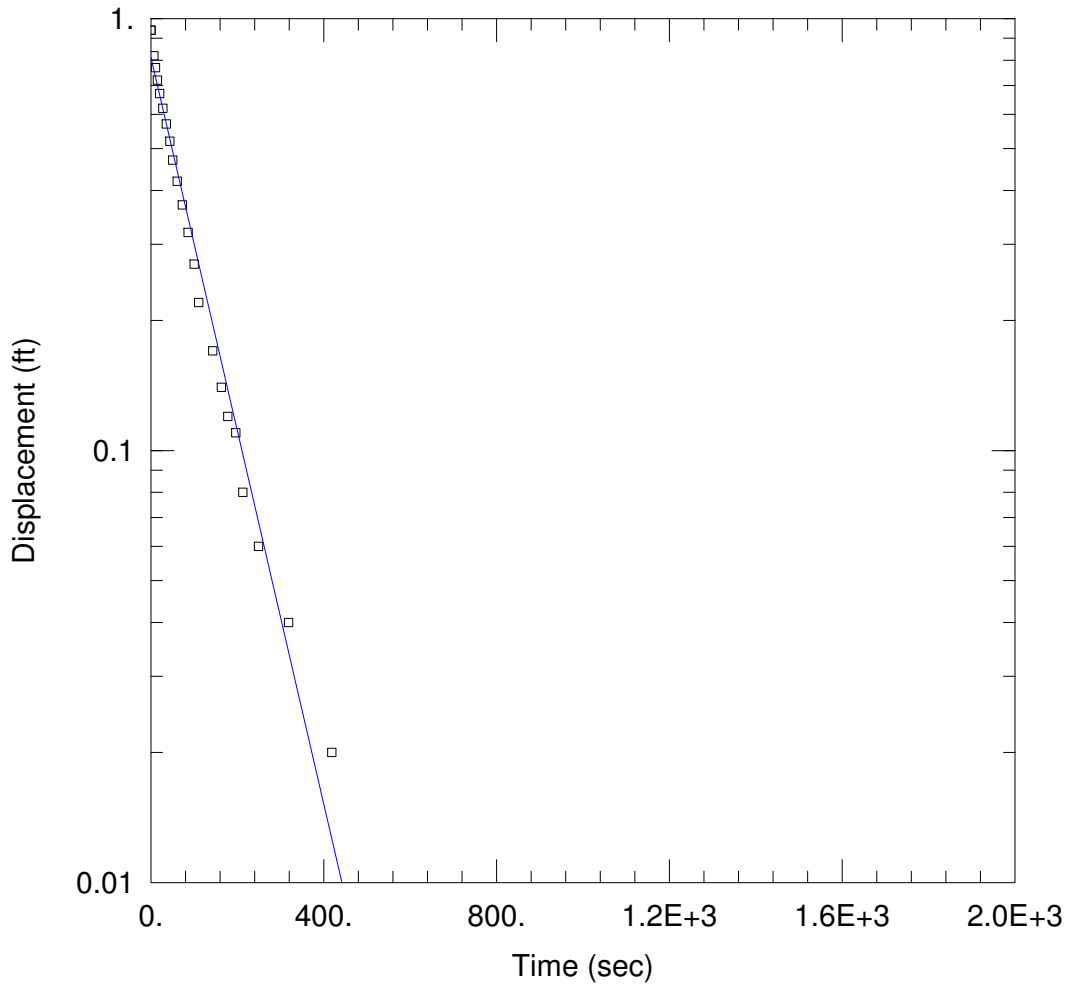
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 4.137

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0003975	cm/sec
y0	1.459	ft

$$T = K \cdot b = 1.174 \text{ cm}^2/\text{sec}$$





SLUG OUT 1

Data Set: P:\...\G51D Slug Out 1.aqt  
 Date: 09/22/17

Time: 14:20:23

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G51D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 96.9 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G51D SO1)

Initial Displacement: 0.94 ft                      Static Water Column Height: 15.7 ft  
 Total Well Penetration Depth: 12.97 ft              Screen Length: 9.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0002346 cm/sec                      y0 = 0.8117 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 1  
 Date: 09/22/17  
 Time: 14:20:38

### PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G51D

### AQUIFER DATA

Saturated Thickness: 96.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

### SLUG TEST WELL DATA

Test Well: G51D SO1

X Location: 832151.5 ft  
 Y Location: 200430.1 ft

Initial Displacement: 0.94 ft  
 Static Water Column Height: 15.7 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.66 ft  
 Total Well Penetration Depth: 12.97 ft

No. of Observations: 23

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	0.94	100.	0.27
7.	0.82	111.	0.22
11.	0.77	143.	0.17
15.	0.72	163.	0.14
20.	0.67	178.	0.12
28.	0.62	197.	0.11
36.	0.57	213.	0.08
44.	0.52	249.	0.06
51.	0.47	319.	0.04
61.	0.42	419.	0.02
73.	0.37	1166.	-0.01
86.	0.32		

### SOLUTION

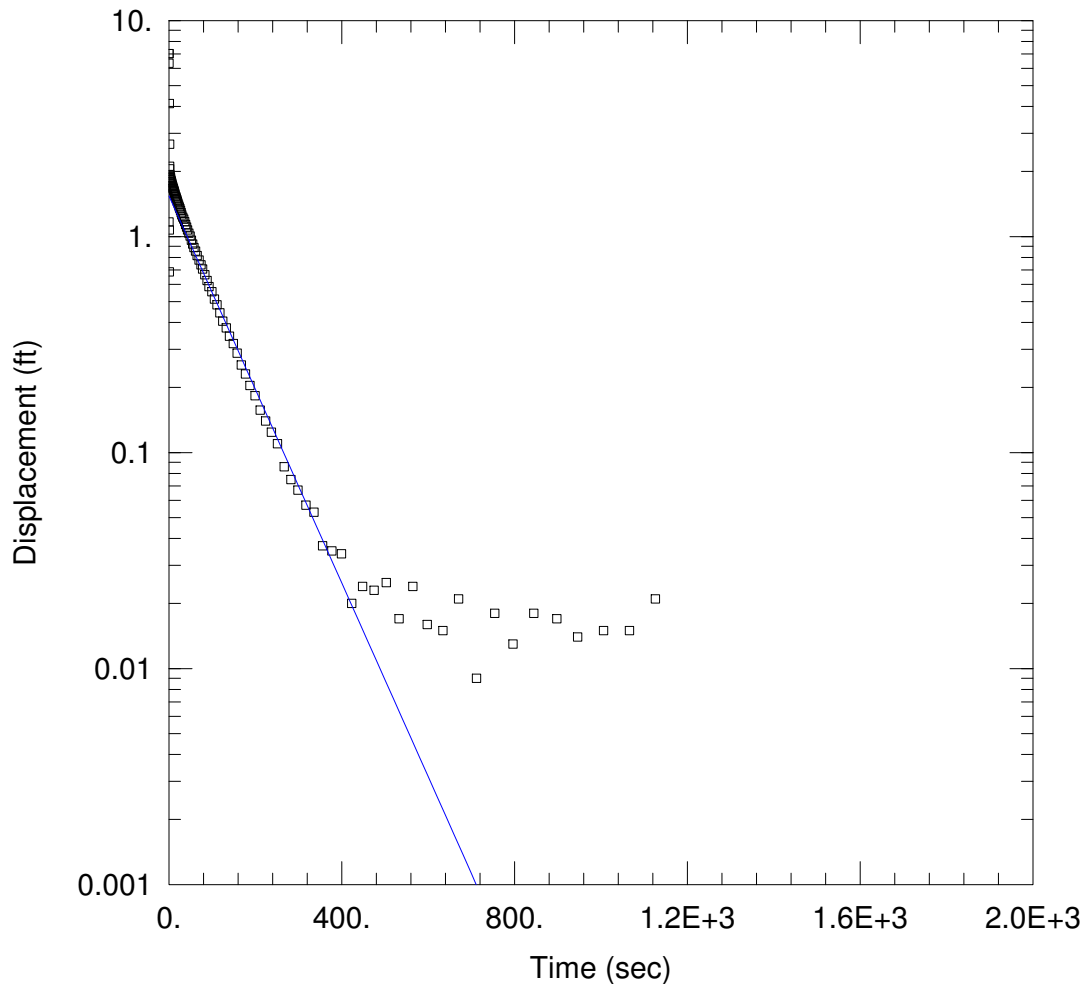
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.152

### VISUAL ESTIMATION RESULTS

#### Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0002346	cm/sec
y0	0.8117	ft

$$T = K*b = 0.6928 \text{ cm}^2/\text{sec}$$



SLUG OUT 2

Data Set: P:\...\G51D Slug Out 2.aqt  
 Date: 09/22/17

Time: 14:21:57

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G51D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 96.9 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G51D SO2)

Initial Displacement: 7.037 ft                      Static Water Column Height: 15.7 ft  
 Total Well Penetration Depth: 12.97 ft                      Screen Length: 9.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0002118 cm/sec                       $y_0 =$  1.542 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 2  
 Date: 09/22/17  
 Time: 14:22:17

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G51D

---

AQUIFER DATA

Saturated Thickness: 96.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G51D SO2

X Location: 832151.5 ft  
 Y Location: 200430.1 ft

Initial Displacement: 7.037 ft  
 Static Water Column Height: 15.7 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.66 ft  
 Total Well Penetration Depth: 12.97 ft

No. of Observations: 110

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	7.037	48.96	1.004
0.25	1.167	51.96	0.963
0.5	6.352	55.14	0.924
0.879	1.073	58.5	0.888
1.001	4.125	62.1	0.855
1.25	0.687	65.7	0.817
1.5	2.675	69.9	0.777
1.873	2.117	74.1	0.74
1.997	2.059	78.3	0.708
2.25	1.865	83.1	0.665
2.5	1.88	88.5	0.626
2.75	1.937	93.3	0.586
3.	1.835	99.3	0.555
3.25	1.891	105.3	0.513
3.5	1.851	111.3	0.482
3.75	1.868	117.9	0.443
4.	1.831	125.1	0.405
4.25	1.823	132.9	0.377
4.5	1.82	140.7	0.345
4.86	1.797	149.1	0.319
5.22	1.791	158.1	0.288
5.64	1.792	167.7	0.254
6.06	1.784	177.3	0.231
6.48	1.76	188.1	0.204
6.96	1.754	199.5	0.183
7.5	1.73	211.5	0.157
7.98	1.718	224.1	0.14
8.58	1.713	237.3	0.124
9.18	1.692	251.7	0.11
9.78	1.672	266.7	0.086

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.44	1.662	282.3	0.075
11.16	1.637	299.1	0.067
11.94	1.623	317.1	0.057
12.72	1.602	335.7	0.053
13.56	1.582	356.1	0.037
14.46	1.563	377.1	0.035
15.42	1.54	399.3	0.034
16.38	1.525	423.3	0.02
17.46	1.497	448.5	0.024
18.6	1.479	474.9	0.023
19.8	1.452	503.1	0.025
21.06	1.428	533.1	0.017
22.38	1.398	564.9	0.024
23.82	1.371	598.5	0.016
25.32	1.35	634.5	0.015
26.88	1.319	670.5	0.021
28.56	1.29	712.5	0.009
30.36	1.258	754.5	0.018
32.22	1.231	796.5	0.013
34.26	1.203	844.5	0.018
36.36	1.17	898.5	0.017
38.58	1.136	946.5	0.014
40.98	1.106	1006.5	0.015
43.5	1.072	1066.5	0.015
46.14	1.036	1126.5	0.021

SOLUTION

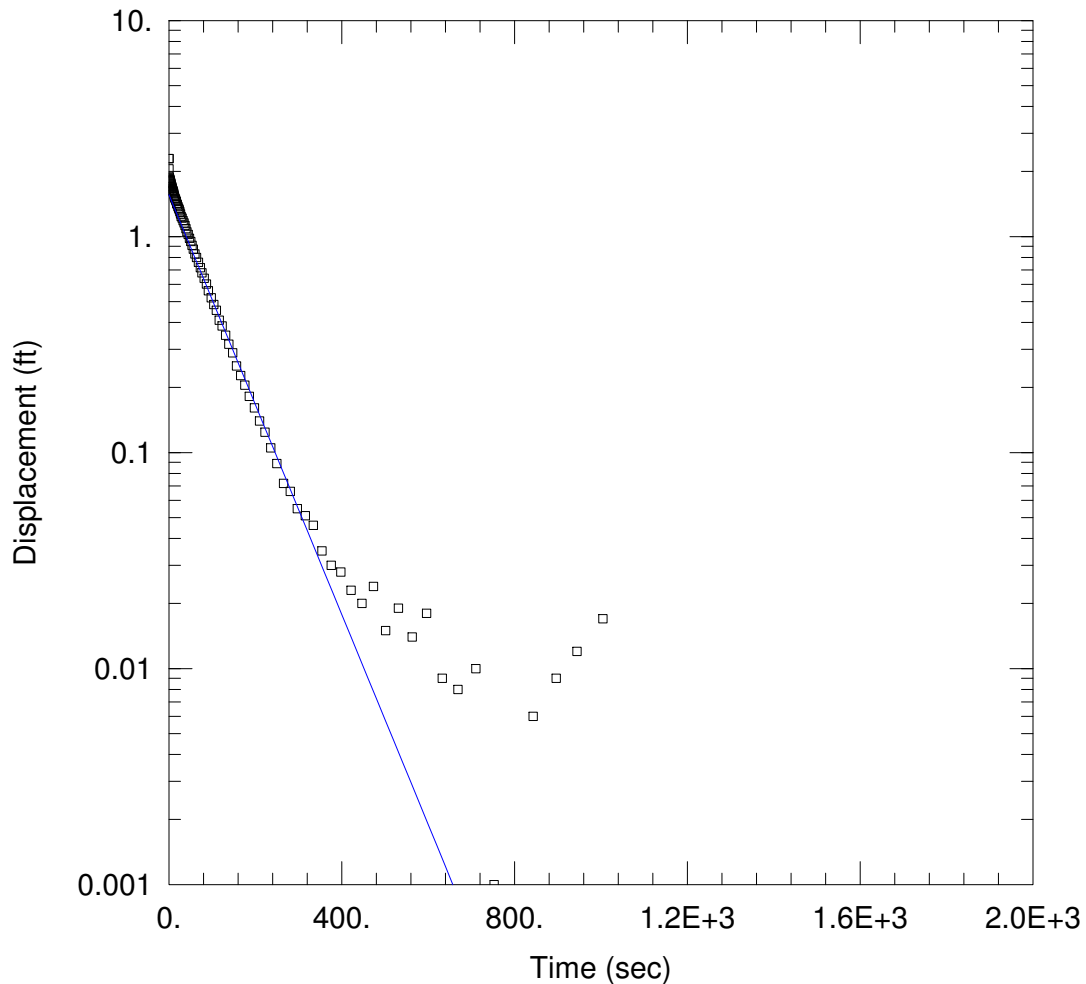
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.152

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0002118	cm/sec
y0	1.542	ft

$$T = K*b = 0.6255 \text{ cm}^2/\text{sec}$$





SLUG OUT 3

Data Set: P:\...\G51D Slug Out 3.aqt  
 Date: 09/22/17

Time: 14:23:14

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G51D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 96.9 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G51D SO3)

Initial Displacement: 2.298 ft                      Static Water Column Height: 15.7 ft  
 Total Well Penetration Depth: 12.97 ft                      Screen Length: 9.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0002296 cm/sec                       $y_0$  = 1.56 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 3  
 Date: 09/22/17  
 Time: 14:23:30

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G51D

---

AQUIFER DATA

Saturated Thickness: 96.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G51D SO3

X Location: 832151.5 ft  
 Y Location: 200430.1 ft

Initial Displacement: 2.298 ft  
 Static Water Column Height: 15.7 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.66 ft  
 Total Well Penetration Depth: 12.97 ft

No. of Observations: 102

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.298	53.64	0.912
0.25	1.633	57.	0.875
0.5	2.056	60.6	0.83
0.75	1.808	64.2	0.8
1.	1.884	68.4	0.759
1.25	1.861	72.6	0.717
1.5	1.825	76.8	0.679
1.75	1.848	81.6	0.64
2.	1.827	87.	0.602
2.25	1.834	91.8	0.561
2.5	1.815	97.8	0.521
2.75	1.8	103.8	0.484
3.	1.799	109.8	0.455
3.36	1.785	116.4	0.41
3.72	1.78	123.6	0.385
4.14	1.767	131.4	0.349
4.56	1.756	139.2	0.317
4.979	1.741	147.6	0.289
5.46	1.731	156.6	0.252
5.999	1.708	166.2	0.227
6.479	1.703	175.8	0.205
7.08	1.686	186.6	0.182
7.68	1.672	198.	0.161
8.279	1.64	210.	0.14
8.939	1.629	222.6	0.124
9.659	1.62	235.8	0.105
10.44	1.597	250.2	0.089
11.22	1.575	265.2	0.072
12.06	1.555	280.8	0.066
12.96	1.531	297.6	0.055

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
13.92	1.507	315.6	0.051
14.88	1.492	334.2	0.046
15.96	1.474	354.6	0.035
17.1	1.452	375.6	0.03
18.3	1.423	397.8	0.028
19.56	1.403	421.8	0.023
20.88	1.375	447.	0.02
22.32	1.352	473.4	0.024
23.82	1.329	501.6	0.015
25.38	1.301	531.6	0.019
27.06	1.274	563.4	0.014
28.86	1.239	597.	0.018
30.72	1.216	633.	0.009
32.76	1.182	669.	0.008
34.86	1.155	711.	0.01
37.08	1.126	753.	0.001
39.48	1.089	795.	0.
42.	1.051	843.	0.006
44.64	1.021	897.	0.009
47.46	0.983	945.	0.012
50.46	0.947	1005.	0.017

SOLUTION

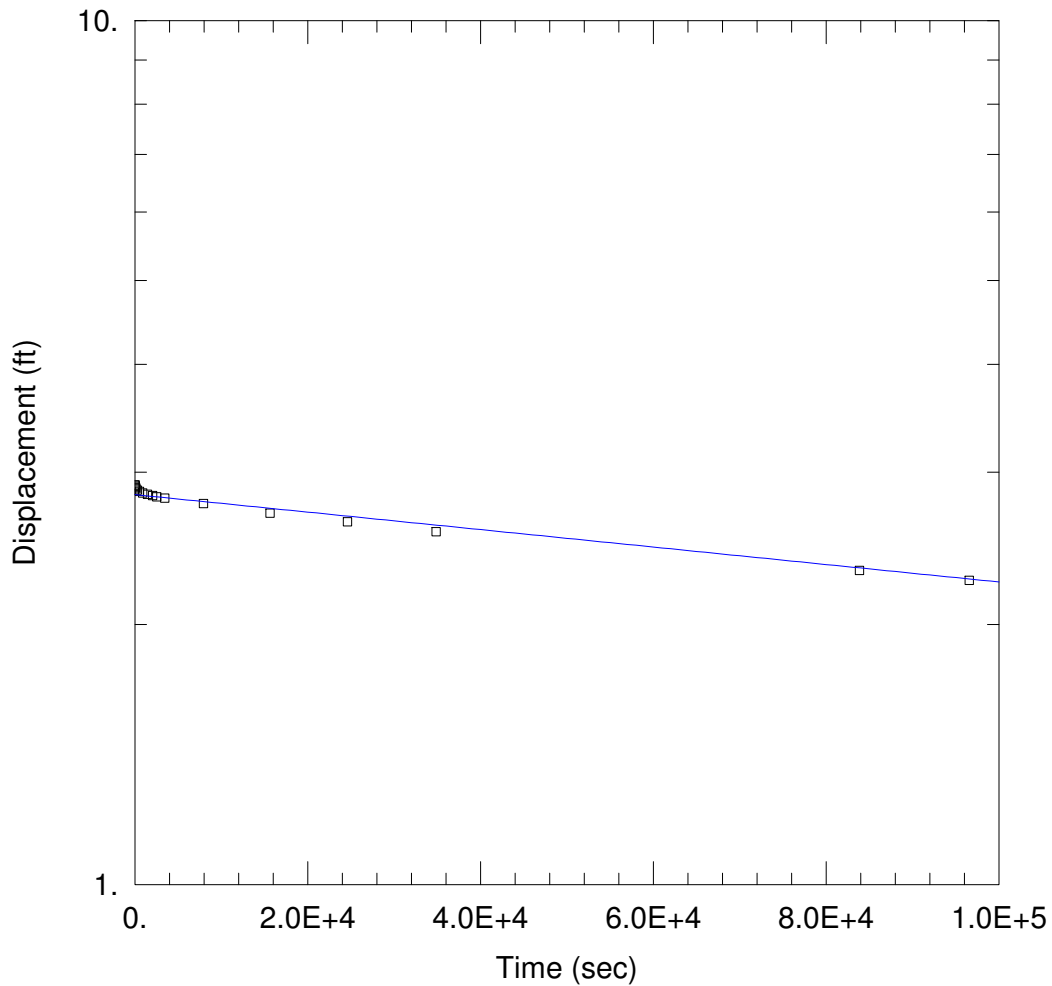
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.152

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0002296	cm/sec
y0	1.56	ft

$T = K \cdot b = 0.6781 \text{ cm}^2/\text{sec}$



### SLUG OUT 1

Data Set: P:\...\G52D Slug Out 1.aqt  
 Date: 09/22/17

Time: 14:28:08

### PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G52D  
 Test Date: 4/3/2017

### AQUIFER DATA

Saturated Thickness: 55.9 ft

Anisotropy Ratio (Kz/Kr): 1.

### WELL DATA (G52D SO1)

Initial Displacement: 2.9 ft  
 Total Well Penetration Depth: 4.2 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.03 ft  
 Screen Length: 4.2 ft  
 Well Radius: 0.3458 ft

### SOLUTION

Aquifer Model: Confined  
 K = 7.129E-8 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.826 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 1  
 Date: 09/22/17  
 Time: 14:29:14

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G52D

AQUIFER DATA

Saturated Thickness: 55.9 ft  
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: G52D SO1

X Location: 832927.9 ft  
 Y Location: 198098.9 ft

Initial Displacement: 2.9 ft  
 Static Water Column Height: 10.03 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 4.2 ft  
 Total Well Penetration Depth: 4.2 ft

No. of Observations: 17

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.9	2555.	2.81
69.	2.89	3455.	2.8
108.	2.88	7949.	2.76
145.	2.87	1.566E+4	2.69
286.	2.86	2.462E+4	2.63
528.	2.85	3.488E+4	2.56
891.	2.84	8.386E+4	2.31
1461.	2.83	9.658E+4	2.25
2039.	2.82		

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 1.396

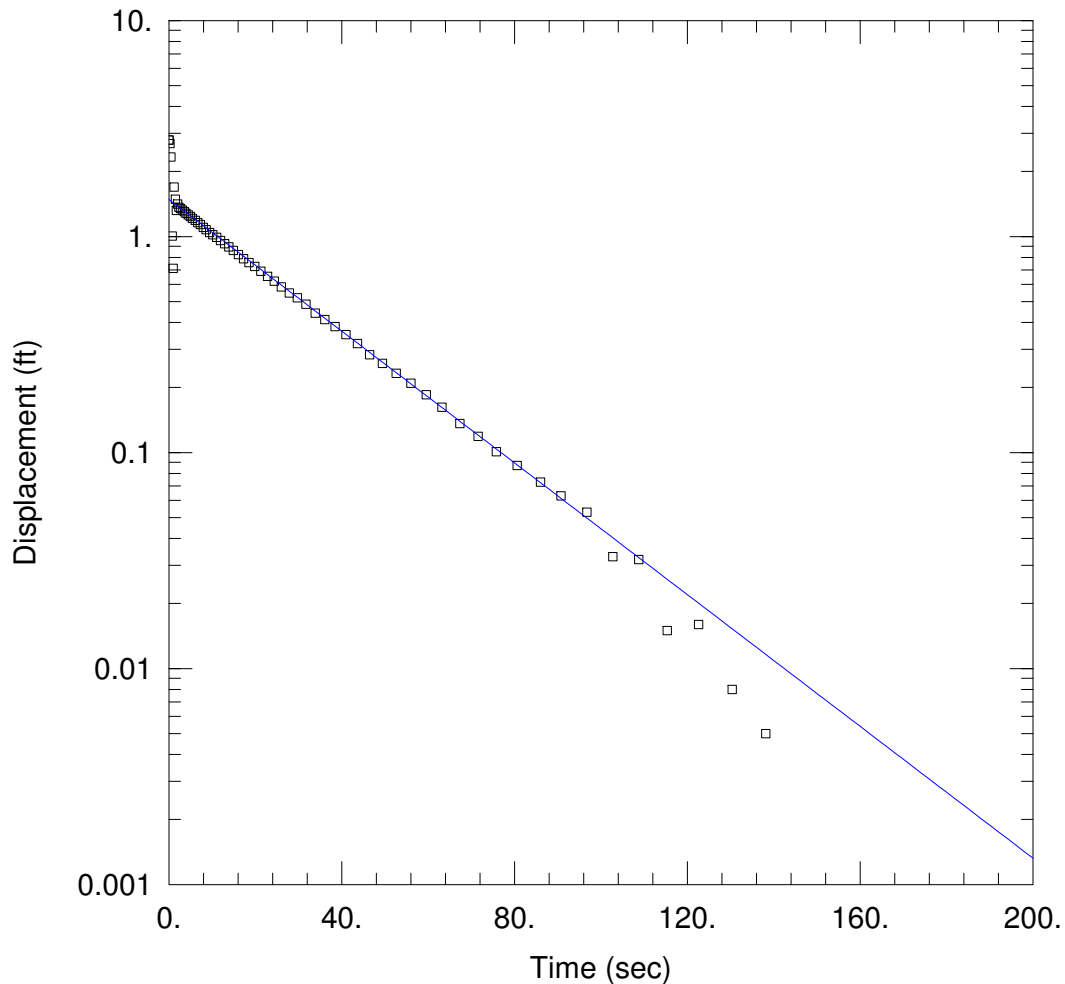
VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	7.129E-8	cm/sec
y0	2.826	ft

$T = K \cdot b = 0.0001215 \text{ cm}^2/\text{sec}$





SLUG IN 1

Data Set: P:\...\G53D Slug In 1.aqt  
 Date: 09/22/17

Time: 14:32:18

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G53D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 94.2 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G53D S11)

Initial Displacement: 2.799 ft                      Static Water Column Height: 20. ft  
 Total Well Penetration Depth: 15.91 ft                      Screen Length: 9.6 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0007519 cm/sec                       $y_0 =$  1.485 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 1  
 Date: 09/22/17  
 Time: 14:32:46

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G53D

---

AQUIFER DATA

Saturated Thickness: 94.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G53D SI1

X Location: 833980.2 ft  
 Y Location: 200075.2 ft

Initial Displacement: 2.799 ft  
 Static Water Column Height: 20. ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.6 ft  
 Total Well Penetration Depth: 15.91 ft

No. of Observations: 64

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.799	19.88	0.726
0.25	2.695	21.32	0.691
0.5	2.335	22.82	0.654
0.75	1.006	24.38	0.621
1.	0.713	26.06	0.584
1.25	1.695	27.86	0.548
1.5	1.489	29.72	0.521
1.75	1.321	31.76	0.486
2.	1.415	33.86	0.442
2.36	1.365	36.08	0.413
2.72	1.35	38.48	0.383
3.14	1.323	41.	0.351
3.56	1.304	43.64	0.319
3.98	1.281	46.46	0.284
4.46	1.26	49.46	0.259
5.	1.237	52.64	0.233
5.48	1.212	56.	0.209
6.08	1.186	59.6	0.185
6.68	1.159	63.2	0.162
7.28	1.136	67.4	0.136
7.94	1.103	71.6	0.119
8.66	1.076	75.8	0.101
9.44	1.045	80.6	0.087
10.22	1.019	86.	0.073
11.06	0.99	90.8	0.063
11.96	0.959	96.8	0.053
12.92	0.926	102.8	0.033
13.88	0.895	108.8	0.032
14.96	0.862	115.4	0.015
16.1	0.825	122.6	0.016

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
17.3	0.79	130.4	0.008
18.56	0.757	138.2	0.005

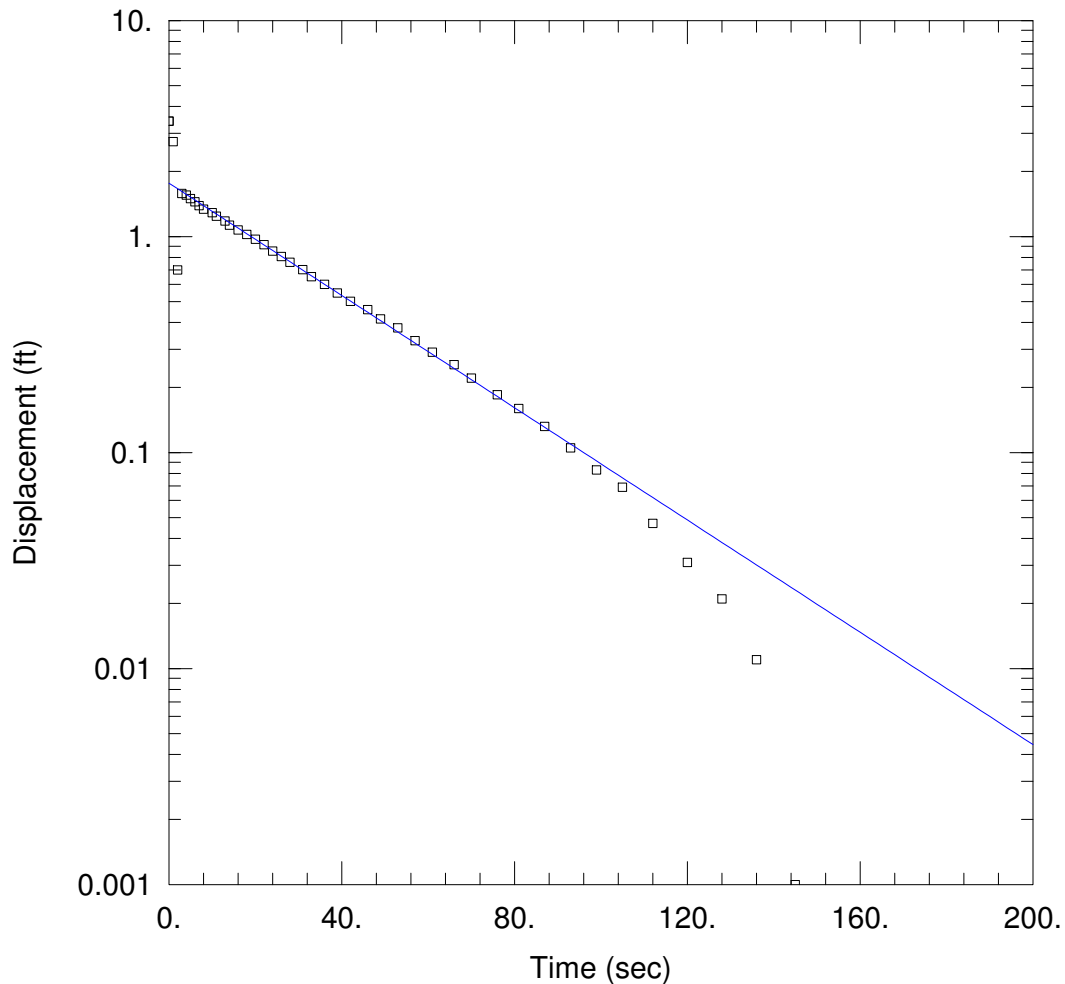
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.232

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0007519	cm/sec
y0	1.485	ft

$$T = K*b = 2.159 \text{ cm}^2/\text{sec}$$



SLUG IN 2

Data Set: P:\...\G53D Slug In 2.aqt  
 Date: 09/22/17

Time: 14:34:32

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G53D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 94.2 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G53D SI2)

Initial Displacement: 3.419 ft                      Static Water Column Height: 20. ft  
 Total Well Penetration Depth: 15.91 ft                      Screen Length: 9.6 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0006408 cm/sec                       $y_0 =$  1.766 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug In 2  
 Date: 09/22/17  
 Time: 14:34:48

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G53D

---

AQUIFER DATA

Saturated Thickness: 94.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G53D SI2

X Location: 833980.2 ft  
 Y Location: 200075.2 ft

Initial Displacement: 3.419 ft  
 Static Water Column Height: 20. ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.6 ft  
 Total Well Penetration Depth: 15.91 ft

No. of Observations: 43

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	3.419	36.	0.601
1.	2.745	39.	0.548
2.	0.7	42.	0.501
3.	1.58	46.	0.459
4.	1.553	49.	0.415
5.	1.497	53.	0.377
6.	1.449	57.	0.329
7.	1.388	61.	0.291
8.	1.339	66.	0.255
10.	1.291	70.	0.221
11.	1.241	76.	0.185
13.	1.178	81.	0.16
14.	1.129	87.	0.132
16.	1.074	93.	0.105
18.	1.023	99.	0.083
20.	0.971	105.	0.069
22.	0.916	112.	0.047
24.	0.856	120.	0.031
26.	0.807	128.	0.021
28.	0.761	136.	0.011
31.	0.702	145.	0.001
33.	0.652		

---

SOLUTION

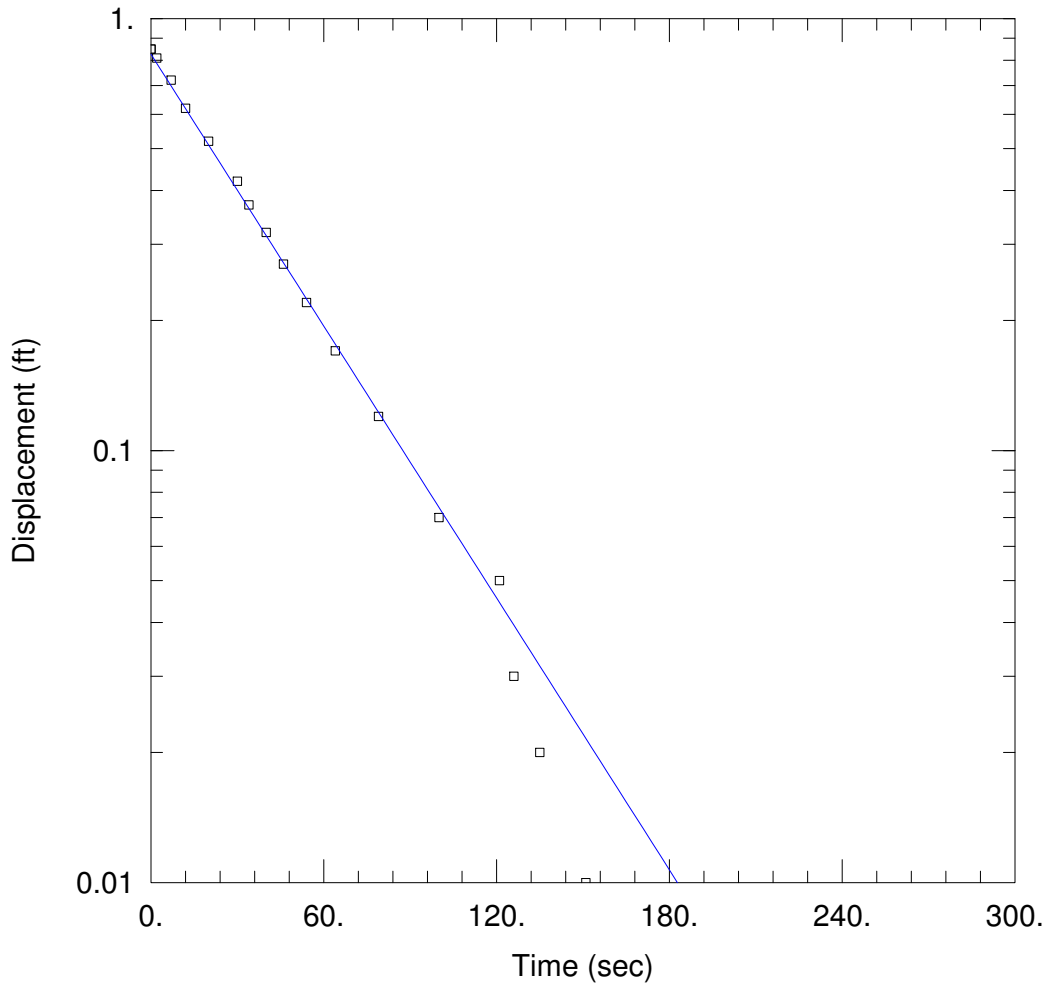
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 In(Re/rw): 2.232



VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0006408	cm/sec
y0	1.766	ft

$$T = K \cdot b = 1.84 \text{ cm}^2/\text{sec}$$



SLUG OUT1

Data Set: P:\...\G53D Slug Out 1.aqt  
 Date: 09/22/17

Time: 14:37:09

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G53D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 94.2 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G53D SO1)

Initial Displacement: 0.85 ft  
 Total Well Penetration Depth: 15.91 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 20. ft  
 Screen Length: 9.6 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0005172 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 0.8263 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out1  
 Date: 09/22/17  
 Time: 14:37:25

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G53D

---

AQUIFER DATA

Saturated Thickness: 94.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G53D SO1

X Location: 833980.2 ft  
 Y Location: 200075.2 ft

Initial Displacement: 0.85 ft  
 Static Water Column Height: 20. ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.6 ft  
 Total Well Penetration Depth: 15.91 ft

No. of Observations: 20

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.85	54.	0.22
2.	0.81	64.	0.17
7.	0.72	79.	0.12
12.	0.62	100.	0.07
20.	0.52	121.	0.05
25.	-0.53	126.	0.03
30.	0.42	135.	0.02
34.	0.37	151.	0.01
40.	0.32	167.	0.
46.	0.27	209.	-0.01

---

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.232

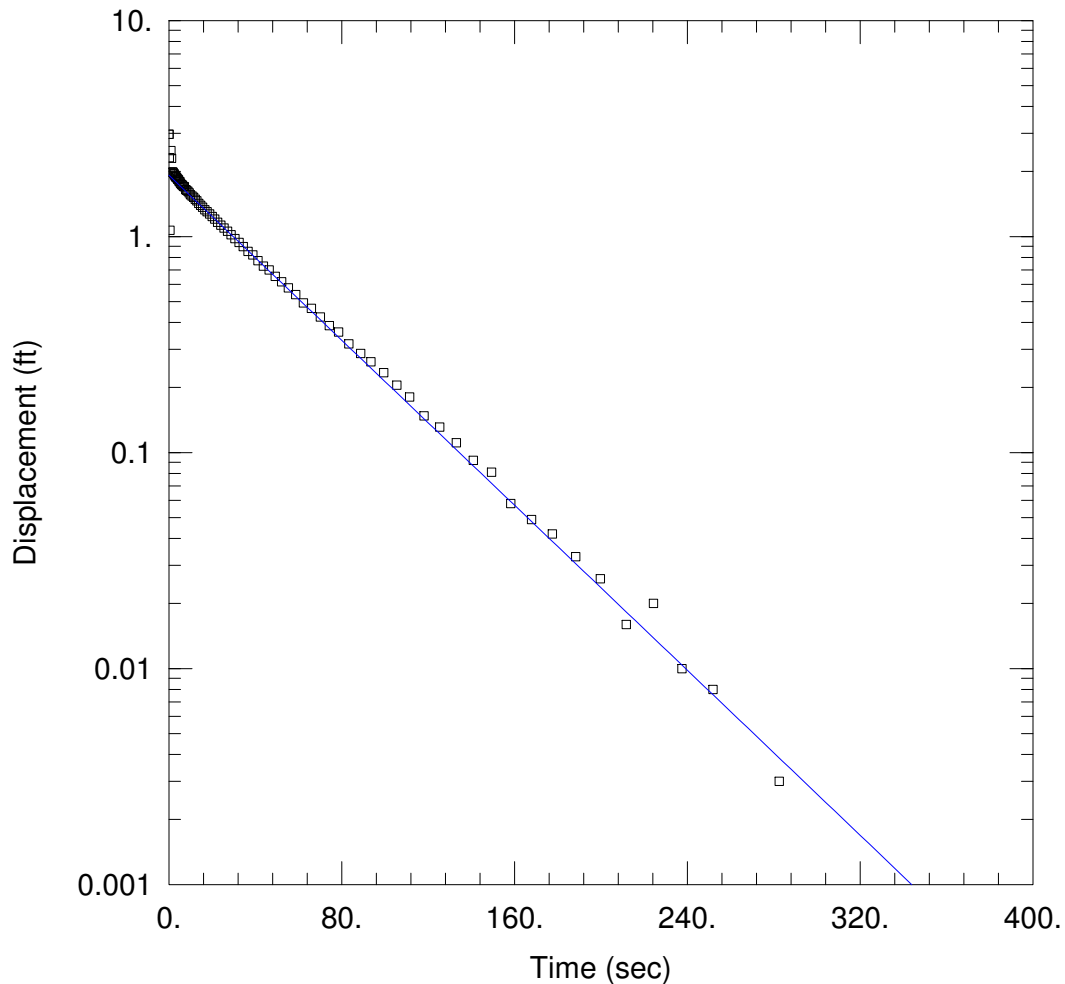
---

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0005172	cm/sec
y0	0.8263	ft

$T = K \cdot b = 1.485 \text{ cm}^2/\text{sec}$



SLUG OUT 2

Data Set: P:\...\G53D Slug Out 2.aqt  
 Date: 09/22/17

Time: 14:38:38

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G53D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 94.2 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G53D S02)

Initial Displacement: 2.971 ft  
 Total Well Penetration Depth: 15.91 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 20. ft  
 Screen Length: 9.6 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0004708 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.92 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 2  
 Date: 09/22/17  
 Time: 14:39:04

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G53D

---

AQUIFER DATA

Saturated Thickness: 94.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G53D S02

X Location: 833980.2 ft  
 Y Location: 200075.2 ft

Initial Displacement: 2.971 ft  
 Static Water Column Height: 20. ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.6 ft  
 Total Well Penetration Depth: 15.91 ft

No. of Observations: 90

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.971	25.57	1.095
0.25	2.32	27.13	1.059
0.5	1.067	28.81	1.019
0.75	1.982	30.61	0.979
1.	2.502	32.47	0.938
1.25	2.3	34.51	0.897
1.5	1.991	36.61	0.854
1.75	1.99	38.83	0.823
2.	1.981	41.23	0.773
2.25	1.955	43.75	0.73
2.5	1.95	46.39	0.7
2.75	1.919	49.21	0.654
3.	1.897	52.21	0.617
3.25	1.888	55.39	0.578
3.5	1.88	58.75	0.539
3.75	1.864	62.35	0.493
4.	1.843	65.95	0.465
4.25	1.836	70.15	0.424
4.5	1.824	74.35	0.387
4.75	1.798	78.55	0.361
5.11	1.793	83.36	0.318
5.47	1.764	88.82	0.287
5.89	1.74	93.55	0.263
6.31	1.728	99.55	0.234
6.73	1.706	105.6	0.205
7.21	1.699	111.6	0.181
7.75	1.65	118.2	0.148
8.23	1.636	125.3	0.131
8.83	1.62	133.2	0.111
9.43	1.595	140.9	0.092



<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.03	1.563	149.3	0.081
10.69	1.541	158.3	0.058
11.41	1.517	167.9	0.049
12.19	1.487	177.6	0.042
12.97	1.461	188.3	0.033
13.81	1.425	199.8	0.026
14.71	1.396	211.8	0.016
15.67	1.366	224.3	0.02
16.63	1.328	237.6	0.01
17.71	1.302	251.9	0.008
18.85	1.27	266.9	-0.002
20.05	1.238	282.6	0.003
21.31	1.204	299.4	-0.006
22.63	1.164	317.4	-0.007
24.07	1.13	335.9	-0.004

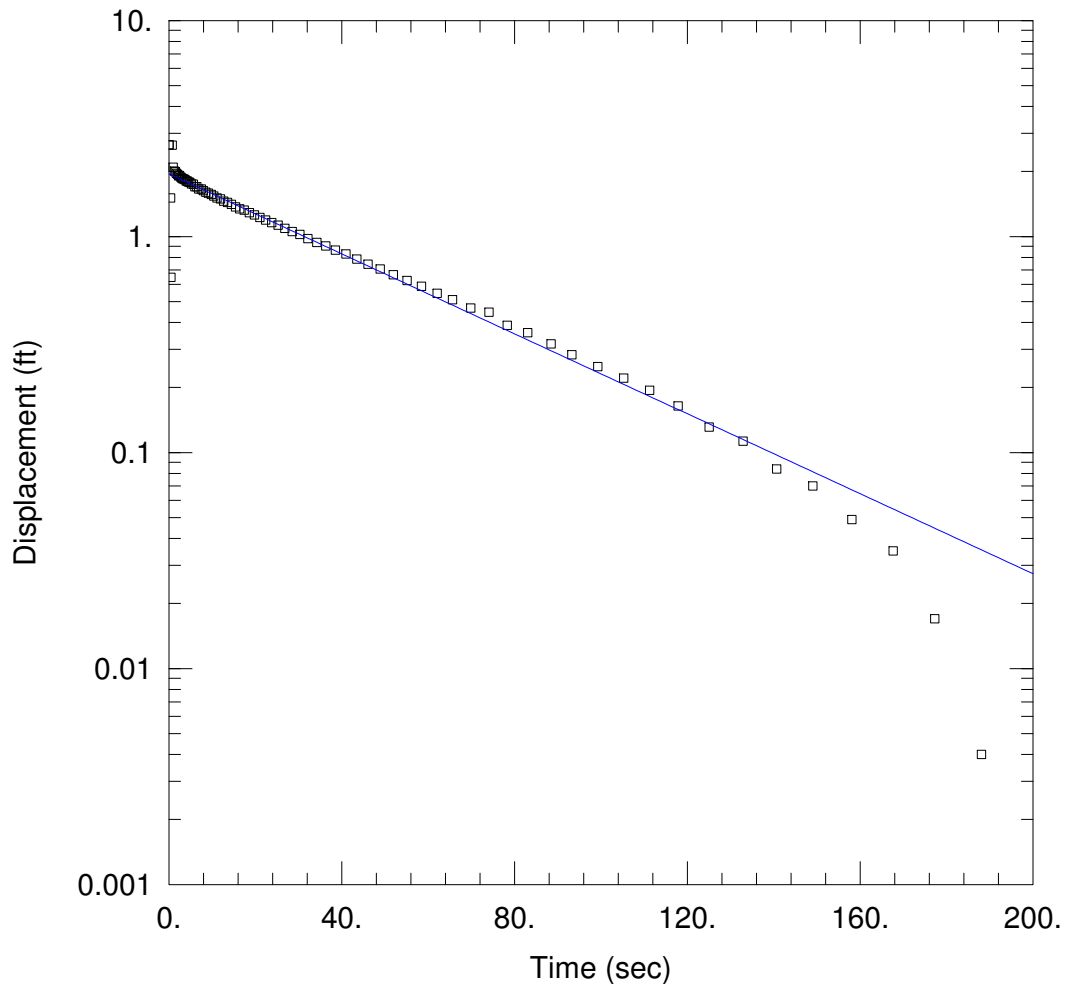
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.232

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0004708	cm/sec
y0	1.92	ft

$$T = K \cdot b = 1.352 \text{ cm}^2/\text{sec}$$



SLUG OUT 3

Data Set: P:\...\G53D Slug Out 3.aqt  
 Date: 09/22/17

Time: 14:40:46

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G53D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 94.2 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G53D SO3)

Initial Displacement: 2.656 ft  
 Total Well Penetration Depth: 15.91 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 20. ft  
 Screen Length: 9.6 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0004565 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.95 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: Slug Out 3  
 Date: 09/22/17  
 Time: 14:41:01

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G53D

---

AQUIFER DATA

Saturated Thickness: 94.2 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G53D SO3

X Location: 833980.2 ft  
 Y Location: 200075.2 ft

Initial Displacement: 2.656 ft  
 Static Water Column Height: 20. ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 9.6 ft  
 Total Well Penetration Depth: 15.91 ft

No. of Observations: 79

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.656	19.8	1.26
0.379	1.509	21.06	1.227
0.502	0.648	22.38	1.193
0.75	2.652	23.82	1.16
1.	2.095	25.32	1.129
1.272	2.011	26.88	1.09
1.5	1.994	28.56	1.056
1.75	1.961	30.36	1.023
2.	1.944	32.22	0.979
2.25	1.906	34.26	0.939
2.5	1.913	36.36	0.903
2.75	1.882	38.58	0.864
3.	1.865	40.98	0.829
3.25	1.853	43.5	0.787
3.5	1.844	46.14	0.745
3.75	1.834	48.96	0.707
4.	1.806	51.96	0.666
4.25	1.805	55.14	0.625
4.5	1.79	58.5	0.588
4.86	1.784	62.1	0.546
5.22	1.752	65.7	0.51
5.64	1.745	69.9	0.467
6.06	1.702	74.1	0.447
6.48	1.698	78.3	0.388
6.96	1.66	83.1	0.359
7.5	1.662	88.5	0.318
7.98	1.632	93.3	0.284
8.58	1.603	99.3	0.25
9.18	1.586	105.3	0.221
9.78	1.567	111.3	0.194

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.44	1.542	117.9	0.164
11.16	1.51	125.1	0.131
11.94	1.492	132.9	0.113
12.72	1.459	140.7	0.084
13.56	1.436	149.1	0.07
14.46	1.407	158.1	0.049
15.42	1.373	167.7	0.035
16.38	1.343	177.3	0.017
17.46	1.323	188.1	0.004
18.6	1.291		

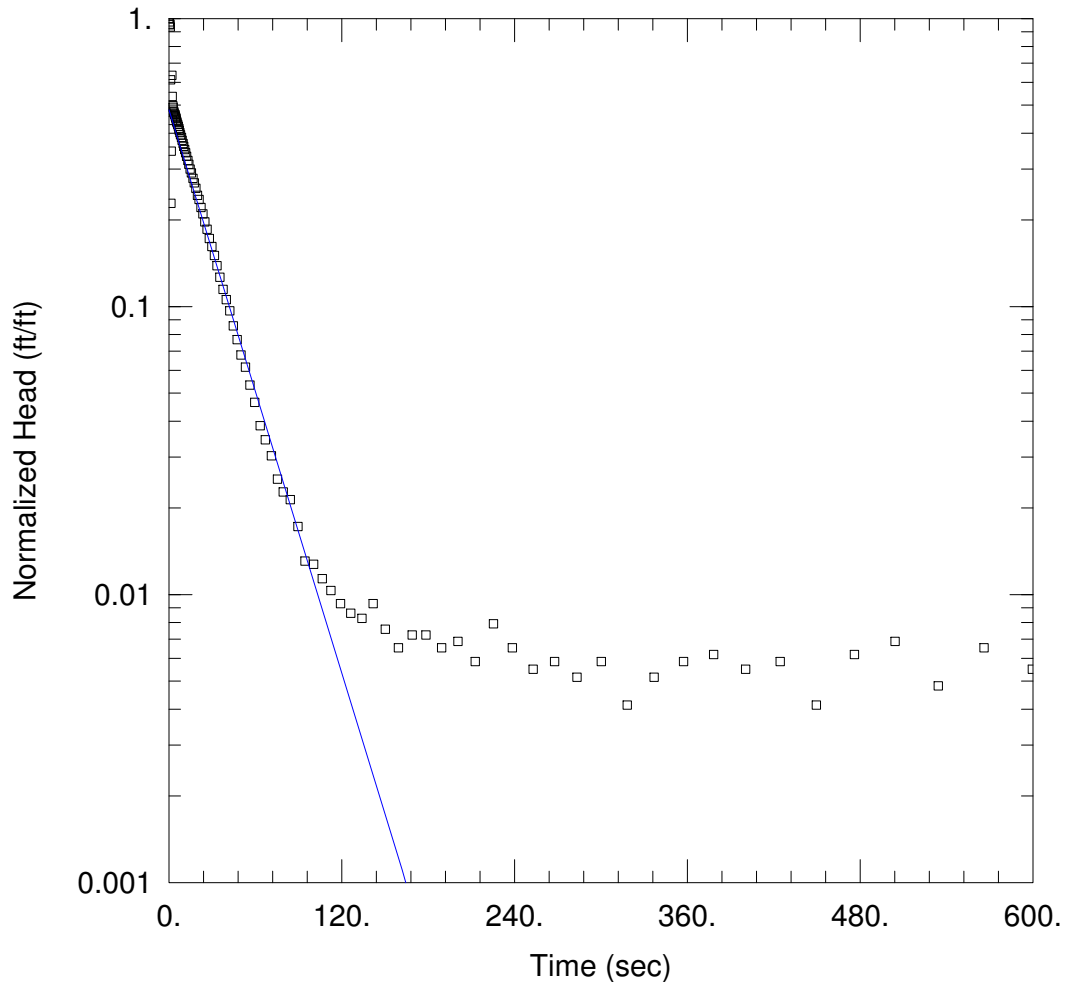
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 2.232

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0004565	cm/sec
y0	1.95	ft

$$T = K \cdot b = 1.311 \text{ cm}^2/\text{sec}$$



G54D SLUG IN 1

Data Set: P:\...\G54D Slug In 1.aqt  
 Date: 09/22/17

Time: 14:43:41

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G54D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 59.7 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G54D S11)

Initial Displacement: 2.906 ft                      Static Water Column Height: 6.14 ft  
 Total Well Penetration Depth: 5.66 ft                      Screen Length: 5.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.0009929 cm/sec                       $y_0 =$  1.4 ft



Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G54D Slug In 1  
 Date: 09/22/17  
 Time: 14:44:07

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G54D

---

AQUIFER DATA

Saturated Thickness: 59.7 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G54D SI1

X Location: 831610.4 ft  
 Y Location: 199066.8 ft

Initial Displacement: 2.906 ft  
 Static Water Column Height: 6.14 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 5.66 ft  
 Total Well Penetration Depth: 5.66 ft

No. of Observations: 104

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.906	31.61	0.437
0.284	2.832	33.47	0.403
0.5	2.768	35.51	0.367
0.75	2.78	37.61	0.333
1.	2.717	39.83	0.307
1.25	1.779	42.23	0.281
1.5	0.664	44.75	0.249
1.75	1.007	47.39	0.223
2.	1.844	50.21	0.197
2.25	1.559	53.21	0.179
2.5	1.285	56.39	0.155
2.75	1.446	59.75	0.135
3.	1.427	63.35	0.112
3.25	1.387	66.95	0.1
3.5	1.38	71.15	0.088
3.75	1.366	75.35	0.073
4.	1.352	79.55	0.066
4.25	1.342	84.35	0.062
4.5	1.328	89.75	0.05
4.75	1.316	94.55	0.038
5.	1.305	100.6	0.037
5.25	1.289	106.6	0.033
5.5	1.278	112.6	0.03
5.75	1.264	119.2	0.027
6.11	1.249	126.3	0.025
6.47	1.228	134.2	0.024
6.89	1.208	141.9	0.027
7.31	1.187	150.3	0.022
7.73	1.166	159.3	0.019
8.21	1.147	168.9	0.021

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
8.75	1.122	178.6	0.021
9.23	1.099	189.3	0.019
9.83	1.07	200.8	0.02
10.43	1.045	212.8	0.017
11.03	1.02	225.3	0.023
11.69	0.993	238.6	0.019
12.41	0.967	252.9	0.016
13.19	0.934	267.9	0.017
13.97	0.905	283.6	0.015
14.81	0.873	300.4	0.017
15.71	0.845	318.4	0.012
16.67	0.809	336.9	0.015
17.63	0.781	357.4	0.017
18.71	0.747	378.4	0.018
19.85	0.707	400.6	0.016
21.05	0.683	424.6	0.017
22.31	0.642	449.8	0.012
23.63	0.609	476.1	0.018
25.07	0.572	504.4	0.02
26.57	0.539	534.4	0.014
28.13	0.501	566.1	0.019
29.81	0.47	599.8	0.016

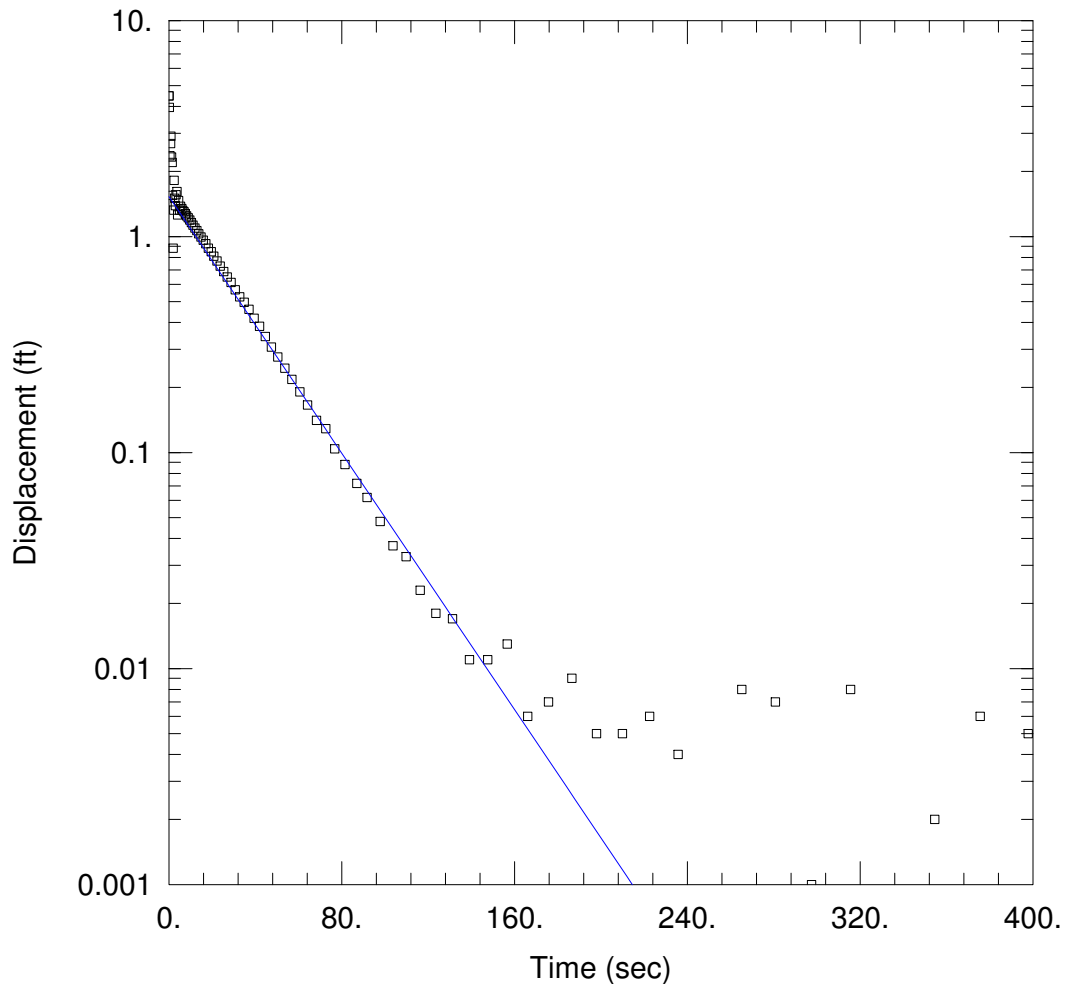
SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 1.626

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0009929	cm/sec
y0	1.4	ft

$$T = K \cdot b = 1.807 \text{ cm}^2/\text{sec}$$



G54D SLUG IN 2

Data Set: P:\...\G54D Slug In 2.aqt  
 Date: 09/22/17

Time: 14:45:25

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G54D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 59.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G54D SI2)

Initial Displacement: 4.476 ft  
 Total Well Penetration Depth: 5.66 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 6.14 ft  
 Screen Length: 5.66 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0009041 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.528 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G54D Slug In 2  
 Date: 09/22/17  
 Time: 14:45:41

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G54D

---

AQUIFER DATA

Saturated Thickness: 59.7 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G54D SI2

X Location: 831610.4 ft  
 Y Location: 199066.8 ft

Initial Displacement: 4.476 ft  
 Static Water Column Height: 6.14 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 5.66 ft  
 Total Well Penetration Depth: 5.66 ft

No. of Observations: 86

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	4.476	32.76	0.526
0.25	3.961	34.86	0.496
0.5	2.37	37.08	0.46
0.75	2.692	39.48	0.419
1.	2.914	42.	0.384
1.25	2.337	44.64	0.344
1.5	2.204	47.46	0.308
1.75	1.552	50.46	0.277
2.	0.884	53.64	0.246
2.25	1.323	57.	0.218
2.5	1.822	60.6	0.191
2.75	1.505	64.2	0.166
3.	1.391	68.4	0.141
3.36	1.563	72.6	0.129
3.72	1.615	76.8	0.104
4.14	1.26	81.6	0.088
4.56	1.47	87.	0.072
4.98	1.325	91.8	0.062
5.46	1.382	97.8	0.048
6.	1.347	103.8	0.037
6.48	1.322	109.8	0.033
7.08	1.301	116.4	0.023
7.68	1.275	123.6	0.018
8.28	1.248	131.4	0.017
8.94	1.219	139.2	0.011
9.66	1.193	147.6	0.011
10.44	1.158	156.6	0.013
11.22	1.13	166.2	0.006
12.06	1.093	175.8	0.007
12.96	1.064	186.6	0.009

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
13.92	1.03	198.	0.005
14.88	0.996	210.	0.005
15.96	0.961	222.6	0.006
17.1	0.925	235.8	0.004
18.3	0.882	250.2	0.
19.56	0.85	265.2	0.008
20.88	0.812	280.8	0.007
22.32	0.771	297.6	0.001
23.82	0.73	315.6	0.008
25.38	0.688	334.2	-0.001
27.06	0.65	354.6	0.002
28.86	0.613	375.6	0.006
30.72	0.566	397.8	0.005

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 1.626

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0009041	cm/sec
y0	1.528	ft

$$T = K \cdot b = 1.645 \text{ cm}^2/\text{sec}$$





Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G54D Slug Out 1  
 Date: 09/22/17  
 Time: 14:47:25

### PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G54D

### AQUIFER DATA

Saturated Thickness: 59.7 ft  
 Anisotropy Ratio (Kz/Kr): 1.

### SLUG TEST WELL DATA

Test Well: G54D SO1

X Location: 831610.4 ft  
 Y Location: 199066.8 ft

Initial Displacement: 1.2 ft  
 Static Water Column Height: 6.14 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 5.66 ft  
 Total Well Penetration Depth: 5.66 ft

No. of Observations: 20

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	1.2	89.	0.23
11.	0.89	98.	0.21
23.	0.74	104.	0.18
27.	0.68	126.	0.13
35.	0.58	171.	0.08
51.	0.42	252.	0.06
60.	0.39	454.	0.05
69.	0.34	841.	0.04
73.	0.29	1451.	0.04
81.	0.26	3246.	0.03

### SOLUTION

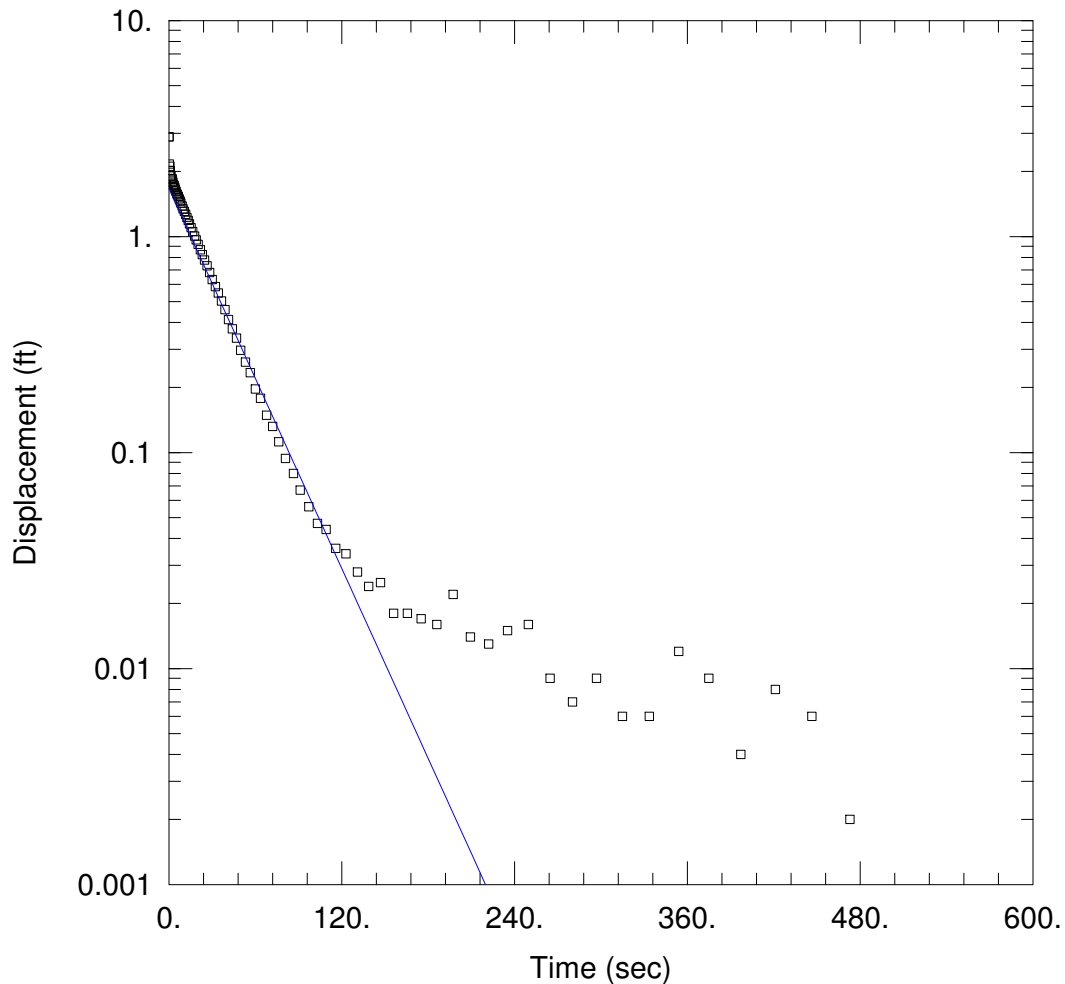
Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 $\ln(R_e/r_w)$ : 1.626

### VISUAL ESTIMATION RESULTS

#### Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0004181	cm/sec
y0	0.8699	ft

$$T = K \cdot b = 0.7609 \text{ cm}^2/\text{sec}$$



G54D SLUG OUT 2

Data Set: P:\...\G54D Slug Out 2.aqt  
 Date: 09/22/17

Time: 14:48:47

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G54D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 59.7 ft                      Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G54D SO2)

Initial Displacement: 2.891 ft                      Static Water Column Height: 6.14 ft  
 Total Well Penetration Depth: 5.66 ft              Screen Length: 5.66 ft  
 Casing Radius: 0.08333 ft                      Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined                      Solution Method: Bouwer-Rice  
 K = 0.000893 cm/sec                       $y_0$  = 1.668 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G54D Slug Out 2  
 Date: 09/22/17  
 Time: 14:49:02

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PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G54D

---

AQUIFER DATA

Saturated Thickness: 59.7 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G54D SO2

X Location: 831610.4 ft  
 Y Location: 199066.8 ft

Initial Displacement: 2.891 ft  
 Static Water Column Height: 6.14 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 5.66 ft  
 Total Well Penetration Depth: 5.66 ft

No. of Observations: 88

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	2.891	38.98	0.458
0.25	2.168	41.5	0.413
0.5	2.022	44.14	0.374
0.75	2.114	46.96	0.338
1.	2.014	49.96	0.297
1.25	1.911	53.14	0.262
1.5	1.908	56.5	0.234
1.75	1.858	60.1	0.197
2.	1.849	63.7	0.178
2.25	1.843	67.9	0.149
2.5	1.805	72.1	0.132
2.86	1.78	76.3	0.112
3.22	1.742	81.1	0.094
3.64	1.721	86.5	0.08
4.06	1.69	91.3	0.067
4.48	1.655	97.3	0.056
4.96	1.621	103.3	0.047
5.5	1.586	109.3	0.044
5.98	1.559	115.9	0.036
6.58	1.532	123.1	0.034
7.18	1.491	130.9	0.028
7.779	1.458	138.7	0.024
8.44	1.427	147.1	0.025
9.159	1.384	156.1	0.018
9.94	1.341	165.7	0.018
10.72	1.307	175.3	0.017
11.56	1.267	186.1	0.016
12.46	1.225	197.5	0.022
13.42	1.186	209.5	0.014
14.38	1.144	222.1	0.013

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
15.46	1.1	235.3	0.015
16.6	1.056	249.7	0.016
17.8	1.006	264.7	0.009
19.06	0.964	280.3	0.007
20.38	0.919	297.1	0.009
21.82	0.867	315.1	0.006
23.32	0.824	333.7	0.006
24.88	0.778	354.1	0.012
26.56	0.731	375.1	0.009
28.36	0.681	397.3	0.004
30.22	0.631	421.3	0.008
32.26	0.586	446.5	0.006
34.36	0.547	472.9	0.002
36.58	0.503	501.1	0.

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 1.626

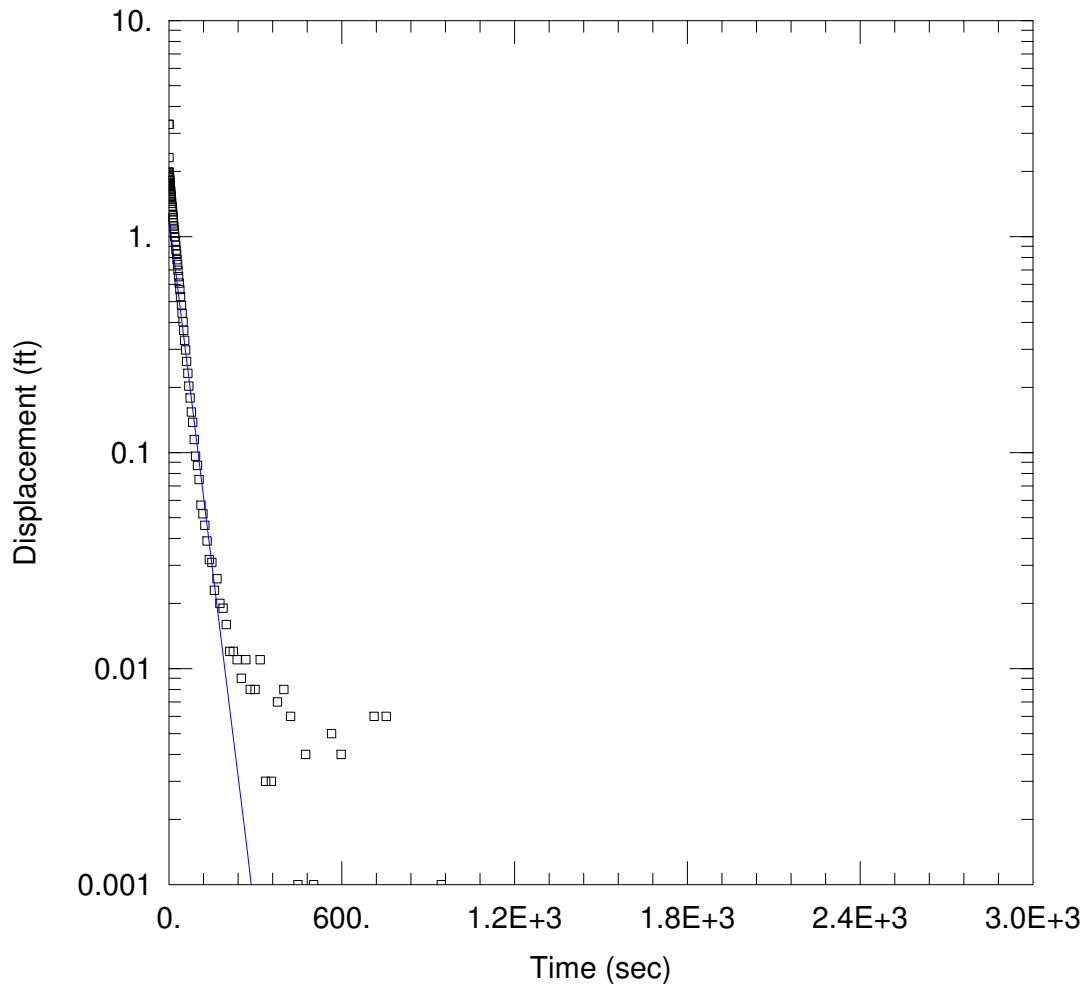
VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.000893	cm/sec
y0	1.668	ft

$T = K \cdot b = 1.625 \text{ cm}^2/\text{sec}$





G54D SLUG OUT 3

Data Set: P:\...\G54D Slug Out 3.aqt  
 Date: 09/22/17

Time: 14:50:24

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Well: G54D  
 Test Date: 4/3/2017

AQUIFER DATA

Saturated Thickness: 59.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G54D SO3)

Initial Displacement: 3.308 ft  
 Total Well Penetration Depth: 5.66 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 6.14 ft  
 Screen Length: 5.66 ft  
 Well Radius: 0.3458 ft

SOLUTION

Aquifer Model: Confined  
 K = 0.0006569 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.225 ft

Data Set: P:\2200\2285\Data\Slug Testing\DC, HAV, COF, JOP, NEWT 2\_2017\Joppa Tests\AQTESOLV and PDF  
 Title: G54D Slug Out 3  
 Date: 09/22/17  
 Time: 14:50:37

---

PROJECT INFORMATION

Company: Natural Resource Technology  
 Client: Electric Energy, Inc. - Joppa  
 Project: 2285  
 Location: Joppa Power Station  
 Test Date: 4/3/2017  
 Test Well: G54D

---

AQUIFER DATA

Saturated Thickness: 59.7 ft  
 Anisotropy Ratio (Kz/Kr): 1.

---

SLUG TEST WELL DATA

Test Well: G54D SO3

X Location: 831610.4 ft  
 Y Location: 199066.8 ft

Initial Displacement: 3.308 ft  
 Static Water Column Height: 6.14 ft  
 Casing Radius: 0.08333 ft  
 Well Radius: 0.3458 ft  
 Well Skin Radius: 0.3458 ft  
 Screen Length: 5.66 ft  
 Total Well Penetration Depth: 5.66 ft

No. of Observations: 125

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	3.308	78.3	0.154
0.25	2.319	83.1	0.138
0.5	1.98	88.5	0.115
0.75	1.985	93.3	0.096
1.	1.986	99.3	0.087
1.25	1.947	105.3	0.075
1.5	1.93	111.3	0.057
1.75	1.892	117.9	0.052
2.	1.873	125.1	0.046
2.25	1.87	132.9	0.039
2.5	1.839	140.7	0.032
2.75	1.822	149.1	0.031
3.	1.813	158.1	0.023
3.25	1.783	167.7	0.026
3.5	1.754	177.3	0.02
3.75	1.754	188.1	0.019
4.	1.742	199.5	0.016
4.25	1.723	211.5	0.012
4.5	1.697	224.1	0.012
4.86	1.697	237.3	0.011
5.22	1.658	251.7	0.009
5.64	1.641	266.7	0.011
6.06	1.623	282.3	0.008
6.48	1.581	299.1	0.008
6.96	1.562	317.1	0.011
7.5	1.533	335.7	0.003
7.98	1.511	356.1	0.003
8.58	1.481	377.1	0.007
9.18	1.457	399.3	0.008
9.78	1.424	423.3	0.006

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
10.44	1.386	448.5	0.001
11.16	1.365	474.9	0.004
11.94	1.33	503.1	0.001
12.72	1.301	533.1	0.
13.56	1.262	564.9	0.005
14.46	1.226	598.5	0.004
15.42	1.193	634.5	-0.003
16.38	1.155	670.5	0.
17.46	1.119	712.5	0.006
18.6	1.079	754.5	0.006
19.8	1.036	796.5	0.
21.06	0.999	844.5	-0.001
22.38	0.952	898.5	-0.005
23.82	0.912	946.5	0.001
25.32	0.866	1006.5	-0.003
26.88	0.827	1066.5	-0.001
28.56	0.782	1126.5	-0.004
30.36	0.741	1192.5	-0.005
32.22	0.698	1264.5	-0.006
34.26	0.652	1342.5	-0.009
36.36	0.609	1420.5	-0.01
38.58	0.568	1504.5	-0.007
40.98	0.528	1594.5	-0.015
43.5	0.479	1690.5	-0.011
46.14	0.442	1786.5	-0.012
48.96	0.403	1894.5	-0.018
51.96	0.368	2008.5	-0.012
55.14	0.331	2128.5	-0.019
58.5	0.298	2254.5	-0.014
62.1	0.264	2386.5	-0.011
65.7	0.233	2530.5	-0.023
69.9	0.203	2680.5	-0.022
74.1	0.179		

SOLUTION

Slug Test  
 Aquifer Model: Confined  
 Solution Method: Bouwer-Rice  
 ln(Re/rw): 1.626

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0006569	cm/sec
y0	1.225	ft

$$T = K \cdot b = 1.195 \text{ cm}^2/\text{sec}$$

## **BORING LOGS**

Drilling Start Date: <b>02/02/2021</b>	Boring Depth (ft): <b>67</b>	Well Depth (ft): <b>67</b>
Drilling End Date: <b>02/02/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>38.23</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>358.56</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>354.84</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK</b>	Location (Lat/Long): <b>37.22078, -88.85045</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
0				SS	14/24	2	5	(0') CLAY (CL); some silt, high organics/roots, brown (10YR 4/3). (0.25') CLAYEY SILT (ML); brownish yellow (10YR 6/6), soft, dry, some light gray mottling.		
				SS	20/24	2	7	(2') As above: higher plasticity. (MH)		
				SS	23/24	2	8	(4') As above: few sand, lower plasticity. (ML)		
5				SS	24/24	2	7	(6') SILT (ML); few sand and clay, yellowish brown (10YR 5/6), medium dense, dry, some light gray mottling.		
				SS	23/24	1	10	(8') As above.		
10				SS	23/24	2	12	(11') As above: trace fine gravel from 11 to 11.5' bgs.		
				SS	24/24	2	13	(12') As above: brownish yellow (10YR 6/6).		
				SS	24/24	2	8	(14') As above: more light gray (10YR 7/2) mottling.		
15				SS	24/24	2	8	(16') As above: trace sand.		
				SS	24/24	2	9	(18') As above: light gray (10YR 7/2) becomes dominant.		
20										

NOTES:



Drilling Start Date: <b>02/02/2021</b>	Boring Depth (ft): <b>67</b>	Well Depth (ft): <b>67</b>
Drilling End Date: <b>02/02/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>38.23</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>358.56</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>354.84</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK</b>	Location (Lat/Long): <b>37.22078, -88.85045</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
20				SS	24/24	1	12	(20') SILT (ML); few clay, brownish yellow (10YR 6/6), very stiff, dry.		
				SS	24/24	4	13	(22') SANDY SILT (ML); yellowish brown (10YR 5/6), soft, dry.		
				SS	24/24	2	10	(24') As above: becomes moist, few red (2.5YR 4/6) silt.		
25				SS	24/24	1	10	(26') As above: red silt disappears.		
				SS	24/24	1	7	(28') As above: becomes grayish brown (10YR 5/2).		
				SS	24/24	1	8	(30') As above.	30-32 Chem	
				SH	24/24				32-34 Geotech	
35				SS	24/24	3	9	(34') POORLY GRADED SAND (SP-SM); fine grained, few silt, brownish yellow (10YR 6/6), loose, moist to wet.		
				SS	24/24	2	5	(36') SANDY SILT (ML); light yellowish brown (10YR 6/4), soft, moist, medium plasticity.		
				SS	24/24	2	5	(38') As above: becomes evenly mottled with light gray (10YR 7/2).		
40										

NOTES: SBG03- (32-34)-20210202: 15.5% moisture content, 730 U mg/kg total organic carbon, 112.7 pcf dry unit weight, 2.659 specific gravity, 4.7x 10<sup>-7</sup>, 27 LL, 16 PL, 11 PI, 0.6% gravel, 53.8% sand, 45.6% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit

Drilling Start Date: <b>02/02/2021</b>	Boring Depth (ft): <b>67</b>	Well Depth (ft): <b>67</b>
Drilling End Date: <b>02/02/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>38.23</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>358.56</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>354.84</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK</b>	Location (Lat/Long): <b>37.22078, -88.85045</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
40				SS	24/24	1	8	(40') SILT (ML); little sand, brownish yellow (10YR 6/6), soft, moist, medium plasticity.		
				SS	24/24	1	7	(42') As above.		
				SS	24/24	2	10	(44') As above: becomes dry, stiff.		
45				SS	24/24	2	17	(46') SILTY SAND (SP-SM); very pale brown (10YR 7/3), loose, moist.		
				SS	23/24	8	20	(48') As above: becomes brownish yellow (10YR 6/8).		
50				SS	20/24	1	16	(50.5') Wet at 50.5 to 50.8' bgs.		
				SS	24/24	1	2	(51') SAND (SP); fine grained, light gray (10YR 7/2), loose, moist.		
				SS	24/24	1	2	(52') As above: brownish yellow (10YR 6/6).		
55				SS	12/24	1	2	(54') GRAVELLY SAND (SW); very pale brown (10YR 7/4), loose, wet.		
				SS	24/24	1	2	(56') As above: moist, very loose.		
60				SS	11/24	1	2	(58') WELL-GRADED SAND (SW); medium to coarse grained, few gravel, very pale brown (10YR 7/4), very loose, moist.	58-60 Chem and Geotech (not tested)	

NOTES:

Drilling Start Date: <b>02/02/2021</b>	Boring Depth (ft): <b>67</b>	Well Depth (ft): <b>67</b>
Drilling End Date: <b>02/02/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>38.23</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>358.56</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>354.84</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK</b>	Location (Lat/Long): <b>37.22078, -88.85045</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
60				SS	20/24	2	16	(60') WELL-GRADED SAND (SW); medium to coarse grained, few gravel, very pale brown (10YR 7/4), wet, loose.	60-62 Geotech	60
6				SS	24/24	1	16	(62') As above: reddish yellow (7.5YR 6/6).		
10				SS	24/24	1	29	(64') GRAVELLY SAND (SW); reddish yellow (7.5YR 6/8), wet, loose.		
11										
13										
12										
15										
14										
13										
1										
4										
66'							(66') As above: brownish yellow (10YR 6/6).			
67'							(67') End of Boring.			

NOTES: SBG03- (60-62)-20210202: 20.0% moisture content, 740 U mg/kg total organic carbon, 2.671 specific gravity, 1.5% gravel, 94.4% sand, 4.1% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit

Drilling Start Date: <b>02/01/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>02/01/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>361.68</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>358.45</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.21716, -88.84883</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
0				SS	18/24	6	11	(0') TOPSOIL.		
						8		(0.25') POORLY GRADED GRAVEL (GP)		
				SS	12/24	2	7	(1.5') CLAY (CL); light brown (10YR 7/3), very stiff, low plasticity, dry.		
						3		(2') As above.		
				SS	24/24	3	10	(4') As above: medium stiff.		
5						7				
				SS	24/24	3	13	(6') As above: mottled light brown (10YR 7/3) and light gray (8/1).		
						6				
				SS	24/24	3	10	(8') As above: trace coarse gravel.		
						5				
				SS	24/24	3	9	(10') As above: stiff.		
10						4				
				SS	24/24	2	8	(12') As above.		
						3				
				SS	24/24	4	13	(13') CLAY (CL); mostly same as above with some very fine to fine grained sand and silt.		
						5		(14') As above: slightly moist.		
15						8				
				SS	24/24	2	8	(16') As above: dry.		
						3				
				SS	24/24	2	7	(18') As above.		
						3				
20						4				

NOTES:



Client: **Dynegy**  
 Project: **GLP0821, Joppa Ash Pond**  
 Address: **Unnamed Road, Metropolis, IL 62960**

**WELL LOG**  
 Well No. **G05**  
 Page: **2 of 4**

Drilling Start Date: <b>02/01/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>02/01/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>361.68</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>358.45</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.21716, -88.84883</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
20				SS	24/24	4	12	(20') As above.		
				SS	24/24	3	11	(22') As above: medium stiff.		
				SS	24/24	4	14	(24') As above.		
25				SS	24/24	3	11	(26') As above: stiff.		
				SS	24/24	4	13	(28') As above.		
				SS	24/24	2	10	(30') As above.		
				SH	24/24	3	19	(32') As above.		
				SS	24/24	8	21	(34') As above.		
35				SS	24/24	3	12	(36') As above.		
				SS	24/24	3	19	(38') SILTY CLAY (CL); same as above with more silt.		
40										

NOTES:



Drilling Start Date: <b>02/01/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>02/01/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>361.68</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>358.45</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.21716, -88.84883</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
40				SS	24/24	5	16	(40') As above: very stiff/hard.		
				SS	24/24	3	12	(42') As above: brown mottling gone, now just gray (8/1).		
				SS	24/24	8	18	(44') As above: hard.		
45				SS	24/24	3	13	(46') As above.		
				SS	24/24	4	10	(48') As above: medium stiff.		
50				SS	24/24	5	17	(50') As above: some very fine to fine grained sand and silt, stiff.		
				SS	12/24	8	16	(52') SILTY SAND (SM); mostly very fine to fine grained sand and silt with some clay, moist, tight, poorly graded, light gray (8/1) with some brown mottling.		
55				SS	24/24	3	11	(54') As above.		
				SS	24/24	4	18	(56') POORLY GRADED SAND (SP-SM); very fine to fine grained sand, some silt, tight, saturated at 57' bgs, light gray (8/1), some rust spots (5YR 6/8).		
60				SS	24/24	3	16	(58') POORLY GRADED SAND (SP); light gray (8/1), mostly fine to medium grained sand, medium packing, wet.		

NOTES:



Client: **Dynegy**  
 Project: **GLP0821, Joppa Ash Pond**  
 Address: **Unnamed Road, Metropolis, IL 62960**

**WELL LOG**  
 Well No. **G05**  
 Page: **4 of 4**

Drilling Start Date: <b>02/01/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>02/01/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>361.68</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>358.45</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.21716, -88.84883</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)				
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)							
60				SS	24/24	2	9	(60') As above: wet.						
											(61') As above: moist, some red color lamination.			
65								(65.5') SAND (SW); some gravel, color change to (5YR 7/6)						
								(66') End of Boring.						
70														

NOTES:

Drilling Start Date: <b>01/29/2021</b>	Boring Depth (ft): <b>62</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>01/29/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>353.86</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>352.47</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA &amp; CL</b>	Location (Lat/Long): <b>37.21116, -88.8492</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
0				SS	24/24	4	14	(0') TOPSOIL.		
0.25				SS	12/24	4	10	(0.25') FAT CLAY (CH); light brown (5YR 6/8), stiff, dry.		
2				SS	24/24	4	11	(2') As above.		
4				SS	24/24	4	11	(4') As above.		
6				SS	24/24	4	13	(6') As above.		
8				SS	24/24	4	6	(8') As above: medium stiffness.		
10				SS	24/24	4	11	(10') LEAN CLAY (CL); light brown (5YR 7/4) to gray (mottled), stiff, dry.		
12				SS	24/24	4	10	(12') As above: top 6" soft with plant material.		
14				SS	24/24	3	7	(14') As above.		
16				SS	24/24	4		(16') As above.		
18				SS	24/24	3	9	(18') As above: silt and clay, some fine sand, stiff, dry. (ML-CL)		

NOTES:

Drilling Start Date: <b>01/29/2021</b>	Boring Depth (ft): <b>62</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>01/29/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>353.86</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>352.47</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA &amp; CL</b>	Location (Lat/Long): <b>37.21116, -88.8492</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
20				SS	24/24	3	10	(20') As above: rust spots.		
				SS	24/24	3	7	(22') As above: moist.		
				SS	24/24	3	7	(24') As above: mottled (10R 8/1).		
25				SS	24/24	3	11	(26') SILTY SAND (SP-SM); mostly silt, fine grained sand, some mottling as previous, poorly graded, tight, moist.		
				SS	24/24	3	13	(28') POORLY GRADED SAND (SP); very fine to fine grained sand, light gray (10R 8/1), tight, moist.		
30				SS	24/24	9	41	(30') As above.		
				SH	18/24	10	15	(31') POORLY GRADED SAND (SP); medium to coarse grained, loose, moist, (10R 8/1). (32') As above: color change to orange (5YR 6/8), clay at bottom.		
35				SS	24/24	4	11	(34') FAT CLAY (CH); stiff, moist, light gray/orange mottled (10R 8/1 to 5YR 6/8).		
				SS	24/24	3	8	(36') As above: medium stiffness.		
40				SS	24/24	2	4	(38') As above.		

NOTES:

Drilling Start Date: <b>01/29/2021</b>	Boring Depth (ft): <b>62</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>01/29/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>353.86</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>352.47</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA &amp; CL</b>	Location (Lat/Long): <b>37.21116, -88.8492</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
40				SS	24/24	3	8	(40') As above.		
				SS	24/24	6	35	(42') SILTY SAND (SP-SM); very fine grained sand and silt, tight, moist, poorly graded, light gray (10R 8/1).		
				SS	18/24	7	45	(44') As above.		
45				SS	24/24	7	61	(45') POORLY GRADED SAND (SP); very fine to fine grained sand, tight, moist, (10R 8/1).		
				SS	24/24	7	61	(46') POORLY GRADED SAND (SP); fine to medium grained sand, loose, wet, interbedded gray to reddish orange (5YR 6/8) - seams 2cm.		
				SS	18/24	14	35	(48') DIAMICTON (GW); mostly fine to coarse gravel and medium to coarse sand, saturated, very loose, well graded, (5YR 7/8).		
50				SS	24/24	12	58	(50') WELL-GRADED SAND (SW); medium to coarse grained with fine gravel, saturated, loose.		
				SS	24/24	9	25	(52') As above: (5YR 7/6).		
				SS	24/24	11		(53') DIAMICTON (GW-SW); same as above, (5YR 6/8).		
				SS	24/24	19	84	(54') Same as above (SW).		
55				SS	24/24	31	53	(55') WELL-GRADED GRAVEL and SAND (GW-SW); mostly fine to coarse grained gravel and fine to medium sand, loose, wet, light gray (10R 8/1), orangish tan chert nodules.		
				SS	24/24	7	35	(57') As above: top 1' tan (5YR 6/8) bottom gray (10R 8/1), wet.		
				SS	24/24	21				
				SS	24/24	14				
				SS	24/24	8				
				SS	24/24	6	20	(58') POORLY GRADED SAND (SP); mostly very fine to fine grained sand, wet, loose, tan (7.5YR 8/4).		
60				SS	24/24	9				
				SS	24/24	11				
				SS	24/24	16				

NOTES:





Client: **Dynegy**  
 Project: **GLP0821, Joppa Ash Pond**  
 Address: **Unnamed Road, Metropolis, IL 62960**

**WELL LOG**  
 Well No. **G07**  
 Page: **4 of 4**

Drilling Start Date: <b>01/29/2021</b>	Boring Depth (ft): <b>62</b>	Well Depth (ft): <b>60</b>
Drilling End Date: <b>01/29/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>353.86</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>352.47</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA &amp; CL</b>	Location (Lat/Long): <b>37.21116, -88.8492</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
60				SS	24/24	32 48 38 8	86	(60') As above.		
								(62') DIAMICTON (GW-SW); same as above.		
								(62') End of Boring.		
65										

NOTES:

Drilling Start Date: <b>01/27/2021</b>	Boring Depth (ft): <b>86</b>	Well Depth (ft): <b>85</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>344.22</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>341.72</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.20984, -88.85066</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
0										
0								(0') TOPSOIL.		
0.25								(0.25') WELL-GRADED SAND (SW); light brown/gray, loose, dry.		
2										
4										
6										
8										
10										
12										
14										
16										
18										
20										

NOTES:

Drilling Start Date: <b>01/27/2021</b>	Boring Depth (ft): <b>86</b>	Well Depth (ft): <b>85</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>344.22</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>341.72</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.20984, -88.85066</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
20				SS				2	(20') CLAY (CH); high plasticity, soft, moist, gray to green.	
				SS				2	(21.5') SILTY SAND (SM); wet, loose, gray to green. (22') As above.	
				SS				4	(24') SILT (ML); loose, dark gray, black clay seam - 2".	
25				SS				3	(26') CLAY (CH); gray to green, saturated, high plasticity.	
				SS				2	(27') SILT (ML); soft, moist, gray to green.	
				SS				2	(28') SILTY SAND (SM-SP); light gray, firm, saturated, mostly poorly graded fine to medium grained sand and silt.	
30				SS				5	(30') As above.	
				SS				7	(31') SILTY SAND (SM); tight, light gray, poorly graded, fine to medium grained sand. (32') As above.	
				SS				7	(33') CLAY (CL); light gray, hard, low plasticity, dry.	
35				SS				8	(35') As above: some fine grained sand. (36') As above: gradually grades to fine to medium sand.	
				SS				6	(37') POORLY GRADED SAND (SP); fine to medium grained sand, tight, trace gravel, mottled with rusty red color. (38') As above.	
40				SS						

NOTES:

Drilling Start Date: <b>01/27/2021</b>	Boring Depth (ft): <b>86</b>	Well Depth (ft): <b>85</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>344.22</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>341.72</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.20984, -88.85066</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
40				SS		5	22	(40') POORLY GRADED SAND (SP); fine to medium grained, tight, light gray, mottled with rust color.		
				SS		10		(41') As above: saturated.		
				SS		12				
				SS		3	13	(42') As above: some fine to coarse gravel.		
				SS		5				
				SS		8				
				SS		8		(43.5') As above: nodule (red chert), saturated.		
				SS		3	13	(44') As above: lots of fine to coarse gravel, yellow/orange/red, gravel/nodules.		
45				SS		6				
				SS		7				
				SS		7				
				SS		5	14	(46') GRAVELLY SAND (GW-SW); mostly fine grained sand and fine to coarse gravel, light gray, gravel bits are red/yellow, saturated.		
				SS		7				
				SS		7				
				SS		11				
				SS		1	10	(48') As above: very loose.		
				SS		5				
				SS		5				
50				SS		9	14	(50') As above.		
				SS		9				
				SS		5				
				SS		14		(51.5') As above: some silt.		
				SS		3	22	(52') WELL-GRADED SAND (SW); fine to coarse grained, trace fine gravel, tan, very loose.		
				SS		11				
				SS		11				
				SS		10				
				SS		9	26	(54') WELL-GRADED GRAVELLY SAND (GW-SW); tan, moist, coarse grained gravel, fine to coarse sand, very loose, wet.		
55				SS		14		(55') As above: light gray.		
				SS		12				
				SS		10				
				SS		17	36	(56') POORLY GRADED SAND (SP); fine to medium grained, wet, loose, dark tan.		
				SS		19				
				SS		17				
				SS		17		(57.5') WELL-GRADED GRAVELLY SAND (GW); dark tan, loose.		
				SS		6	19	(58') As above.		
				SS		8				
				SS		11		(59') WELL-GRADED SAND (SW); dark tan, wet, loose, trace fine gravel.		
60				SS		12				

NOTES:

Drilling Start Date: <b>01/27/2021</b>	Boring Depth (ft): <b>86</b>	Well Depth (ft): <b>85</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>344.22</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>341.72</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.20984, -88.85066</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
60				SS	24/24	14	24	(60') As above.		
				SS	18/24	5	7	(61') GRAVELLY SAND (GW-SW); dark tan, well-graded, coarse chert nodules, wet, loose.		
				SS	12/24	4	13	(62') As above.		
				SS	18/24	5	16	(64') As above.		
				SS	18/24	5	14	(66') As above.		
				SS	18/24	5	14	(68') As above: saturated.		
				SS	12/24	5	13	(70') As above.		
				SS	18/24	7	18	(72') As above.		
				SS	24/24	7	15	(74') As above: mostly silt and gravel, (5YR 6/8).		
				SS	18/24	10	33	(76') WELL-GRADED SAND (SW); mostly medium to coarse grained sand, wet, loose, (5YR 6/8).		
				SS	24/24	8	54	(78') DIAMICTON (SW-SM); mostly coarse grained gravel, fine sand, silt, wet, medium density, (5YR 6/8).		
						15		(79') Same fine to coarse gravel, more coarse gravel, (5YR 6/8).		
						39		(GW-SW)		
80						42				

NOTES:



Drilling Start Date: <b>01/27/2021</b>	Boring Depth (ft): <b>86</b>	Well Depth (ft): <b>85</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>7.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft):	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>344.22</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>341.72</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>BA</b>	Location (Lat/Long): <b>37.20984, -88.85066</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
80				SS	18/24	6	23	(80') As above. (SW)		
11				SS	24/24	7	33	(81.5') 1/2" seam - orangish sand, medium packing, moist, (7.5YR 8/6). (SP)		
12								(82') Same as above. (SW)		
14				SS	12/24	19	42	(83') Same as above, top 3" (10R 6/6), tight, moist. (SP)		
19								(84') As above.		
21				SS	12/24	19	42	(85') 2cm seam of reddish/oxidized fine grained sand, dry.		
27	(86') End of Boring.									
85										
90										

NOTES:

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
0				SS	6/24	6	9	(0') LEAN CLAY (CL); brown (7.5YR 5/3), stiff, dry, some reddish brown mottling, trace sand.		
				SS	22/24	4	11			
				SS	24/24	2	6	(4') FAT CLAY (CH); light brown (7.5YR 6/4), medium dense, moist.		
5				SS	24/24	0	6	(6') As above: lean clay, moist. (CL)		
				SS	24/24	2	8	(8') As above: brown (7.5YR 5/4), some reddish brown mottling.		
10				SS	20/24	2	7	(10') As above.	10-12 Chem	
				SS	22/24	2	9	(12') CLAY (CL); gray to light brown (7.5YR 6/1) mottled, medium dense, dry, few sand.		
				SS	21/24	2	8	(14') As above: brown (7.5YR 5/4).		
15				SH	24/24			(16') As above: light brown (7.5YR 6/3).	16-18 Geotech	
				SS	23/24	2	11	(18') CLAY (CL); gray to light brown (7.5YR 6/1) mottled, very stiff, moist, few sand.		
20										

NOTES: SBG09M- (16-18)-20210127: 20.6% moisture content, 950 mg/kg total organic carbon, 105.4 pcf dry unit weight, 2.666 specific gravity,  $8.3 \times 10^{-8}$  cm/s vertical hydraulic conductivity, 39 LL, 16PL, 23PI, 0.0% gravel, 5.0% sand, 95.0% fines.

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
20				SS	24/24	2	11	(20') CLAY (CL); light gray with brown (10YR 7/1) mottling, very stiff, moist, trace sand and silt.	20-22 Chem	
				SS	24/24	4	13	(22') As above: (10YR 7/2).		
				SS	24/24	2	12	(24') As above: fewer brown mottling.		
25				SS	24/24	3	9			
				SS	24/24	3	9			
				SS	24/24	6	7	(27-28') As above: increased reddish brown mottling.		
				SS	24/24	4	16	(28') SILT (ML); with few sand and clay, light gray (10YR 7/2) with some brown mottling, dry, stiff.		
30				SS	24/24	4	14	(30') As above: moist.		
				SS	24/24	4	11	(32') As above.		
				SS	24/24	2	8	(34') SANDY CLAY (SC); light gray (10YR 7/2) with some brown mottling, moist.		
35				SS	24/24	4	9	(34.5') SILT (ML); with some sand, few clay, stiff.		
				SS	24/24	3	9	(36') As above: trace black organics.		
				SS	24/24	5	38	(38') SANDY CLAY (SC); fine grained sand, few silt, gray (7.5YR 5/1), moist.		
40						20				
						18				
						17				

NOTES:

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
40				SS	24/24	3	14	(40') SILT WITH SAND (ML); few clay, gray (7.5YR 6/1), moist.		
				SS	24/24	6				
				SS	24/24	8				
				SS	24/24	7	7	(42') As above: some reddish brown mottling.		
				SS	24/24	5				
				SS	24/24	3				
				SS	24/24	4				
				SS	24/24	5				
45				SS	24/24	2	8	(44') As above: fewer clay, more sand.		
				SS	24/24	3				
				SS	24/24	5				
				SH	24/24	6			46-48 Geotech	
				SS	24/24	5	26	(48') SILT WITH CLAY (ML); gradationally sandier, becomes moist, stiff to medium dense, gray (7.5YR 6/1).	48-50 Chem	
				SS	24/24	8				
				SS	24/24	18				
50				SS	20/24	18	23	(50') POORLY GRADED SAND (SP); light gray (7.5YR 7/1), moist, loose.		
				SS	20/24	8				
				SS	20/24	15				
				SS	20/24	23				
				SS	16/24	16	50	(52') POORLY GRADED SAND (SP); fine grained, with gravel up to cobble size, light gray (10YR 7/1), medium dense to loose, moist.		
				SS	16/24	22				
				SS	16/24	28				
				SS	20/24	32				
				SS	20/24	25	94	(54') POORLY GRADED SAND (SP); fine to medium grained, light gray (7.5YR 7/1), moist, loose.		
55				SS	20/24	45		(55') As above: few coarse gravel, reddish yellow (7.5YR 7/6).		
				SS	20/24	49				
				SS	23/24	49				
				SS	23/24	27	53	(56') POORLY GRADED SAND (SP); fine to coarse grained, with coarse gravel, moist, gray (7.5YR 7/1) to reddish yellow (7.5YR 7/8).		
				SS	23/24	33				
				SS	18/24	20				
				SS	18/24	20				
				SS	18/24	8	80	(58') As above: fine gray sand contains trace silt.		
				SS	18/24	33				
				SS	18/24	47				
60				SS	18/24	34				

NOTES: SBG09M- (46-48)-20210127: 19.8% moisture content, 105.4 pcf dry unit weight, 2.715 specific gravity, 3.5x 10<sup>-7</sup> cm/s vertical hydraulic conductivity, 35 LL, 15 PL, 20 PI, 0.0% gravel, 17.2% sand, 82.8% fines.

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE				
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)			
60				SS	16/24	32	82	(60') POORLY GRADED SAND (SP); coarse grained, reddish yellow (7.5YR 6/8), moist, loose.					
							SS	16/24	22	64	(62') POORLY GRADED SAND (SP); coarse grained, reddish yellow (7.5YR 6/8), medium dense, some coarse gravel pebble size.		
									50/5				
									14				
							SS	13/24	17	23	(64') As above: increasing fine to coarse gravel.		
65									11				
									12				
							SS	12/24	15	31	(66') As above.		
									16				
						15							
						11							
				SS	11/24	38	50	(68') POORLY GRADED GRAVEL WITH SAND (GP); strong brown (7.5YR 5/6), loose, moist.					
						50							
70				SS	12/24	14	47	(70') As above.					
						17							
						30							
						32							
				SS	12/24	25	39	(72') As above: reddish yellow (7.5YR 6/8).					
						24							
						15							
						16							
				SS	8/24	6	45	(74') As above: sand disappears, wet.					
75						25							
						20							
						12							
				SS	14/24	7	15	(76') As above: strong brown (7.5YR 5/8).					
						7							
						8							
						7							
				SS	16/24	11	36	(78') As above: with some sand.					
						22							
						14							
80						8							

NOTES:



Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
80	Gravelly sand with some clay		SS	12/24	2	36	(80') POORLY GRADED GRAVEL (GP); little sand, reddish yellow (7.5YR 6/8), very loose, wet.	80-82 Chem		
				17						
				10/24	5	31		82-84 Geotech		
				14/24	14					
85	Sand with trace gravel		SS	14/24	19		(83.7') POORLY GRADED SAND (SP); medium grained, trace gravel, reddish brown (7.5YR 6/8), loose, moist.			
				12						
				14/24	22		(86') WELL-GRADED GRAVEL (GW); few sand, trace clay, reddish brown (7.5YR 6/8), loose, wet.			
				14/24	14		(88') As above: clay disappears.			
					8					
					6					
90	Lean clay		SS		4		(91') GRAVELLY LEAN CLAY (CL); very pale brown (10YR 8/2), moist, soft.			
				6						
					2		(92') CLAY (CL); trace gravel, gray (7.5YR 6/1), medium dense.			
					3					
					4					
					2		(94') As above: gray (10YR 5/1).			
					1					
95	Sand with trace gravel		SS		3					
				3						
					1		(96') POORLY GRADED SAND (SP); fine grained, strong brown (7.5YR 5/8), loose.			
					6					
					23					
					23					
					5		(98') As above.			
					14					
					25					
100					23					

NOTES: SBG09M- (82-84)-20210127: 7.6% moisture content, 740 U mg/kg total organic carbon, 100.0 pcf dry unit weight, 2.686 specific gravity, 22.7% gravel, 75.4% sand, 1.9% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
100				SS	14/24	14	27	(100') CLAY (CL); (10YR 6/1), very soft, trace gravel.		
				SS	15/24	14	20	(101') CLAYEY GRAVEL (GC); (7.5YR 5/8), moist, loose.		
				SS	9/24	12	21	(102') As above: some sand, brown (7.5YR 4/4).		
105				SS	15/24	12	24	(104') GRAVELLY CLAY (CL); light gray (2.5Y 7/2), stiff, moist.		
				SS	14/24	9	39	(106') CLAYEY GRAVEL (GC); pinkish gray (7.5YR 7/2), medium dense, moist.		
				SS	15/24	8	20	(108') POORLY GRADED SAND (SP); fine grained, yellow (10YR 7/6) to white (10YR 8/1) at 109.8' bgs, moist, loose.		
110				SS	8/24	8	20	(110') As above: light gray (10YR 7/1).	110-112 Chem	
				SH	13/24	10	20	(112-114) As above: yellow (10YR 7/6), trace gravel.	112-114 Geotech	
115				SS	12/24	7	18	(114') As above: yellow (10YR 7/6), trace gravel.		
				SS	22/24	7	3	(116') As above: light gray (10YR 7/2), no gravel.	116-118 Geotech (not tested)	
				SS		1		(118') SILT WITH SAND (ML); gray (10YR 6/1) with some light brown mottling, soft, moist.		
120						2		(119.5') CLAY (CL); little silt, gray (10YR 6/1), stiff, moist.		


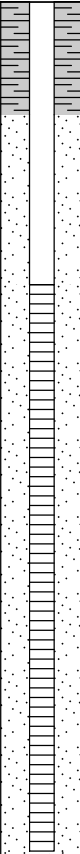

NOTES: SBG09M- (110-112)-20210127: 25.5% moisture content, 760 U mg/kg total organic carbon, 87.0 pcf dry unit weight, 2.675 specific gravity, 0.7% gravel, 84.1% sand, 15.2% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
120				SS	21/24	2	7	(120') SAND WITH SILT (SM); light gray (10YR 7/1), medium dense, moist.		
						3		(121') As above: less silty. (SP-SM)		
				SS	16/24	7	29			
						7				
						22				
				SS	11/24	13	30	(123.5') As above: yellow (2.5Y 7/6). (SP)		
125						14		(124') POORLY GRADED SAND (SP); fine to medium grained, red (2.5YR 5/6), loose, dry.		
						16				
						14				
				SS	16/24	3	13	(126') CLAY (CL); few silt and sand, light brownish gray (10YR 6/2), very stiff, dry.		
						5				
						8				
						10				
				SS	15/24	3	17	(128') As above.	128-130 Chem	
						8				
						13				
130				SS	15/24	8	30	(130') Crushed SAPROLITE, dark yellowish brown (10YR 3/4) to black (10YR 2/1).		
						17				
						6				
						6				
				SS	16/24	6	10	(132') CLAY (CL); few gravel, few sand, yellowish brown (10YR 5/4), moist, stiff.	132-134 Chem	
						4				
						6				
						6				
				SS	22/24	1	8	(134') As above: light brownish gray (10YR 6/2), no sand.		
135						2				
						6				
						7				
						7				
				SS	20/24	2	10	(136') As above: very pale brown (10YR 7/3).		
						5				
						5				
						6				
				SS	13/24	4	15	(138') As above: light yellowish brown (5YR 6/4).		
						8				
						7				
						21				
140										

NOTES:

Drilling Start Date: <b>01/26/2021</b>	Boring Depth (ft): <b>158</b>	Well Depth (ft): <b>155</b>
Drilling End Date: <b>01/28/2021</b>	Boring Diameter (in): <b>4.25</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>51.93</b>	Riser Material: <b>Sch 80 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>351.53</b>	Screen Material: <b>Sch 80 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>348.60</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>SK &amp; AT</b>	Location (Lat/Long): <b>37.21040, -88.85422</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample		
140				SS	6/24	70/1		(140') CALCARENITE, very pale brown (10YR 7/3), dry.	140-142 Chem		
145											
150											
155								(155') End of Boring.			
160								(158') Redrilled to 158' due to well installation difficulties.			

NOTES:

Drilling Start Date: <b>01/19/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>66</b>
Drilling End Date: <b>01/19/2021</b>	Boring Diameter (in): <b>7.5</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>45.66</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>366.88</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>363.38</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>ZJF &amp; AT</b>	Location (Lat/Long): <b>37.21436, -88.85636</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE Lab Sample	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)			
0				SS	24/24	6	13	(0') TOPSOIL.		
				SS	17/24	4		(0.2') ASH (ML)		
				SS	17/24	9		(0.8') LEAN SILT (ML); trace fine sand, stiff, moist, tan (2.5Y 7/4).		
				SS	16/24	7				
				SS	16/24	1	3			
				SS	16/24	1		(2.7') LEAN CLAY (CL); some orange fine sand, soft, wet, brown (2.5Y 3/3).		
				SS	16/24	2				
				SS	16/24	4				
				SS	16/24	5	71			
5				SS	17/24	21		(5.1') SILTY SAND (SM); fine to medium grained, with coal, some organics, very dense, gray (N3), moist, well-graded.		
				SS	17/24	50/6				
				SS	17/24	5	12			
				SS	17/24	7				
				SS	17/24	5		(7.0') LEAN CLAY (CL); stiff, moist, tan (5Y 7/2) with gray (N8) mottles.		
				SS	24/24	5				
				SS	24/24	1	8	(8') As above: becomes medium stiff, orange (10YR 7/12) mottles.		
				SS	24/24	3				
				SS	24/24	5				
10				SS	24/24	6	13	(10') As above: becomes stiff, black inclusions, trace organics.		
				SS	24/24	2				
				SS	23/24	5				
				SS	23/24	8	9	(12') As above.		
				SS	23/24	4				
				SS	24/24	5				
				SS	24/24	7				
				SS	24/24	2	11	(14') As above.		
				SS	24/24	5				
15				SS	24/24	8				
				SS	24/24	2	9	(16') As above.		
				SS	24/24	4				
				SS	24/24	5				
				SS	24/24	6				
				SS	24/24	6				
				SS	24/24	3	16	(18') LEAN SILT (ML); trace sand, stiff, moist, tan (5Y 7/2) with orange (10YR 7/12) and black mottling.		
				SS	24/24	7				
				SS	24/24	9				
20				SS	24/24	10				

NOTES:



Drilling Start Date: <b>01/19/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>66</b>
Drilling End Date: <b>01/19/2021</b>	Boring Diameter (in): <b>7.5</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>45.66</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>366.88</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>363.38</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>ZJF &amp; AT</b>	Location (Lat/Long): <b>37.21436, -88.85636</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
20				SS	24/24	3	14	(20.1') LEAN CLAY (CL); trace fine sand, stiff, moist, tannish orange (10YR 7/6) with gray (N8) mottles.		
				SS	27/24	2	10	(22') As above.	22-24 Chem	
				SS	27/24	4		(24') As above.	24-26 ST	
25				SS	24/24	3	9	(26') As above.		
				SS	24/24	4	10	(28') As above.		
				SS	26/24	2	8	(30') As above: with increased moisture.		
				SS	24/24	2	8	(32') As above.		
30				SS	25/24	4	13	(34') As above: with fine sand.		
				SS	26/24	2	10	(36') As above: orange (10YR 7/12) inclusions, gray (N8) with tan orange (10YR 7/6) mottling.		
				SS	25/24	2	10	(38') As above: trace silt.		
40										

NOTES: SBG11-(24-26)-20210119: 18.5% moisture content, 415 U mg/kg total organic carbon, 109.1 pcf dry unit weight, 2.688 specific gravity, 5.6x10<sup>-8</sup> cm/s vertical hydraulic conductivity, 36 LL, 15 PL, 21 PI, 0.0% gravel, 11.5% sand, 88.5% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit

Drilling Start Date: <b>01/19/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>66</b>
Drilling End Date: <b>01/19/2021</b>	Boring Diameter (in): <b>7.5</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>45.66</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>366.88</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>363.38</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>ZJF &amp; AT</b>	Location (Lat/Long): <b>37.21436, -88.85636</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	DEPTH (ft)
40				SS	25/24	2	7	(40') As above: becomes medium stiff.		
				SS	27/24	2	8	(42') LEAN CLAY (CL); orange (10YR 7/6) silty fine sand seams, medium stiff, moist, gray (N8).		
				SS	25/24	2	9	(44') As above: stiff.		
45				SS	25/24	3	15	(46') As above: seams are silt only.		
				SS	24/24	3	9	(48') As above: no seams, trace orange (10YR 7/6) silt, increased moisture.		
50				SS	27/24	1	3	(50') As above: increased moisture.		
				SS	27/24	2	6	(52') As above: gray (N9) sand layer.		
				SS	27/24	3	34	(53.2') POORLY GRADED SAND (SP); fine to medium grained, trace silt, loose, gray (N9), wet.		
55				SS	27/24	3	8	(54') As above: becomes dense, trace clay, trace orange (10YR 7/6) silt inclusions.		
				SS	8/24	7	30	(56') As above.	56-58 Geotech	
				SS	24/24	7	14	(58') As above: trace gravel, no silt, some orange (10YR 7/6) fine to medium sand.	58-60 Chem	
60										

NOTES: SBG11-(56-58)-20210119: 14.4% moisture content, 679 U mg/kg total organic carbon, 110.0 pcf dry unit weight, 2.661 specific gravity, 0.2% gravel, 87.7% sand, 12.1% fines.  
\*U = Analyte was not present in concentrations above method detection limit and is reported as the reporting limit



Client: **Dynegy**  
 Project: **GLP0821, Joppa Ash Pond**  
 Address: **Unnamed Road, Metropolis, IL 62960**

**WELL LOG**  
 Well No. **G11**  
 Page: **4 of 4**

Drilling Start Date: <b>01/19/2021</b>	Boring Depth (ft): <b>66</b>	Well Depth (ft): <b>66</b>
Drilling End Date: <b>01/19/2021</b>	Boring Diameter (in): <b>7.5</b>	Well Diameter (in): <b>2</b>
Drilling Company: <b>Geotechnology</b>	DTW During Drilling (ft):	Screen Slot (in): <b>0.010</b>
Drilling Method: <b>Hollow Stem Auger</b>	DTW After Drilling (ft): <b>45.66</b>	Riser Material: <b>Sch 40 PVC</b>
Drilling Equipment: <b>CME 55LC</b>	Top of Casing Elev. (ft): <b>366.88</b>	Screen Material: <b>Sch 40 PVC Slotted</b>
Driller:	Ground Elev. (ft): <b>363.38</b>	Seal Material(s): <b>Grout &amp; Bentonite</b>
Logged By: <b>ZJF &amp; AT</b>	Location (Lat/Long): <b>37.21436, -88.85636</b>	Filter Pack: <b>Sand</b>

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE	DEPTH (ft)
				Sample Type	Recovery (in)	Blow Counts	N Value RQD (%)		Lab Sample	
60				SS	20/24	6	29	(60') As above: increased orange sand.		
14										
15										
16										
				SS	14/24	0	17	(62') WELL-GRADED SAND (SW); fine to medium grained, medium dense, wet, orangish tan (7.5YR 8/8) with some gray (N9) sand layers.		
						6				
						11				
				SS	18/24	2	25	(64') As above: with sandy gravel layer (~5" thick).		
65						10				
						15				
						11				
								(66') End of Boring.		
70										

NOTES:

Surface Elevation: 360.9

Completion Date: 6/19/10

Datum msl

**WELL DIAGRAM**

Flushmount

DEPTH  
IN FEET

**DESCRIPTION OF MATERIAL**

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)  
SPT BLOW COUNTS  
CORE RECOVERY/RQD

SAMPLES

Depth (ft)  
Elev. (ft)

GRAVEL

Medium stiff to stiff, brown and gray, silty CLAY - (CL)

$k = 1.6 \times 10^{-6} \text{ cm/s}$

Medium stiff to stiff, brown and gray, silty CLAY, trace sand - CL

Medium stiff to very stiff, brown and gray, sandy CLAY with silt - CL

Boring terminated at 42 feet.



Boring terminated at 42 feet.

SS1

3-4-4-5 SS2

2-3-3-5 SS3

3-3-4-4 SS4

1-2-3-5 SS5

3-5-5-6 SS6

2-4-5-6 SS7

2-3-4-5 SS8

3-4-6-7 SS9

3-4-6-6 SS10

3-5-7-8 SS11

3-5-7-9 SS12

2-3-5-6 SS13

3-5-7-6 SS14

3-5-8-8 SS15

4-7-9-4 SS16

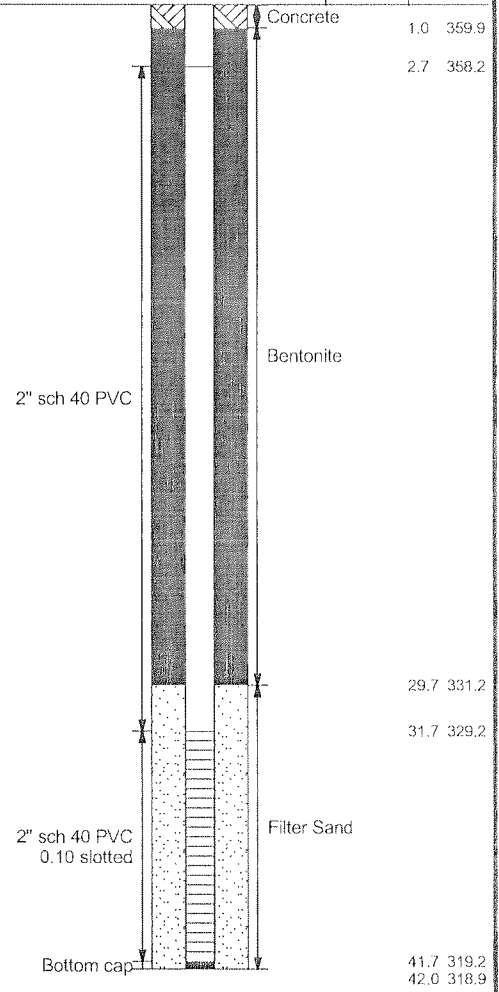
4-4-6-7 SS17

2-4-3-5 SS18

5-5-7-14 SS19

13-13-10-8 SS20

2-4-6-7 SS21



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

**GROUNDWATER DATA**

FREE WATER NOT ENCOUNTERED DURING DRILLING

**DRILLING DATA**

AUGER  HOLLOW STEM WASHBORING FROM \_\_\_ FEET  
 PH DRILLER  BGF LOGGER  
 DRILL RIG  
 HAMMER TYPE Auto

REMARKS:

Drawn by: KA      Checked by: RDP      App'vd. by: RDP  
 Date: 7/14/10      Date: 9/20/10      Date: 9/20/10



Ash Pond Evaluation  
 EEI Facility  
 Joppa, Illinois

LOG OF BORING: G-151

Project No. J017150.02

# FIELD BORING LOG



**CLIENT:** Natural Resource Technology, Inc.  
**Site:** Joppa Power Station  
**Location:** Joppa, Illinois  
**Project:** 15E0030  
**DATES: Start:** 8/17/2015  
**Finish:** 8/18/2015  
**WEATHER:** Partly cloudy, warm, mid-80s

**CONTRACTOR:** Bulldog Drilling, Inc.  
**Rig mfg/model:** CME-750 ATV Drill  
**Drilling Method:** 4/4" HSA, split spoon sampler  
**FIELD STAFF: Driller:** J. Dittmaier  
**Helper:** M. Hill  
**Eng/Geo:** R. Hasenyager

**BOREHOLE ID:** G51D  
**Well ID:** G51D  
**Surface Elev:** 361.10 ft. MSL  
**Completion:** 59.90 ft. BGS  
**Station:** 200,430.10N  
 832,151.51E

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft <sup>3</sup> )	Q <sub>u</sub> (tsf) Q <sub>p</sub> (tsf) Failure Type	TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
							Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					2	Blind drill - see G151 boring log			
	0/60 0%	BD				4					
	0/60 0%	BD				6					
	0/60 0%	BD				8					
	0/60 0%	BD				10					
	0/60 0%	BD				12					
	0/60 0%	BD				14					
	0/60 0%	BD				16					
	0/60 0%	BD				18					
	0/60 0%	BD				20					

**NOTE(S):** G51D installed in borehole.



# FIELD BORING LOG



**CLIENT:** Natural Resource Technology, Inc.  
**Site:** Joppa Power Station  
**Location:** Joppa, Illinois  
**Project:** 15E0030  
**DATES: Start:** 8/17/2015  
**Finish:** 8/18/2015  
**WEATHER:** Partly cloudy, warm, mid-80s

**CONTRACTOR:** Bulldog Drilling, Inc.  
**Rig mfg/model:** CME-750 ATV Drill  
**Drilling Method:** 4 1/4" HSA, split spoon sampler  
**FIELD STAFF: Driller:** J. Dittmaier  
**Helper:** M. Hill  
**Eng/Geo:** R. Hasenyager

**BOREHOLE ID:** G51D  
**Well ID:** G51D  
**Surface Elev:** 361.10 ft. MSL  
**Completion:** 59.90 ft. BGS  
**Station:** 200,430.10N  
 832,151.51E

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:		
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft <sup>3</sup> )	Q <sub>u</sub> (tsf) Q <sub>p</sub> (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 0%	BD					22			338	
	0/60 0%	BD					24			336	
	0/60 0%	BD					26			334	
	0/60 0%	BD					28			332	
	0/60 0%	BD					30	Blind drill - see G151 boring log [Continued from previous page]		330	
	0/60 0%	BD				32			328		
	0/60 0%	BD				34			326		
	0/60 0%	BD				36			324		
	0/60 0%	BD					38			322	
9A	24/24 100%	SS	6-7 4-4 N=11	22	1.50		40	Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, medium, CLAY with few silt and little very fine- to fine-grained sand.		320	

**NOTE(S):** G51D installed in borehole.

# FIELD BORING LOG



CLIENT: Natural Resource Technology, Inc.  
 Site: Joppa Power Station  
 Location: Joppa, Illinois  
 Project: 15E0030  
 DATES: Start: 8/17/2015  
 Finish: 8/18/2015  
 WEATHER: Partly cloudy, warm, mid-80s

CONTRACTOR: Bulldog Drilling, Inc.  
 Rig mfg/model: CME-750 ATV Drill  
 Drilling Method: 4 1/4" HSA, split spoon sampler  
 FIELD STAFF: Driller: J. Dittmaier  
 Helper: M. Hill  
 Eng/Geo: R. Hasenyager

BOREHOLE ID: G51D  
 Well ID: G51D  
 Surface Elev: 361.10 ft. MSL  
 Completion: 59.90 ft. BGS  
 Station: 200,430.10N  
 832,151.51E

SAMPLE		TESTING					TOPOGRAPHIC MAP INFORMATION:		WATER LEVEL INFORMATION:				
Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft <sup>3</sup> )	Q <sub>u</sub> (tsf) Q <sub>p</sub> (tsf) Failure Type	Quadrangle: Joppa Township: 15S,3E Section 14, Tier 15S; Range 3E	▼ = 39.50 - During Drilling ▽ = 34.91 - 8/18/15 ▽ =	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
10A	24/24 100%	ss	1-2 4-5 N=6	20	1.50		Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, medium, CLAY with few silt and little very fine- to fine-grained sand. <i>[Continued from previous page]</i>		44		318		
11A	24/24 100%	ss	3-4 4-4 N=8	16	0.25			46	Yellowish brown (10YR5/8) with 50% gray (10YR6/1) mottles, moist, soft, very fine- to medium-grained SAND with some silt and little clay.		316		
12A	24/24 100%	ss	5-7 10-11 N=17	13	1.50			48	Yellowish brown (10YR5/8) with 50% gray (10YR6/1) mottles, moist, stiff, very fine- to medium-grained SAND with some silt, little clay, and trace small gravel.		314		
13A	20/24 83%	ss	5-12 14-15 N=26	15	0.25			50	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, wet, loose, very fine- to medium-grained SAND with trace silt, trace clay and trace small gravel.		312		
14A	23/24 96%	ss	5-15 19-21 N=34	15	1.25			52			310		
15A	22/24 92%	ss	3-12 14-7 N=26	15	1.50			54			308		
16A	24/24 100%	ss	1-5 6-11 N=11	17	0.00			56	Strong brown (7.5YR5/8), wet, loose, very fine- to medium-grained SAND with trace silt, trace clay, and trace small gravel.		306		
17A	24/24 100%	ss	2-7 8-11 N=15	19	0.00			58			304		
	0/23 0%	BD								302	Drilled past end of sample interval		

End of boring = 59.9 feet

NOTE(S): G51D installed in borehole.

**ATTACHMENT 2**

**RAMBOLL RESPONSE LETTER DATED NOVEMBER 6, 2023**

November 6, 2023

VIA E-MAIL

Lauren.Martin@epa.gov

EPA.CCR.PART845.COORDINATOR@ILLINOIS.GOV

EPA.CCR.Part845.Notify@Illinois.gov

**Re: Joppa Power Plant East Ash Pond Alternative Source Demonstration Response to IEPA Comments**

To Whom It May Concern:

This letter addresses the following requests for information from the Illinois Environmental Protection Agency (IEPA) provided on October 26, 2023 via email from Lauren Hunt regarding the Joppa Power Plant East Ash Pond alternative source demonstration (ASD) submitted on October 21, 2023:

1. Source characterization of the CCR at the East Ash Pond must include total solids sampling, analysis and reporting in accordance with SW846.
2. Hydraulic conductivities from laboratory or insitu testing must be collected, analyzed and presented with hydrogeologic characterization of all units including aquifers and confining units. Hydraulic conductivity data must include field and software analysis.
3. Characterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with the ASD.

**Background**

Alternative source demonstrations use a multiple lines of evidence approach to support the conclusions that 1) the coal combustion residuals (CCR) unit is not the source of an exceedance, and 2) there is an alternative source of the exceedance. The multiple lines of evidence approach is consistent with the approach used in many areas of environmental analysis such as ecological risk assessment, monitored natural attenuation (MNA), and vapor intrusion (USEPA, 2016; USEPA, 1999; ITRC, 2007). The goal of a multiple lines of evidence approach is to provide robust support for a causal relationship based on many smaller individual qualitative or quantitative pieces of evidence (USEPA, 2016). Critically, no individual line of evidence will be completely conclusive, and each will have varying degrees of certainty. The final determination of a conclusion is based on the totality of the evidence provided.

ASDs based on a multiple lines of evidence approach are routinely prepared by environmental consultants to comply with federal CCR rules (Title 40 of the Code of Federal Regulations [40 C.F.R.] § 257) and State CCR rules (Title 35 of the Illinois Administrative Code [35 I.A.C.] § 845). In Georgia, where the CCR permitting authority has been delegated to the State, the Georgia Environmental Protection Division has approved ASDs using multiple lines of evidence to satisfy the requirements of federal CCR rule. An example of such approval is documented in the summary section (page 3) of the 2023 Annual Groundwater Monitoring and Corrective Action Report found in the publicly accessible files linked here: [https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-mcmanus/20230731\\_2023aqwmcarr\\_mcm\\_ap-1.pdf](https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-mcmanus/20230731_2023aqwmcarr_mcm_ap-1.pdf).

The East Ash Pond ASD was completed in conformance with the Electric Power Research Institute (EPRI) guidance for development of ASDs at CCR sites (EPRI, 2017). The EPRI document presents an approach for developing ASD lines of evidence that relies, where possible, on leachate samples collected from leachate wells, lysimeters, and/or leachate collection systems to provide samples that are representative of interstitial porewater. This direct approach for evaluating the potential for the East Ash Pond to impact groundwater is in contrast to the indirect approach implied by the IEPA request to characterize the CCR at the East Ash Pond using methods in accordance with SW-846 (specifically those used for waste characterization [e.g., EP, TCLP, SPLP, LEAF<sup>1</sup>]), as discussed below.

Additionally, the lines of evidence as presented as section headings in the East Ash Pond ASD commonly contain multiple qualitative and quantitative pieces of information that contribute to the body of evidence that support the conclusion that the CCR surface impoundment (SI) is not the source of an exceedance.

### **Response to Request Number 1: SW-846 Characterization of CCR Material**

The CCR porewater most accurately represents the mobile constituents associated with the waste management activity within the CCR SI (EPRI, 2017). The composition of CCR porewater accumulated at the base of the CCR unit, which is derived from, and represents contact with, CCR material above and around the well screen, is the truest representation of mobile constituents throughout the CCR SI. Leach tests presented in SW-846 (e.g., TCLP, SPLP, LEAF 1313 - 1316) are inconsistent predictors or surrogates of *in situ* porewater chemical concentrations (EPRI, 2020; EPRI, 2021; and EPRI, 2022). Indeed, laboratory leach test effectiveness is determined by comparing results to porewater data (USEPA, 2014; EPRI, 2020; EPRI, 2021; and EPRI, 2022). These laboratory leach tests most accurately predict porewater concentrations when conditions in the test closely reflect conditions present in the field (USEPA, 2019). In many cases, the pH and/or redox potential of porewater is poorly represented by any laboratory leach test conditions. For these reasons, analysis of actual CCR porewater is more representative of potential contributions to groundwater observed in compliance monitoring wells than laboratory leach testing. The uncertainty in comparing the laboratory leach test results with the actual porewater concentrations means that the contribution of laboratory leach test data as a line of evidence to an ASD would be minimal.

Prior to performing hydrogeologic investigations in 2021, Ramboll completed a review of existing data to determine whether sufficient information existed to meet the requirements of 35 I.A.C. § 845. Based on the review, Ramboll developed an approach to fully characterize the CCR material as part of the 2021 investigation. Three locations for porewater wells were selected by evaluating the extent of ash through time on aerial photographs (**Figure 1**), identifying visible differences (color) in surficial materials, and capturing a representative spatial distribution. Porewater was encountered at an elevation of approximately 370 to 374 feet (Ramboll, 2021). For the purpose of visualization, **Figure 2** shows the areas within the SI that were not accessible for potential sampling and testing as illustrated by different colored portions of the East Ash Pond. Of the 122 acre unit, about 66% was accessible for safely installing porewater monitoring wells. A total of three porewater wells were installed in 2021.

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<sup>1</sup> Extraction Procedure, Toxic Characteristic Leaching Procedure, Synthetic Precipitation Leaching Procedure, Leaching Environmental Assessment Framework



During installation of the porewater wells, the borings were logged, and solid samples were collected from six intervals for geotechnical and chemical analysis. Samples were analyzed for total metal concentrations via EPA Method 6010B and 6020A (SW-846) and results were summarized in the Hydrogeologic Site Characterization Report (Ramboll, 2021) and submitted in the 2021 Operating Permit (Burns and McDonnell, 2021).

As established above, testing porewater is a direct source term for evaluating potential influence on groundwater. SW-846 provides analytical methods for evaluating solid waste using leach tests that are designed to replicate potential *in situ* conditions (either current or future). The goal of these laboratory leach tests is to predict the potential concentration of chemicals under laboratory controlled conditions (*e.g.*, landfill leachate, synthetic precipitation, variable pH) which may or may not represent conditions observed in the field. The use of leach test results performed under variable conditions collected from any number of locations within the CCR SI to estimate a total potential for chemical leaching from CCR into groundwater under a variety of different conditions is irrelevant to an ASD. ASDs are prepared to evaluate the potential for actual porewater leaking from a CCR SI to be the cause of a detected exceedance observed in a compliance well.

### **Response to Request Number 2: Provide Hydraulic Conductivity Data**

Responses to Request Number 2 are provided in the cover letter to this Attachment and in Attachment 1 to that cover letter.

### **Response to Request Number 3: Alternative Source Characterization**

In the East Ash Pond ASD, the multiple lines of evidence approach is appropriate for identifying that a source other than the East Ash Pond caused the observed exceedance and that the East Ash Pond did not contribute to the cobalt exceedance at G05 or the low pH at G11 and G51D. Ramboll's investigation determined that release of naturally occurring cobalt from manganese oxides was the source of cobalt at G05. Results of solid sampling indicates the presence of cobalt in native materials from multiple locations at the site and naturally occurring cobalt was found to be associated with manganese throughout the site.

Mixing of oxidizing and reducing waters was identified as the source of the low pH at G11 and G51D. A distinct redox transition was identified, shifting from more reducing conditions in upgradient waters to more oxidizing conditions in downgradient wells, including the exceedance wells. The oxidation of dissolved iron to iron oxides is known to produce acidity (Hem and Cropper, 1959) and is believed to be the cause of the low pH at G11 and G51D.

When an exceedance is caused by natural variability driving geochemical reactions (*e.g.*, as by mixing of waters with different compositions), direct sampling of a "source" becomes challenging. The closest approximation of direct sampling would involve using collected materials in complex laboratory simulations which would attempt to replicate field conditions. Instead, site-specific hydrogeologic, groundwater composition, and solid phase data were analyzed using industry-standard geochemical and statistical methods to provide multiple lines of evidence which support the conclusions. As described above, a multiple lines of evidence approach allows for determination of robust conclusions when specific source data are inaccessible.

## Conclusions

The combined strength of the lines of evidence in the East Ash Pond ASD demonstrates that the East Ash Pond is not the source of the cobalt exceedance at G05 or the low pH at G11 and G51D (and did not contribute to these exceedances) and that the likely source is natural variability in groundwater due to water-solid interactions and groundwater mixing, respectively. Ramboll does not believe that additional lines of evidence based on leach test data or testing of the alternative source would change the conclusion of the full body of evidence presented in the ASD that the East Ash Pond is not the source of the exceedances and did not contribute to the exceedances.

## References

Burns & McDonnell, 2021. Initial Operating Permit. Joppa East Ash Pond. October 25.

Geosyntec Consultants, Inc. (Geosyntec), 2023. Supplemental Site Investigation Report. Joppa Power Station, East Ash Pond (CCR Unit #401), Electric Energy, Inc. April

Interstate Technology Regulatory Council (ITRC), 2007. Technical and Regulatory Guidance Vapor Intrusion Pathway: A Practical Guide. January 2007.

Electric Power Research Institute (EPRI), 2017. Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites. EPRI, Palo Alto, CA: 2017. 3002010920.

Electric Power Research Institute (EPRI), 2020. Leaching, Geotechnical, and Hydrologic Characterization of Coal Combustion Products from a Closed Coal Ash Impoundment: Capped Unit. EPRI, Palo Alto, CA: 2020. 3002017363.

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United States Environmental Protection Agency (USEPA), 1999. Use of Monitoring Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. OSWER Directive Number 9200.4-17P.

**Attachments**

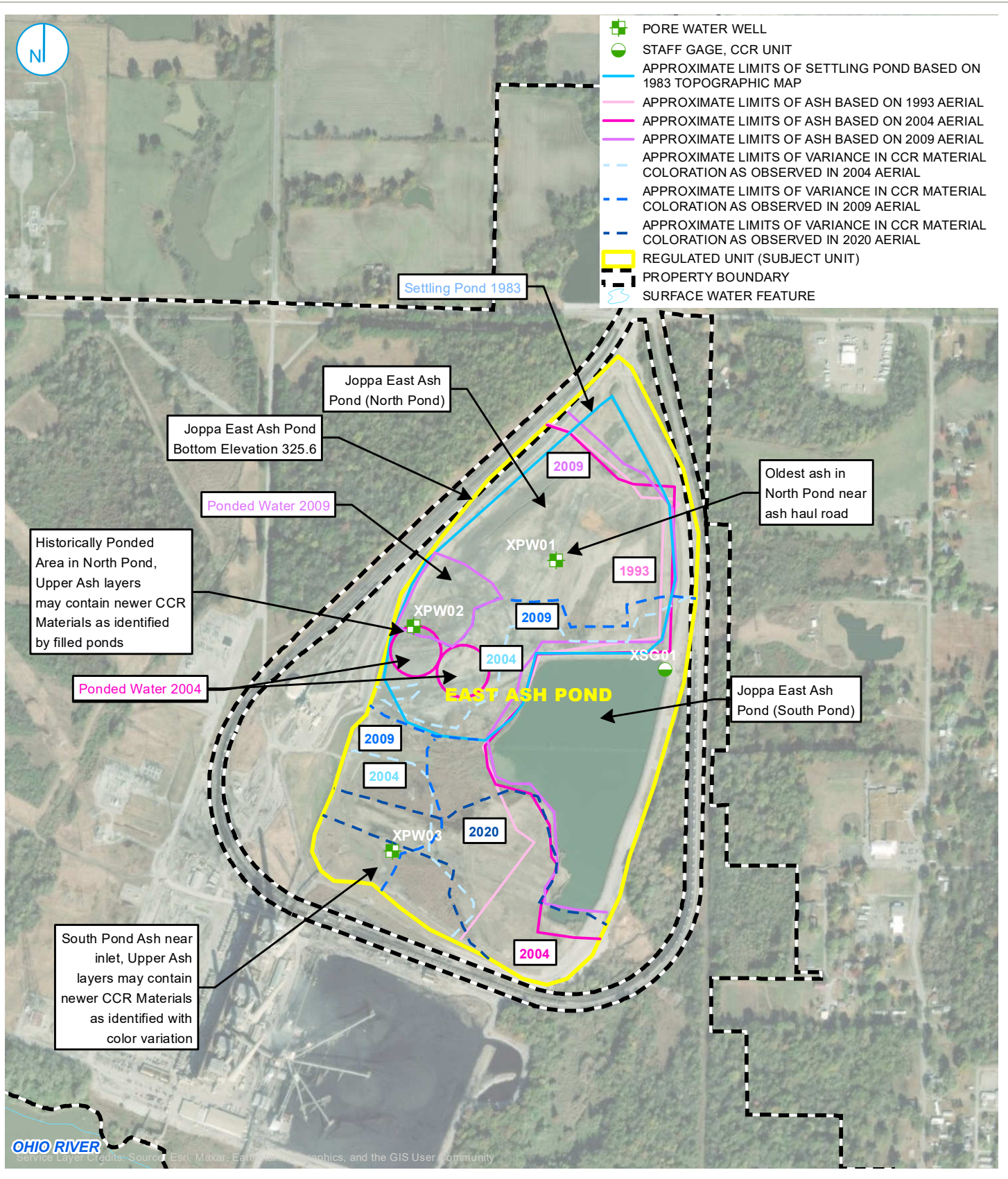
- Figure 1 CCR Characterization
- Figure 2 2022 Conditions

If you have any questions about this letter, please do not hesitate to contact Brian Hennings or Frances Ackerman, as referenced below.

Sincerely,

**Brian G. Hennings, PG**  
Project Officer, Hydrogeology  
D +1 414 837 3524  
D +1 262 719 4512  
[brian.hennings@ramboll.com](mailto:brian.hennings@ramboll.com)

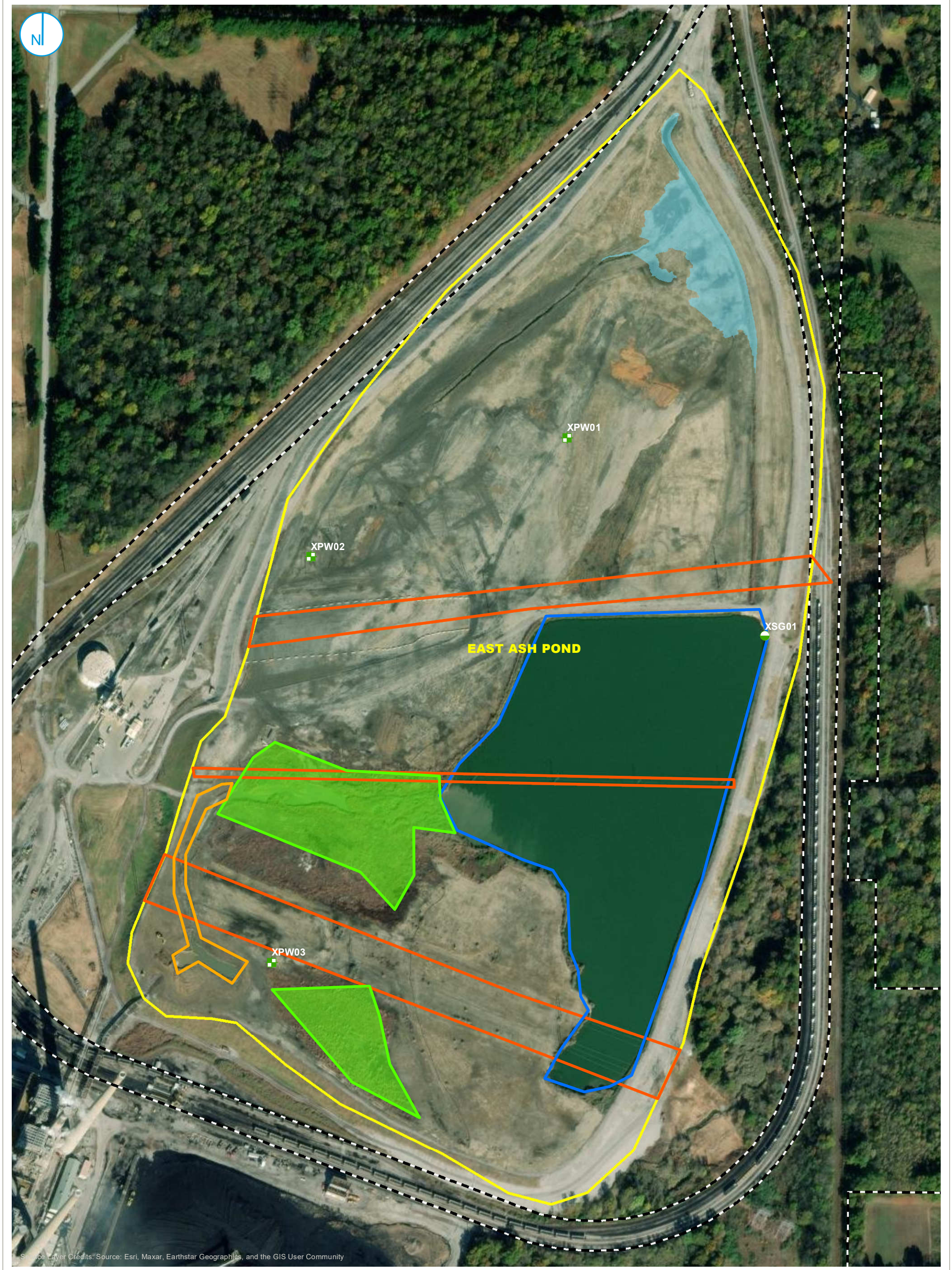
**A. Frances Ackerman, PE**  
Subject Matter Expert/Technical Manager 2  
D +1 414 308 0811  
M +1 414 308 0811  
[frances.ackerman@ramboll.com](mailto:frances.ackerman@ramboll.com)



CCR CHARACTERIZATION

FIGURE 1





Source Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- PORE WATER WELL
- STAFF GAGE, CCR UNIT
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY
- ACTIVE SLUICE AREA
- HEAVY VEGETATION AREA
- OPEN WATER
- TRANSMISSION LINES AREA
- ELEVATION BELOW 370FT

2022 CONDITIONS

FIGURE 2

0 150 300 Feet

EAST ASH POND  
JOPPA POWER PLANT  
JOPPA, ILLINOIS

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.







# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, DIRECTOR

217-782-1020

November 16, 2023

Dianna Tickner  
Electric Energy, Inc.  
1500 Eastport Plaza drive  
Collinsville, Illinois 62234

Re: Joppa Power Plant East Ash Pond; W1270100004-02  
Alternative Source Demonstration Submittal

Dear Ms. Tickner:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) does not concur with the Joppa East Ash Pond Alternative Source Demonstration (ASD) dated October 21, 2023. The Illinois EPA does not concur due to the following data gaps:

1. Source characterization of the CCR at the East Ash Pond must include total solids sampling in accordance with SW846.
  - a. 35 IAC 845.650(e) states “the owner or operator of a CCRSI may...submit a demonstration to the Agency that a source other than the CCRSI caused the contamination and the CCRSI did not contribute to the contamination... Either type of ASD must include a report that contains the factual or evidentiary basis for any conclusions...”
    - i. The Illinois EPA cannot concur with ASDs that do not include source characterization of the CCR with adequate sampling and analysis of the CCR which must characterize the CCR horizontally and vertically within the CCRSI.
2. Characterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with the ASD.
  - a. 35 IAC 845.640(a) requires evidence of field collection methods and field and laboratory quality control and quality assurance.
  - b. 35 IAC 845.650(e) requires alternative source data as evidence of the alternative source, see item 1(a)(i) above. SW846 chapter 1, incorporated by reference in 35 IAC 845, states that regulatory decisions must be made with environmental data.

2125 S. First Street, Champaign, IL 61820 (217) 278-5800  
1101 Eastport Plaza Dr., Suite 100, Collinsville, IL 62234 (618) 346-5120  
9511 Harrison Street, Des Plaines, IL 60016 (847) 294-4000  
595 S. State Street, Elgin, IL 60123 (847) 608-3131

2309 W. Main Street, Suite 116, Marion, IL 62959 (618) 993-7200  
412 SW Washington Street, Suite D, Peoria, IL 61602 (309) 671-3022  
4302 N. Main Street, Rockford, IL 61103 (815) 987-7760

If you have any questions, please contact: **Lauren Hunt** Illinois EPA, Bureau of Water, WPC #15, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,



Michael Summers, P.G.  
Manager, Groundwater Section  
Division of Public Water Supplies  
Bureau of Water

cc: Lauren Hunt  
Keegan MacDonna  
Records Files 06M  
Jenny Cassel, EARTHJUSTICE

**ATTACHMENT C  
CORRECTIVE MEASURES ASSESSMENT EXTENSION  
REQUEST AND IEPA APPROVAL LETTER**



Electric Energy, Inc  
2100 Portland Road  
Metropolis, IL 62960

November 21, 2023

Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

Re: Joppa East Ash Pond (IEPA ID: W1270100004-02) Corrective Measures Assessment Schedule Extension  
Demonstration

Dear Mr. LeCrone:

In accordance with 35 I.A.C. § 845.660(a)(2), Electric Energy, Inc. (EEI), is submitting a schedule extension demonstration for completing the Corrective Measures Assessment (CMA) for the East Ash Pond (IEPA ID: W1270100004-02) at the Joppa Power Plant, as enclosed.

Sincerely,

A handwritten signature in blue ink that reads "Dianna Tickner".

Dianna Tickner, P.E., PMP  
Senior Director, Decommissioning & Demolition

Enclosures

## INTRODUCTION AND BACKGROUND

Exceedances of the groundwater protection standards (GWPS) listed in Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600 have been detected at the East Ash Pond (EAP, Illinois Environmental Protection Agency [IEPA] Identification [ID]: W127010004-02) at the Joppa Power Plant (JPP). The GWPS exceedances are documented in the 2023 Quarter 2 Groundwater Monitoring Data and Detected Exceedances report that was prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) and submitted to IEPA on August 22, 2023 [1].

In accordance with 35 I.A.C. § 845.660, Electric Energy Inc., (EEI) initiated a Corrective Measures Assessment (CMA) on November 20, 2023, which was within 90 days of the exceedance detection. Upon reviewing site-specific conditions, circumstances, and information gathered to-date, EEI has determined, in accordance with 35 I.A.C. § 845.660(a)(2), that an additional 60 days will be required to complete the CMA. This extension of the CMA deadline would result in the CMA for the EAP being submitted to IEPA on or before April 18, 2024.

## DEMONSTRATION

As discussed below, there are four site-specific conditions or circumstances at the EAP that justify the need for a 60-day extension of the default CMA deadline.

### Circumstance 1: Ongoing Fieldwork and Additional Data Collection

The reliability of monitored natural attenuation (MNA) to attain GWPS is currently under evaluation. EEI is in the process of evaluating the results of additional recent fieldwork and data collection associated with the evaluation of MNA as a corrective measure for the EAP. The fieldwork included geochemical analysis of groundwater. The results of this fieldwork and data collection will be utilized to evaluate the reliability, including the potential for reversibility, of MNA relative to other types of corrective measures.

### Circumstance 2: Physical Size of the EAP, Potential Conflicts with Closure, Existing Site Features, and Adjacent Wetlands and Floodplains

The evaluation of performance and reliability of corrective measures for the EAP will be complicated by physical challenges and constraints around effectively implementing corrective measures at the site. The challenges include, but are not limited to:

- The EAP has a total surface area of nearly 128 acres and a perimeter of approximately 9,500 feet. Coal combustion residuals (CCR) material is also located in a 32-acre area outside of the EAP [2].
- A significant amount of existing site infrastructure is present at or adjacent to the EAP. The infrastructure includes, but is not limited to [2]:
  - Four overhead power lines, some of which are high-voltage, that cross the EAP;
  - An inactive rail loop located along the perimeter of the EAP;
  - A buried 72-inch corrugated metal pipe (CMP) culvert along the eastern boundary of the EAP which provides stormwater and run-on/run-off control;
  - Several other culverts that transmit flow beneath the rail loop;
  - An approximately 40,000-square foot subsurface zone of deep mixing method (DMM) ground improvement that was installed in 2016; and
  - Other miscellaneous plant infrastructure including pipe racks, roadways, and CCR beneficial use loading facilities.
- Closure of the EAP, in accordance with the Closure Plan and Construction Permit Application submitted to IEPA on July 28, 2022 [2], will be a large-scale construction project.



- Closure will include a consolidate-and-cap approach where CCR is removed from a 54-acre area inside the EAP and the 32-acre area outside the EAP, consolidating the CCR into a 74-acre area, and removing approximately 3,000 feet of the perimeter dikes. Closure will result in moving approximately 2 million cubic yards of CCR, subgrade, and dike soils over a period of two to three years [2].
- Areas adjacent to the EAP are located within the 100-year floodplain of the adjacent Ohio River, per Federal Emergency Management Agency (FEMA) floodplain mapping for the site [3].
- Areas adjacent to the EAP have also been identified as both potential freshwater emergent wetlands and forested shrub wetlands by the U.S. Fish and Wildlife Service's mapping tool [4].

These factors will require substantial additional effort to evaluate the physical location and dimensions of any proposed corrective action which considers the size of the EAP and limits impacts to existing site infrastructure and proposed closure construction, while also minimizing impacts to environmentally sensitive wetlands and floodplains.

#### Circumstance 3: Future Solar Development

The ease of implementation and time required to begin and complete corrective action at the EAP may be affected by potential future solar development at the site. EEI is in the planning stages of developing a solar facility over the closed-in-place EAP which could provide renewable, low-carbon energy to Illinois while repurposing the EAP into productive land use. Additional time is required to evaluate potential conflicts between the future solar development that is being considered and potential corrective measures.

#### Circumstance 4: Depths and High Hydraulic Conductivity of the Uppermost Aquifer

The complexity of implementing corrective action will be affected by the high-permeability foundation soils and their relatively large depths. The Uppermost Aquifer (UA) at the EAP, which consists of the Upper McNairy Formation, extends to 130 ft below grade, with a typical thickness of approximately 58 feet. The UA, which has observed GWPS exceedances of cobalt, boron, and pH [1], has a geometric mean hydraulic conductivity of  $3.1 \times 10^{-3}$  centimeters/second [5]. Additional time will be required for the CMA to address these site-specific conditions.

#### REFERENCES

- [1] Ramboll Americas Engineering Solutions, Inc., "35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2, East Ash Pond, Joppa Power Plant," August 22, 2023.
- [2] Geosyntec Consultants, "Construction Permit Application, Joppa Power Plant, East Ash Pond," July 28, 2022.
- [3] Federal Emergency Management Agency, "Flood Insurance Rate Map, County of Massac, Illinois (Unincorporated Areas), Community-Panel Number 170467 0025 B," National Flood Insurance Program, July 5, 1983.
- [4] U.S. Fish and Wildlife Service, "National Wetlands Inventory, surface waters and wetlands," [Online]. Available: <https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/>.
- [5] Ramboll, "Hydrogeologic Site Characterization Report, East Ash Pond, Joppa Power Plant, Joppa, Illinois," October 25, 2021.

**CERTIFICATION STATEMENT**

CCR Unit: Electric Energy Inc; Joppa Power Plant, East Ash Pond  
IEPA ID: W1270100004-02

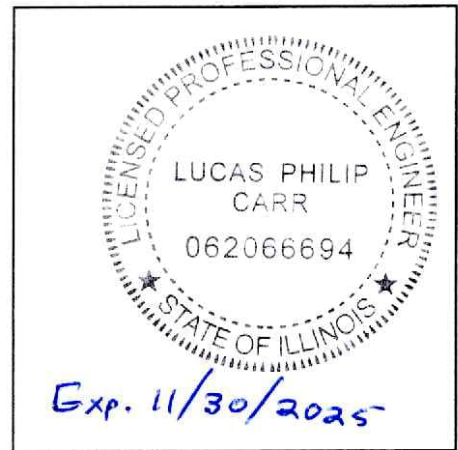
I, Lucas P. Carr, being a Registered Professional Engineer in good standing with the state of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR unit, that the 60-day extension demonstration for the Corrective Measures Assessment has been prepared in accordance with 35 I.A.C. § 845.600(a)(2) and is accurate.



Lucas P. Carr, P.E.  
Senior Managing Consultant



Date





Electric Energy, Inc.  
2100 Portland Road  
Metropolis, IL 62960

November 30, 2023

Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

**Re: Joppa Power Plant East Ash Pond (IEPA ID: W1270100004-02)  
Corrective Measures Assessment Schedule Extension Demonstration Addendum**

Dear Mr. LeCrone:

In accordance with 35 I.A.C. § 845.660(a)(2), Electric Energy, Inc. (EEI) submitted a schedule extension demonstration for completing the Corrective Measures Assessment (CMA) for the East Ash Pond (Illinois Environmental Protection Agency [IEPA] ID: W1270100004-02) at the Joppa Power Plant on November 21, 2023. On November 16, 2023, IEPA issued a non-concurrence letter to EEI regarding an alternative source demonstration (ASD) for the East Ash Pond. Therefore, EEI has prepared this CMA Schedule Extension Demonstration Addendum to include the ASD non-concurrence as an additional site-specific circumstance, as enclosed.

Sincerely,

A handwritten signature in blue ink that reads "Dianna Tickner".

Dianna Tickner, P.E., P.M.P.  
Senior Director, Decommissioning & Demolition

Enclosures

## **INTRODUCTION AND BACKGROUND**

EEl submitted a CMA Schedule Extension Request Demonstration (Extension Demonstration) for the East Ash Pond (EAP) at the Joppa Power Plant (JPP) on November 21, 2023 [1]. The Extension Demonstration considered the GWPS exceedances listed in the 2023 Quarter 2 Groundwater monitoring report [2] which were not included within the Alternative Source Demonstration (ASD) that was prepared by Ramboll and submitted to IEPA on October 21, 2023 [3]. Additional data to support the ASD, based on communication between IEPA and EEl, were submitted to IEPA on November 6, 2023 [4]. On November 16, 2023, IEPA issued a letter to EEl indicating that they did not concur with the ASD [5]. Therefore, in accordance with 35 I.A.C. § 845.660(a), these exceedances would need to be addressed in the CMA.

This CMA Schedule Extension Demonstration Addendum has been prepared to supplement the previously submitted Extension Demonstration [1] to include a new site-specific circumstance related to the non-concurrence with the ASD [5].

## **DEMONSTRATION**

As discussed below, there is one additional circumstance (Circumstance 5) for the EAP that justifies the need for a 60-day extension of the default CMA deadline.

### **Circumstance 5: IEPA Non-Concurrence with Alternative Source Demonstration**

IEPA has issued a non-concurrence with an ASD for an exceedance of cobalt (well G05) and pH (wells G11 and G51D) at the EAP [5]. This non-concurrence will require additional time for the exceedances to be incorporated into the CMA, for the following reasons:

- The exceedances addressed in the ASD are for different parameters and are in different physical locations around the unit compared to the exceedances documented in the 2023 Quarter 2 Groundwater monitoring report for which an ASD was not prepared.
  - Additional time is required to evaluate whether the remedial options proposed at other locations with exceedances will also adequately address the exceedances at G11 and G51D; and, if they do not, additional time will be required to develop additional remedial options for these exceedances.
- As discussed in the ASD [3], elevated levels of cobalt are consistent with reductive dissolution of manganese oxides from native soils, while pH exceedances are consistent with natural iron oxidation within groundwater at the EAP.
  - Therefore, additional time is required to evaluate feasible remedial measures which may adequately address exceedances of cobalt and pH at the EAP while also considering the potential for known natural sources of non-CCR related pH and cobalt exceedances at the site.
  - Specific CMA items that require substantial additional time to evaluate at a site with naturally occurring sources of the elevated concentrations of pH and cobalt include, but are not limited to, the time until GWPS are achieved (35 I.A.C. § 845.670(e)(1)(E)) and the long-term reliability of engineering and institutional controls (35 I.A.C. § 845.670(e)(1)(G)).

## **REFERENCES**

- [1] Electric Energy, Inc., "Joppa East Ash Pond (IEPA ID: W1270100004-02) Corrective Measures Assessment Schedule Extension Demonstration," November 21, 2023.
- [2] Ramboll Americas Engineering Solutions, Inc., "35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2, East Ash Pond, Joppa Power Plant," Joppa, Illinois.
- [3] Ramboll Americas Engineering Solutions, "35 I.A.C. § 845.650(E): Alternative Source Demonstration, East Ash Pond, Joppa Power Plant, Joppa, Illinois, IEPA ID: W1270100004-02," October 21, 2023.
- [4] Electric Energy, Inc., "Re: Alternative Source Demonstration ("ASD") for Joppa Power Power Plant East Ash Pond," November, 6, 2023.
- [5] Illinois Environmental Protection Agency, "Letter from Michael Summers to Dianna Tickner: Re: Joppa Power Plant East Ash Pond; W1270100004-02, Alternate Source Demonstration Submittal," November 16, 2023.



**CERTIFICATION STATEMENT**

CCR Unit: Electric Energy, Inc.; Joppa Power Plant, East Ash Pond  
IEPA ID: W1270100004-02

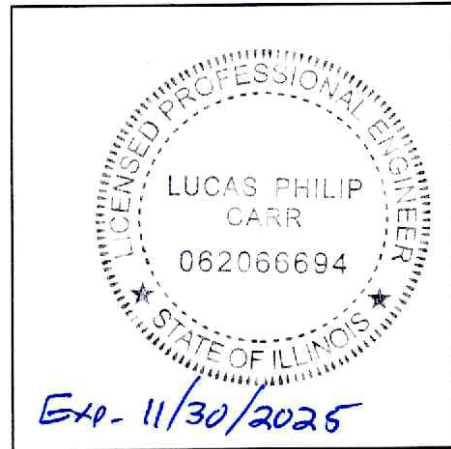
I, Lucas P. Carr, being a Registered Professional Engineer in good standing with the state of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR unit, that the 60-day extension demonstration addendum for the Corrective Measures Assessment has been prepared in accordance with 35 I.A.C. § 845.600(a)(2) and is accurate.



Lucas P. Carr, P.E.  
Senior Managing Consultant



Date





# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR

JOHN J. KIM, DIRECTOR

217-782-1020

December 11, 2023

Dianna Tickner  
Electric Energy, Inc.  
1500 Eastport Plaza drive  
Collinsville, Illinois 62234

Re: Joppa Power Plant East Ash Pond; W1270100004-02  
Corrective Measures Assessment Schedule Extension Request

Dear Mrs. Tickner:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) approves of the extension request submitted on November 30, 2023, for completing the Corrective Measures Assessment (CMA).

If you have any questions, please contact: **Heather Mullenax** Illinois EPA, Bureau of Water, PWS #13, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,

Michael Summers, P.G.  
Manager, Groundwater Section  
Division of Public Water Supplies  
Bureau of Water

cc: Heather Mullenax  
Keegan Macdonna  
Phil Morris  
Records Files 06M - W1270100004

## **ATTACHMENT D COMPARISON OF STATISTICAL RESULTS TO BACKGROUND**

- **ATTACHMENT C FROM THE QUARTER 2, 2023  
GROUNDWATER MONITORING DATA AND DETECTED  
EXCEEDANCES REPORT (RAMBOLL, 2023a)**
- **ATTACHMENT C FROM THE QUARTER 3, 2023  
GROUNDWATER MONITORING DATA AND DETECTED  
EXCEEDANCES REPORT (RAMBOLL, 2024a)**
- **ATTACHMENT C FROM THE QUARTER 4, 2023  
GROUNDWATER MONITORING DATA AND DETECTED  
EXCEEDANCES REPORT (RAMBOLL, 2024b)**

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G03	UA	E001	Antimony, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G03	UA	E001	Arsenic, total	mg/L	03/05/21 - 05/03/23	11	36	CI around geomean	0.00113	0.0017
G03	UA	E001	Barium, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.0572	0.254
G03	UA	E001	Beryllium, total	mg/L	03/05/21 - 05/03/23	11	91	CI around median	0.001	0.0011
G03	UA	E001	Boron, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.224	0.0531
G03	UA	E001	Cadmium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G03	UA	E001	Chloride, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	20.9	32
G03	UA	E001	Chromium, total	mg/L	03/05/21 - 05/03/23	11	9	CI around mean	0.00303	0.0039
G03	UA	E001	Cobalt, total	mg/L	03/05/21 - 05/03/23	11	27	CI around geomean	0.00141	0.0015
G03	UA	E001	Fluoride, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	0.189	0.25
G03	UA	E001	Lead, total	mg/L	03/05/21 - 05/03/23	11	27	CI around geomean	0.00117	0.0015
G03	UA	E001	Lithium, total	mg/L	03/05/21 - 05/03/23	11	64	CI around median	0.003	0.003
G03	UA	E001	Mercury, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G03	UA	E001	Molybdenum, total	mg/L	03/05/21 - 05/03/23	11	82	CI around median	0.0015	0.0015
G03	UA	E001	Selenium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.001	0.0042
G03	UA	E001	Sulfate, total	mg/L	03/05/21 - 05/03/23	11	0	CI around mean	72.3	39
G03	UA	E001	Thallium, total	mg/L	03/05/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G03	UA	E001	Total Dissolved Solids	mg/L	03/05/21 - 05/03/23	11	0	CI around geomean	286	334
G03	UA	E001	pH (field)	SU	03/05/21 - 05/03/23	11	0	CI around mean	6.2/6.4	6/6.8
G05	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G05	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.0017
G05	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.161	0.254
G05	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0005	0.0011
G05	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.000444	0.0531
G05	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G05	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	16.2	32
G05	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.0015	0.0039

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G05	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.007	0.0015
G05	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.312	0.25
G05	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0075	0.0015
G05	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.003	0.003
G05	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G05	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00402	0.0015
G05	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	27	CB around linear reg	-0.000273	0.0042
G05	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	82.1	39
G05	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.002	0.002
G05	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	351	334
G05	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.4/6.5	6/6.8
G06	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.001
G06	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.001	0.0017
G06	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0273	0.254
G06	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0005	0.0011
G06	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	3.05	0.0531
G06	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G06	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	21	32
G06	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	36	CI around mean	0.00119	0.0039
G06	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	54	CI around median	0.001	0.0015
G06	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.252	0.25
G06	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0015
G06	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around median	0.0031	0.003
G06	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G06	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.0015
G06	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.0042
G06	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	212	39



**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**

845 QUARTERLY REPORT  
 JOPPA POWER PLANT  
 EAST ASH POND  
 JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G06	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G06	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	511	334
G06	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	10	0	CI around mean	6.4/6.6	6/6.8
G07	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G07	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.0017
G07	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	0.0426	0.254
G07	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.0011
G07	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	4.26	0.0531
G07	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G07	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	20.1	32
G07	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	36	CI around geomean	0.00187	0.0039
G07	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.00142	0.0015
G07	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	0.35	0.25
G07	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.0015
G07	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.003	0.003
G07	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G07	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.0015	0.0015
G07	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.0042
G07	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	247	39
G07	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G07	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	568	334
G07	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.1/6.6	6/6.8
G08	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G08	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00569	0.0017
G08	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0467	0.254
G08	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.0011
G08	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	4.08	0.0531

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G08	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G08	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	14	32
G08	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around geomean	0.00164	0.0039
G08	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	9	CI around mean	0.00287	0.0015
G08	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	0.195	0.25
G08	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0015
G08	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.003	0.003
G08	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G08	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0017	0.0015
G08	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.0042
G08	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	211	39
G08	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G08	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	541	334
G08	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	6.8/7.0	6/6.8
G09	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.001
G09	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	18	CI around mean	0.00215	0.0017
G09	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0371	0.254
G09	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	73	CI around median	0.001	0.0011
G09	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around median	3.15	0.0531
G09	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G09	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	14.6	32
G09	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around mean	0.00177	0.0039
G09	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	-0.00203	0.0015
G09	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.275	0.25
G09	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.001	0.0015
G09	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0034	0.003
G09	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002

**ATTACHMENT C.**  
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JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G09	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.0015
G09	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.0042
G09	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	267	39
G09	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G09	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	477	334
G09	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	6.0/6.4	6/6.8
G10	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G10	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	36	CI around median	0.001	0.0017
G10	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.0401	0.254
G10	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.0011
G10	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	3.65	0.0531
G10	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G10	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	26	32
G10	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	27	CI around mean	0.00138	0.0039
G10	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	0	CB around linear reg	-0.00146	0.0015
G10	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.275	0.25
G10	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.001	0.0015
G10	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	46	CI around median	0.003	0.003
G10	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G10	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	64	CI around median	0.0015	0.0015
G10	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.0042
G10	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	375	39
G10	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.002
G10	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	753	334
G10	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around mean	6.5/6.7	6/6.8
G11	UA	E001	Antimony, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.001	0.001
G11	UA	E001	Arsenic, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.01	0.0017

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**  
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JOPPA POWER PLANT  
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JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G11	UA	E001	Barium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around geomean	0.0122	0.254
G11	UA	E001	Beryllium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.001	0.0011
G11	UA	E001	Boron, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.286	0.0531
G11	UA	E001	Cadmium, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.002	0.001
G11	UA	E001	Chloride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	33.6	32
G11	UA	E001	Chromium, total	mg/L	03/04/21 - 05/03/23	11	82	CI around median	0.0015	0.0039
G11	UA	E001	Cobalt, total	mg/L	03/04/21 - 05/03/23	11	27	CI around geomean	0.000965	0.0015
G11	UA	E001	Fluoride, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.174	0.25
G11	UA	E001	Lead, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0075	0.0015
G11	UA	E001	Lithium, total	mg/L	03/04/21 - 05/03/23	11	18	CI around median	0.0036	0.003
G11	UA	E001	Mercury, total	mg/L	03/04/21 - 05/03/23	11	100	All ND - Last	0.0002	0.0002
G11	UA	E001	Molybdenum, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.0015	0.0015
G11	UA	E001	Selenium, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	0.00444	0.0042
G11	UA	E001	Sulfate, total	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	392	39
G11	UA	E001	Thallium, total	mg/L	03/04/21 - 05/03/23	11	91	CI around median	0.002	0.002
G11	UA	E001	Total Dissolved Solids	mg/L	03/04/21 - 05/03/23	11	0	CI around mean	755	334
G11	UA	E001	pH (field)	SU	03/04/21 - 05/03/23	11	0	CI around median	5.8/5.9	6/6.8
G51D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.001
G51D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.01	0.0017
G51D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CI around median	0.0417	0.254
G51D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.0011
G51D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	0.465	0.0531
G51D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.001
G51D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	2.81	32
G51D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	76	CB around T-S line	0.00144	0.0039
G51D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	10	CB around T-S line	-0.0129	0.0015
G51D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	86	CI around median	0.1	0.25

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**  
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JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G51D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0015
G51D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	5	CB around T-S line	0.00567	0.003
G51D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.0002
G51D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	100	All ND - Last	0.01	0.0015
G51D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	5	CB around T-S line	0.00426	0.0042
G51D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	121	39
G51D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002
G51D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	313	334
G51D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CB around T-S line	5.2/5.5	6/6.8
G52D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.001	0.001
G52D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	20	10	CI around mean	0.00205	0.0017
G52D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	20	0	CB around linear reg	0.108	0.254
G52D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.0005	0.0011
G52D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	21	90	CI around median	0.025	0.0531
G52D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.002	0.001
G52D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	6.86	32
G52D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	20	100	All ND - Last	0.005	0.0039
G52D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	20	0	CI around mean	0.0028	0.0015
G52D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	21	0	CI around median	0.24	0.25
G52D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	20	100	All ND - Last	0.0075	0.0015
G52D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	20	40	CI around geomean	0.0025	0.003
G52D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.0002	0.0002
G52D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	16	75	CI around median	0.001	0.0015
G52D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	20	95	CI around median	0.001	0.0042
G52D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	21	0	CI around mean	80.1	39
G52D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	15	100	All ND - Last	0.002	0.002
G52D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	21	0	CI around mean	336	334



**ATTACHMENT C.**  
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JOPPA POWER PLANT  
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JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G52D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	21	0	CI around mean	6.2/6.4	6/6.8
G53D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.001
G53D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.01	0.0017
G53D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	0.0193	0.254
G53D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.0011
G53D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	0.334	0.0531
G53D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.001
G53D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	0	CI around median	18	32
G53D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	86	CB around T-S line	0.00144	0.0039
G53D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	19	CI around geomean	0.0014	0.0015
G53D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	0.636	0.25
G53D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0015
G53D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	52	CB around T-S line	0.00266	0.003
G53D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.0002
G53D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	88	CB around T-S line	0.001	0.0015
G53D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.001	0.0042
G53D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	37.7	39
G53D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002
G53D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CB around T-S line	255	334
G53D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CI around median	6.5/6.8	6/6.8
G54D	UA	E001	Antimony, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.001	0.001
G54D	UA	E001	Arsenic, total	mg/L	12/03/15 - 05/03/23	21	48	CB around T-S line	-0.000438	0.0017
G54D	UA	E001	Barium, total	mg/L	12/03/15 - 05/03/23	21	0	CB around T-S line	0.0631	0.254
G54D	UA	E001	Beryllium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0005	0.0011
G54D	UA	E001	Boron, total	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	0.469	0.0531
G54D	UA	E001	Cadmium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.001
G54D	UA	E001	Chloride, total	mg/L	12/03/15 - 05/03/23	22	4	CB around T-S line	9.56	32

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G54D	UA	E001	Chromium, total	mg/L	12/03/15 - 05/03/23	21	67	CI around median	0.0015	0.0039
G54D	UA	E001	Cobalt, total	mg/L	12/03/15 - 05/03/23	21	0	CB around linear reg	0.0031	0.0015
G54D	UA	E001	Fluoride, total	mg/L	12/03/15 - 05/03/23	22	0	CB around linear reg	0.257	0.25
G54D	UA	E001	Lead, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.0075	0.0015
G54D	UA	E001	Lithium, total	mg/L	12/03/15 - 05/03/23	21	14	CB around linear reg	0.00109	0.003
G54D	UA	E001	Mercury, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.0002	0.0002
G54D	UA	E001	Molybdenum, total	mg/L	12/03/15 - 05/03/23	17	94	CB around T-S line	0.001	0.0015
G54D	UA	E001	Selenium, total	mg/L	12/03/15 - 05/03/23	21	100	All ND - Last	0.001	0.0042
G54D	UA	E001	Sulfate, total	mg/L	12/03/15 - 05/03/23	22	0	CB around linear reg	175	39
G54D	UA	E001	Thallium, total	mg/L	12/03/15 - 05/03/23	16	100	All ND - Last	0.002	0.002
G54D	UA	E001	Total Dissolved Solids	mg/L	12/03/15 - 05/03/23	22	0	CI around mean	490	334
G54D	UA	E001	pH (field)	SU	12/03/15 - 05/03/23	22	0	CI around mean	6.6/6.8	6/6.8

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 2, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Lower Confidence Limit (LCL) or Upper Confidence Limit (UCL) exceeded the statistical background value

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range  
For pH, the values presented are the lower / upper limits of the background determination

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G03	UA	E002	Antimony, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.001
G03	UA	E002	Arsenic, total	mg/L	03/05/21 - 09/26/23	12	42	CI around geomean	0.0011	0.00170
G03	UA	E002	Barium, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.059	0.254
G03	UA	E002	Beryllium, total	mg/L	03/05/21 - 09/26/23	12	92	CI around median	0.001	0.00110
G03	UA	E002	Boron, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.228	0.0531
G03	UA	E002	Cadmium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.00100
G03	UA	E002	Chloride, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	20.6	32.0
G03	UA	E002	Chromium, total	mg/L	03/05/21 - 09/26/23	12	8	CI around mean	0.00291	0.00390
G03	UA	E002	Cobalt, total	mg/L	03/05/21 - 09/26/23	12	25	CI around geomean	0.0014	0.00150
G03	UA	E002	Fluoride, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	0.191	0.250
G03	UA	E002	Lead, total	mg/L	03/05/21 - 09/26/23	12	33	CI around geomean	0.00113	0.00150
G03	UA	E002	Lithium, total	mg/L	03/05/21 - 09/26/23	12	67	CI around median	0.003	0.003
G03	UA	E002	Mercury, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.0002	0.0002
G03	UA	E002	Molybdenum, total	mg/L	03/05/21 - 09/26/23	12	83	CI around median	0.0015	0.00150
G03	UA	E002	pH (field)	SU	03/05/21 - 09/26/23	12	0	CI around mean	6.2/6.4	6.0/6.8
G03	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/05/21 - 09/26/23	12	0	CI around mean	0.307	1.70
G03	UA	E002	Selenium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.001	0.00420
G03	UA	E002	Sulfate, total	mg/L	03/05/21 - 09/26/23	12	0	CI around mean	71.2	39.0
G03	UA	E002	Thallium, total	mg/L	03/05/21 - 09/26/23	12	100	All ND - Last	0.002	0.00200
G03	UA	E002	Total Dissolved Solids	mg/L	03/05/21 - 09/26/23	12	0	CI around median	284	334
G05	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.001
G05	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.00170
G05	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CB around linear reg	0.159	0.254
G05	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00110
G05	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CB around linear reg	-0.0117	0.0531
G05	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00100
G05	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	16.6	32.0

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G05	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.0015	0.00390
G05	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.00601	0.00150
G05	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.314	0.250
G05	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00150
G05	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.003	0.003
G05	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.0002
G05	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	8	CI around mean	0.00408	0.00150
G05	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	12	0	CI around mean	6.4/6.5	6.0/6.8
G05	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.344	1.70
G05	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	25	CB around linear reg	-0.000179	0.00420
G05	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	82	39.0
G05	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.002	0.00200
G05	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	352	334
G06	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.001
G06	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	58	CI around median	0.001	0.00170
G06	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.0269	0.254
G06	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00110
G06	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	3.08	0.0531
G06	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00100
G06	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around median	21	32.0
G06	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	33	CI around mean	0.00143	0.00390
G06	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	58	CI around median	0.001	0.00150
G06	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.253	0.250
G06	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	83	CI around median	0.001	0.00150
G06	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	25	CI around median	0.0031	0.003
G06	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.0002
G06	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0015	0.00150



**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G06	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	11	0	CI around mean	6.4/6.6	6.0/6.8
G06	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.48	1.70
G06	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00420
G06	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	207	39.0
G06	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.002	0.00200
G06	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	506	334
G07	UA	E002	Antimony, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.001
G07	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.001	0.00170
G07	UA	E002	Barium, total	mg/L	03/04/21 - 09/27/23	12	0	CI around geomean	0.0415	0.254
G07	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.001	0.00110
G07	UA	E002	Boron, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	4.29	0.0531
G07	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00100
G07	UA	E002	Chloride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	20.2	32.0
G07	UA	E002	Chromium, total	mg/L	03/04/21 - 09/27/23	12	33	CI around geomean	0.00196	0.00390
G07	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	0.00136	0.00150
G07	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/27/23	12	0	CI around median	0.35	0.250
G07	UA	E002	Lead, total	mg/L	03/04/21 - 09/27/23	12	75	CI around median	0.001	0.00150
G07	UA	E002	Lithium, total	mg/L	03/04/21 - 09/27/23	12	67	CI around median	0.003	0.003
G07	UA	E002	Mercury, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.0002	0.0002
G07	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/27/23	12	92	CI around median	0.0015	0.00150
G07	UA	E002	pH (field)	SU	03/04/21 - 09/27/23	12	0	CI around mean	6.2/6.6	6.0/6.8
G07	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/27/23	12	0	CB around linear reg	1.09	1.70
G07	UA	E002	Selenium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.001	0.00420
G07	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	249	39.0
G07	UA	E002	Thallium, total	mg/L	03/04/21 - 09/27/23	12	100	All ND - Last	0.002	0.00200
G07	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/27/23	12	0	CI around mean	572	334
G08	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.001

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G08	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	8	CI around mean	0.00595	0.00170
G08	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CB around T-S line	-0.398	0.254
G08	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.00110
G08	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	4.1	0.0531
G08	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00100
G08	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around median	14	32.0
G08	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around geomean	0.00162	0.00390
G08	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	8	CI around geomean	0.00319	0.00150
G08	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	0.202	0.250
G08	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.001	0.00150
G08	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.003	0.003
G08	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.0002
G08	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0017	0.00150
G08	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	6.8/7.0	6.0/6.8
G08	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around mean	0.372	1.70
G08	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00420
G08	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	214	39.0
G08	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.00200
G08	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	548	334
G09	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.001
G09	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	17	CI around mean	0.00235	0.00170
G09	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00515	0.254
G09	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	75	CI around median	0.001	0.00110
G09	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CB around T-S line	3.64	0.0531
G09	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00100
G09	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	13.6	32.0
G09	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	25	CI around mean	0.00178	0.00390

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G09	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00188	0.00150
G09	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.279	0.250
G09	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	67	CI around median	0.001	0.00150
G09	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0034	0.003
G09	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.0002
G09	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0015	0.00150
G09	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	6.0/6.4	6.0/6.8
G09	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.249	1.70
G09	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.00420
G09	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	260	39.0
G09	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.00200
G09	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	453	334
G10	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.001
G10	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	33	CI around geomean	0.00111	0.00170
G10	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.039	0.254
G10	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.00110
G10	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	3.61	0.0531
G10	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00100
G10	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	25.7	32.0
G10	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	33	CI around mean	0.0013	0.00390
G10	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	-0.00202	0.00150
G10	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.272	0.250
G10	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.001	0.00150
G10	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	42	CI around median	0.003	0.003
G10	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.0002
G10	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	58	CI around median	0.0015	0.00150
G10	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around mean	6.5/6.7	6.0/6.8

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G10	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around mean	0.503	1.70
G10	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00420
G10	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	372	39.0
G10	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.002	0.00200
G10	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	743	334
G11	UA	E002	Antimony, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.001
G11	UA	E002	Arsenic, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00170
G11	UA	E002	Barium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.0129	0.254
G11	UA	E002	Beryllium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.00110
G11	UA	E002	Boron, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.288	0.0531
G11	UA	E002	Cadmium, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.001	0.00100
G11	UA	E002	Chloride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	32.8	32.0
G11	UA	E002	Chromium, total	mg/L	03/04/21 - 09/26/23	12	83	CI around median	0.0015	0.00390
G11	UA	E002	Cobalt, total	mg/L	03/04/21 - 09/26/23	12	33	CI around geomean	0.000945	0.00150
G11	UA	E002	Fluoride, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.172	0.250
G11	UA	E002	Lead, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.001	0.00150
G11	UA	E002	Lithium, total	mg/L	03/04/21 - 09/26/23	12	17	CI around median	0.0035	0.003
G11	UA	E002	Mercury, total	mg/L	03/04/21 - 09/26/23	12	100	All ND - Last	0.0002	0.0002
G11	UA	E002	Molybdenum, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.0015	0.00150
G11	UA	E002	pH (field)	SU	03/04/21 - 09/26/23	12	0	CI around median	5.8/6.0	6.0/6.8
G11	UA	E002	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 09/26/23	12	0	CI around geomean	0.199	1.70
G11	UA	E002	Selenium, total	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	0.00401	0.00420
G11	UA	E002	Sulfate, total	mg/L	03/04/21 - 09/26/23	12	0	CB around linear reg	2.87	39.0
G11	UA	E002	Thallium, total	mg/L	03/04/21 - 09/26/23	12	92	CI around median	0.002	0.00200
G11	UA	E002	Total Dissolved Solids	mg/L	03/04/21 - 09/26/23	12	0	CI around mean	693	334
G51D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.001
G51D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/25/23	22	100	All ND - Last	0.001	0.00170

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G51D	UA	E002	Barium, total	mg/L	12/03/15 - 09/25/23	22	0	CB around T-S line	-0.00761	0.254
G51D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.00110
G51D	UA	E002	Boron, total	mg/L	12/03/15 - 09/25/23	23	0	CB around T-S line	0.534	0.0531
G51D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.001	0.00100
G51D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/25/23	23	0	CB around T-S line	2.5	32.0
G51D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/25/23	22	73	CB around T-S line	0.00116	0.00390
G51D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/25/23	22	14	CB around T-S line	-0.0152	0.00150
G51D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/25/23	23	87	CI around median	0.1	0.250
G51D	UA	E002	Lead, total	mg/L	12/03/15 - 09/25/23	22	100	All ND - Last	0.001	0.00150
G51D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/25/23	22	4	CB around T-S line	0.00579	0.003
G51D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.0002	0.0002
G51D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/25/23	18	100	All ND - Last	0.0015	0.00150
G51D	UA	E002	pH (field)	SU	12/03/15 - 09/25/23	23	0	CB around T-S line	5.2/5.4	6.0/6.8
G51D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/25/23	22	0	CI around mean	0.452	1.70
G51D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/25/23	22	4	CB around T-S line	0.00454	0.00420
G51D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/25/23	23	0	CI around median	121	39.0
G51D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/25/23	17	100	All ND - Last	0.002	0.00200
G51D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/25/23	23	0	CB around linear reg	284	334
G52D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.001
G52D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/26/23	21	10	CB around linear reg	-0.000734	0.00170
G52D	UA	E002	Barium, total	mg/L	12/03/15 - 09/26/23	21	0	CB around linear reg	0.113	0.254
G52D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.00110
G52D	UA	E002	Boron, total	mg/L	12/03/15 - 09/26/23	22	91	CI around median	0.025	0.0531
G52D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.001	0.00100
G52D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	6.76	32.0
G52D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/26/23	21	100	All ND - Last	0.0015	0.00390
G52D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/26/23	21	0	CI around mean	0.00287	0.00150



**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G52D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/26/23	22	0	CI around median	0.24	0.250
G52D	UA	E002	Lead, total	mg/L	12/03/15 - 09/26/23	21	100	All ND - Last	0.001	0.00150
G52D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/26/23	21	43	CI around geomean	0.0025	0.003
G52D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.0002	0.0002
G52D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/26/23	17	76	CI around median	0.001	0.00150
G52D	UA	E002	pH (field)	SU	12/03/15 - 09/26/23	22	0	CI around mean	6.2/6.4	6.0/6.8
G52D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/26/23	21	0	CI around mean	0.824	1.70
G52D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/26/23	21	95	CI around median	0.001	0.00420
G52D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/26/23	22	0	CI around mean	77.9	39.0
G52D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/26/23	16	100	All ND - Last	0.002	0.00200
G52D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	278	334
G53D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.001
G53D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.00170
G53D	UA	E002	Barium, total	mg/L	12/03/15 - 09/27/23	22	0	CB around linear reg	0.0177	0.254
G53D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.00110
G53D	UA	E002	Boron, total	mg/L	12/03/15 - 09/27/23	23	0	CI around median	0.334	0.0531
G53D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.001	0.00100
G53D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/27/23	23	0	CI around median	17	32.0
G53D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/27/23	22	86	CI around median	0.001	0.00390
G53D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/27/23	22	18	CI around median	0.0013	0.00150
G53D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/27/23	23	0	CI around mean	0.641	0.250
G53D	UA	E002	Lead, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.00150
G53D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/27/23	22	54	CB around T-S line	0.00266	0.003
G53D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.0002	0.0002
G53D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/27/23	18	89	CB around T-S line	0.001	0.00150
G53D	UA	E002	pH (field)	SU	12/03/15 - 09/27/23	23	0	CB around T-S line	6.3/6.5	6.0/6.8
G53D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/27/23	22	0	CI around mean	0.351	1.70

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G53D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/27/23	22	100	All ND - Last	0.001	0.00420
G53D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/27/23	23	0	CB around T-S line	46.6	39.0
G53D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/27/23	17	100	All ND - Last	0.002	0.00200
G53D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/27/23	23	0	CB around T-S line	268	334
G54D	UA	E002	Antimony, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.001
G54D	UA	E002	Arsenic, total	mg/L	12/03/15 - 09/26/23	22	50	CB around T-S line	-0.000236	0.00170
G54D	UA	E002	Barium, total	mg/L	12/03/15 - 09/26/23	22	0	CB around T-S line	0.0612	0.254
G54D	UA	E002	Beryllium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.00110
G54D	UA	E002	Boron, total	mg/L	12/03/15 - 09/26/23	23	0	CI around mean	0.464	0.0531
G54D	UA	E002	Cadmium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.001	0.00100
G54D	UA	E002	Chloride, total	mg/L	12/03/15 - 09/26/23	23	4	CB around T-S line	13.6	32.0
G54D	UA	E002	Chromium, total	mg/L	12/03/15 - 09/26/23	22	68	CI around median	0.0015	0.00390
G54D	UA	E002	Cobalt, total	mg/L	12/03/15 - 09/26/23	22	0	CB around linear reg	0.00315	0.00150
G54D	UA	E002	Fluoride, total	mg/L	12/03/15 - 09/26/23	23	0	CB around linear reg	0.258	0.250
G54D	UA	E002	Lead, total	mg/L	12/03/15 - 09/26/23	22	100	All ND - Last	0.001	0.00150
G54D	UA	E002	Lithium, total	mg/L	12/03/15 - 09/26/23	22	18	CB around linear reg	0.00175	0.003
G54D	UA	E002	Mercury, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.0002	0.0002
G54D	UA	E002	Molybdenum, total	mg/L	12/03/15 - 09/26/23	18	94	CB around T-S line	0.001	0.00150
G54D	UA	E002	pH (field)	SU	12/03/15 - 09/26/23	23	0	CI around mean	6.6/6.8	6.0/6.8
G54D	UA	E002	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 09/26/23	22	0	CI around geomean	0.493	1.70
G54D	UA	E002	Selenium, total	mg/L	12/03/15 - 09/26/23	22	100	All ND - Last	0.001	0.00420
G54D	UA	E002	Sulfate, total	mg/L	12/03/15 - 09/26/23	23	0	CB around linear reg	175	39.0
G54D	UA	E002	Thallium, total	mg/L	12/03/15 - 09/26/23	17	100	All ND - Last	0.002	0.00200
G54D	UA	E002	Total Dissolved Solids	mg/L	12/03/15 - 09/26/23	23	0	CI around mean	491	334

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 3, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Lower Confidence Limit (LCL) or Upper Confidence Limit (UCL) exceeded the statistical background value

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with the Statistical Analysis Plan using constituent concentrations observed at each monitoring well during all sampling events within the specified date range

For pH, the values presented are the lower / upper limits of the background determination

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G03	UA	E003	Antimony, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.001
G03	UA	E003	Arsenic, total	mg/L	03/05/21 - 10/23/23	13	46	CI around geomean	0.00108	0.00170
G03	UA	E003	Barium, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	0.0596	0.254
G03	UA	E003	Beryllium, total	mg/L	03/05/21 - 10/23/23	13	92	CI around median	0.001	0.00110
G03	UA	E003	Boron, total	mg/L	03/05/21 - 10/23/23	13	0	CI around geomean	0.24	0.0531
G03	UA	E003	Cadmium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.00100
G03	UA	E003	Chloride, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	20.5	32.0
G03	UA	E003	Chromium, total	mg/L	03/05/21 - 10/23/23	13	8	CI around mean	0.00279	0.00390
G03	UA	E003	Cobalt, total	mg/L	03/05/21 - 10/23/23	13	31	CI around geomean	0.00133	0.00150
G03	UA	E003	Fluoride, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	0.192	0.250
G03	UA	E003	Lead, total	mg/L	03/05/21 - 10/23/23	13	38	CI around geomean	0.0011	0.00150
G03	UA	E003	Lithium, total	mg/L	03/05/21 - 10/23/23	13	69	CI around median	0.003	0.003
G03	UA	E003	Mercury, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.0002	0.0002
G03	UA	E003	Molybdenum, total	mg/L	03/05/21 - 10/23/23	13	85	CI around median	0.0015	0.00150
G03	UA	E003	pH (field)	SU	03/05/21 - 10/23/23	13	0	CI around mean	6.3/6.4	6.0/6.8
G03	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/05/21 - 10/23/23	13	0	CI around mean	0.387	1.70
G03	UA	E003	Selenium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.001	0.00420
G03	UA	E003	Sulfate, total	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	69.7	39.0
G03	UA	E003	Thallium, total	mg/L	03/05/21 - 10/23/23	13	100	All ND - Last	0.002	0.00200
G03	UA	E003	Total Dissolved Solids	mg/L	03/05/21 - 10/23/23	13	0	CI around mean	279	334
G05	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.001
G05	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00170
G05	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.162	0.254
G05	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00110
G05	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.00317	0.0531
G05	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G05	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	16.9	32.0

**ATTACHMENT C.**  
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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G05	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.0015	0.00390
G05	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.000824	0.00150
G05	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.358	0.250
G05	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00150
G05	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.003	0.003
G05	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G05	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00381	0.00150
G05	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.4/6.5	6.0/6.8
G05	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.372	1.70
G05	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	31	CB around linear reg	3.89e-05	0.00420
G05	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	82.9	39.0
G05	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.002	0.00200
G05	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	352	334
G06	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.001
G06	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.001	0.00170
G06	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0277	0.254
G06	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00110
G06	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	3.11	0.0531
G06	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G06	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around median	21	32.0
G06	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	31	CI around mean	0.00148	0.00390
G06	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.001	0.00150
G06	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.256	0.250
G06	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.001	0.00150
G06	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	23	CI around median	0.0035	0.003
G06	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G06	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0015	0.00150



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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G06	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	12	0	CI around mean	6.5/6.6	6.0/6.8
G06	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.518	1.70
G06	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00420
G06	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	180	39.0
G06	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.00200
G06	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	501	334
G07	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.001
G07	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.00170
G07	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.0415	0.254
G07	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00110
G07	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	4.34	0.0531
G07	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G07	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	20.3	32.0
G07	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	38	CI around geomean	0.00187	0.00390
G07	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00123	0.00150
G07	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around median	0.4	0.250
G07	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.00150
G07	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.003	0.003
G07	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G07	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.0015	0.00150
G07	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.2/6.6	6.0/6.8
G07	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.744	1.70
G07	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00420
G07	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	251	39.0
G07	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.00200
G07	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	575	334
G08	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.001

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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G08	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00609	0.00170
G08	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0486	0.254
G08	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00110
G08	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	4.18	0.0531
G08	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G08	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	14.2	32.0
G08	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	15	CI around geomean	0.00174	0.00390
G08	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	8	CI around mean	0.00325	0.00150
G08	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	0.218	0.250
G08	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	77	CI around median	0.001	0.00150
G08	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.003	0.003
G08	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G08	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	15	CI around median	0.0017	0.00150
G08	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around median	6.8/7.0	6.0/6.8
G08	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.284	1.70
G08	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00420
G08	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	289	39.0
G08	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.00200
G08	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	555	334
G09	UA	E003	Antimony, total	mg/L	03/04/21 - 10/25/23	13	92	CI around median	0.001	0.001
G09	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/25/23	13	15	CI around mean	0.00238	0.00170
G09	UA	E003	Barium, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	0.000628	0.254
G09	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/25/23	13	77	CI around median	0.001	0.00110
G09	UA	E003	Boron, total	mg/L	03/04/21 - 10/25/23	13	0	CI around median	3.19	0.0531
G09	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.001	0.00100
G09	UA	E003	Chloride, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	14	32.0
G09	UA	E003	Chromium, total	mg/L	03/04/21 - 10/25/23	13	23	CI around geomean	0.00154	0.00390

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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G09	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	-0.00147	0.00150
G09	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/25/23	13	0	CI around mean	0.282	0.250
G09	UA	E003	Lead, total	mg/L	03/04/21 - 10/25/23	13	69	CI around median	0.001	0.00150
G09	UA	E003	Lithium, total	mg/L	03/04/21 - 10/25/23	13	15	CI around median	0.0034	0.003
G09	UA	E003	Mercury, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.0002	0.0002
G09	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.0015	0.00150
G09	UA	E003	pH (field)	SU	03/04/21 - 10/25/23	13	0	CI around median	6.1/6.4	6.0/6.8
G09	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/25/23	13	0	CI around mean	0.257	1.70
G09	UA	E003	Selenium, total	mg/L	03/04/21 - 10/25/23	13	92	CI around median	0.001	0.00420
G09	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/25/23	13	0	CI around mean	258	39.0
G09	UA	E003	Thallium, total	mg/L	03/04/21 - 10/25/23	13	100	All ND - Last	0.002	0.00200
G09	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/25/23	13	0	CB around linear reg	447	334
G10	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.001
G10	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	31	CI around geomean	0.00118	0.00170
G10	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.0388	0.254
G10	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00110
G10	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	2.17	0.0531
G10	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G10	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	25.7	32.0
G10	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	31	CI around geomean	0.00156	0.00390
G10	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.0014	0.00150
G10	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.276	0.250
G10	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.001	0.00150
G10	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	38	CI around median	0.003	0.003
G10	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G10	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	62	CI around median	0.0015	0.00150
G10	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around mean	6.5/6.7	6.0/6.8

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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G10	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around mean	0.561	1.70
G10	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00420
G10	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	372	39.0
G10	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.002	0.00200
G10	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	747	334
G11	UA	E003	Antimony, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.001
G11	UA	E003	Arsenic, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00170
G11	UA	E003	Barium, total	mg/L	03/04/21 - 10/24/23	13	0	CI around geomean	0.0135	0.254
G11	UA	E003	Beryllium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00110
G11	UA	E003	Boron, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.287	0.0531
G11	UA	E003	Cadmium, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.001	0.00100
G11	UA	E003	Chloride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	32.4	32.0
G11	UA	E003	Chromium, total	mg/L	03/04/21 - 10/24/23	13	85	CI around median	0.0015	0.00390
G11	UA	E003	Cobalt, total	mg/L	03/04/21 - 10/24/23	13	38	CI around geomean	0.000934	0.00150
G11	UA	E003	Fluoride, total	mg/L	03/04/21 - 10/24/23	13	0	CI around mean	0.167	0.250
G11	UA	E003	Lead, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.001	0.00150
G11	UA	E003	Lithium, total	mg/L	03/04/21 - 10/24/23	13	15	CI around median	0.0035	0.003
G11	UA	E003	Mercury, total	mg/L	03/04/21 - 10/24/23	13	100	All ND - Last	0.0002	0.0002
G11	UA	E003	Molybdenum, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.0015	0.00150
G11	UA	E003	pH (field)	SU	03/04/21 - 10/24/23	13	0	CI around median	5.8/5.9	6.0/6.8
G11	UA	E003	Radium 226 + Radium 228, total	pCi/L	03/04/21 - 10/24/23	13	0	CI around mean	0.238	1.70
G11	UA	E003	Selenium, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	-0.0023	0.00420
G11	UA	E003	Sulfate, total	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	20.9	39.0
G11	UA	E003	Thallium, total	mg/L	03/04/21 - 10/24/23	13	92	CI around median	0.002	0.00200
G11	UA	E003	Total Dissolved Solids	mg/L	03/04/21 - 10/24/23	13	0	CB around linear reg	237	334
G51D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.001
G51D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00170

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Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G51D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	0.00372	0.254
G51D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00110
G51D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	0.509	0.0531
G51D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00100
G51D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	2.77	32.0
G51D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	74	CB around T-S line	0.00149	0.00390
G51D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	17	CB around T-S line	-0.0109	0.00150
G51D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	83	CI around median	0.1	0.250
G51D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00150
G51D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	4	CB around T-S line	0.00554	0.003
G51D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.0002
G51D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	95	CB around T-S line	0.001	0.00150
G51D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CB around T-S line	5.1/5.4	6.0/6.8
G51D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around mean	0.469	1.70
G51D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	4	CB around T-S line	0.00412	0.00420
G51D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	121	39.0
G51D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.00200
G51D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	279	334
G52D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.001
G52D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/24/23	22	9	CB around linear reg	-0.000569	0.00170
G52D	UA	E003	Barium, total	mg/L	12/03/15 - 10/24/23	22	0	CB around linear reg	0.134	0.254
G52D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.00110
G52D	UA	E003	Boron, total	mg/L	12/03/15 - 10/24/23	23	91	CI around median	0.025	0.0531
G52D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.001	0.00100
G52D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	7.24	32.0
G52D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/24/23	22	100	All ND - Last	0.0015	0.00390
G52D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/24/23	22	0	CI around mean	0.0029	0.00150



**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G52D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/24/23	23	0	CI around median	0.24	0.250
G52D	UA	E003	Lead, total	mg/L	12/03/15 - 10/24/23	22	100	All ND - Last	0.001	0.00150
G52D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/24/23	22	46	CI around geomean	0.0025	0.003
G52D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.0002	0.0002
G52D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/24/23	18	78	CI around median	0.0011	0.00150
G52D	UA	E003	pH (field)	SU	12/03/15 - 10/24/23	23	0	CI around mean	6.2/6.4	6.0/6.8
G52D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/24/23	22	0	CI around mean	0.849	1.70
G52D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/24/23	22	96	CI around median	0.001	0.00420
G52D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	53.8	39.0
G52D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/24/23	17	100	All ND - Last	0.002	0.00200
G52D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/24/23	23	0	CB around linear reg	277	334
G53D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.001
G53D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00170
G53D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	-0.0271	0.254
G53D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00110
G53D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	0.334	0.0531
G53D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00100
G53D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	0	CI around median	18	32.0
G53D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	87	CI around median	0.001	0.00390
G53D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	17	CI around median	0.0012	0.00150
G53D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	0.644	0.250
G53D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00150
G53D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	56	CB around T-S line	0.00267	0.003
G53D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.0002
G53D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	90	CB around T-S line	0.001	0.00150
G53D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CB around T-S line	6.3/6.5	6.0/6.8
G53D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around mean	0.363	1.70

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 4, 2023**  
845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

Well ID	HSU	Event	Parameter	Units	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	Background
G53D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00420
G53D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	44.8	39.0
G53D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.00200
G53D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CB around T-S line	258	334
G54D	UA	E003	Antimony, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.001
G54D	UA	E003	Arsenic, total	mg/L	12/03/15 - 10/25/23	23	48	CB around T-S line	-0.000139	0.00170
G54D	UA	E003	Barium, total	mg/L	12/03/15 - 10/25/23	23	0	CB around T-S line	0.0624	0.254
G54D	UA	E003	Beryllium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00110
G54D	UA	E003	Boron, total	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	0.46	0.0531
G54D	UA	E003	Cadmium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.001	0.00100
G54D	UA	E003	Chloride, total	mg/L	12/03/15 - 10/25/23	24	4	CB around T-S line	15.5	32.0
G54D	UA	E003	Chromium, total	mg/L	12/03/15 - 10/25/23	23	65	CI around median	0.0015	0.00390
G54D	UA	E003	Cobalt, total	mg/L	12/03/15 - 10/25/23	23	0	CB around linear reg	0.00362	0.00150
G54D	UA	E003	Fluoride, total	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	0.262	0.250
G54D	UA	E003	Lead, total	mg/L	12/03/15 - 10/25/23	23	96	CI around median	0.001	0.00150
G54D	UA	E003	Lithium, total	mg/L	12/03/15 - 10/25/23	23	17	CB around linear reg	0.00186	0.003
G54D	UA	E003	Mercury, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.0002	0.0002
G54D	UA	E003	Molybdenum, total	mg/L	12/03/15 - 10/25/23	19	95	CB around T-S line	0.001	0.00150
G54D	UA	E003	pH (field)	SU	12/03/15 - 10/25/23	24	0	CI around mean	6.6/6.8	6.0/6.8
G54D	UA	E003	Radium 226 + Radium 228, total	pCi/L	12/03/15 - 10/25/23	23	0	CI around geomean	0.513	1.70
G54D	UA	E003	Selenium, total	mg/L	12/03/15 - 10/25/23	23	100	All ND - Last	0.001	0.00420
G54D	UA	E003	Sulfate, total	mg/L	12/03/15 - 10/25/23	24	0	CB around linear reg	176	39.0
G54D	UA	E003	Thallium, total	mg/L	12/03/15 - 10/25/23	18	100	All ND - Last	0.002	0.00200
G54D	UA	E003	Total Dissolved Solids	mg/L	12/03/15 - 10/25/23	24	0	CI around mean	492	334

**ATTACHMENT C.**  
**COMPARISON OF STATISTICAL RESULTS TO BACKGROUND - QUARTER 4, 2023**

845 QUARTERLY REPORT  
JOPPA POWER PLANT  
EAST ASH POND  
JOPPA, IL

**Notes:**

Lower Confidence Limit (LCL) or Upper Confidence Limit (UCL) exceeded the statistical background value

HSU = hydrostratigraphic unit:

UA = Uppermost Aquifer

mg/L = milligrams per liter

ND = non-detect

pCi/L = picocuries per liter

SU = standard units

Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result

Statistical Calculation = method used to calculate the statistical result:

All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown

CB around T-S line = Confidence band around Thiel-Sen line

CB around linear reg = Confidence band around linear regression

CI around geomean = Confidence interval around the geometric mean

CI around mean = Confidence interval around the mean

CI around median = Confidence interval around the median

Statistical Result = calculated in accordance with the Statistical Analysis Plan using constituent concentrations observed at each monitoring well during all sampling events within the specified date range

For pH, the values presented are the lower / upper limits of the background determination