Luminant

Illinois Power Generating Company
1500 Eastport Plaza Dr.
Collinsville, IL 62234

October 25, 2021

Illinois Environmental Protection Agency
DWPC – Permits MC #15
Attn: Part 845 Coal Combustion Residual Rule Submittal
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Newton Power Plant Primary Ash Pond; IEPA ID # W0798070001-01

Dear Mr. LeCrone:

In accordance with 35 I.A.C. § 845.200, Illinois Power Generating Company (IPGC) is submitting an operating permit application for the Newton Power Plant Primary Ash Pond (IEPA ID # W0798070001-01). One hardcopy and one digital copy are provided with this submittal.

The permit application was prepared in accordance with 35 I.A.C. § 845.230(d)(2) (Existing, Inactive and Inactive Closed CCR Surface Impoundment that have not completed an Agency approved closure before July 30, 2021). This submittal includes the completed permit forms as required by § 845.210.

Sincerely,

Cynthia Vodopivec
SVP-Environmental Health and Safety

Enclosures

Prepared for

Illinois Power Generating Company
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

INITIAL OPERATING PERMIT

NEWTON ASH POND

Prepared by

BURNS McDONNELL

425 South Woods Mill Road, Suite 300
St. Louis, MO 63017

October 25, 2021

TABLE OF CONTENTS

TABLE OF CONTENTS

ATTACHMENTS

1. INTRODUCTION

Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The IEPA assigned identification number assigned to this impoundment is: W0798070001-01 for the Primary Ash Pond. The National Inventory of Dams (NID) number assigned for the Primary Ash Pond by the Illinois Department of Natural Resources (IDNR) is IL50719.

This initial operating permit application was developed in accordance with 35 Ill. Admin. Code 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

This initial operating permit application is for the Primary Ash Pond.

1.1. Facility Information

> Section 845.210(b)(1): *All permit applications must contain the name, address, email address and telephone number of the operator, or duly authorized agent, and the property owner to whom all inquiries and correspondence shall be addressed.*

Facility:	Newton Ash Pond Newton Power Plant 6725 North 500th Street Newton, IL 62448
Owner/Operator:	Illinois Power Generating Company 1500 Eastport Plaza Drive Collinsville, Illinois 62234

1.2. Owner Signatures

> <u>Section 845.210(b)(2):</u> *All permit applications must be signed by the owner, operator or a duly authorized agent of the operator.*

The owner of the Newton Power Plant is a corporation.

> <u>Section 845.210(b)(3):</u> *An application submitted by a corporation must be signed by a principal executive officer of at least the level of vice president, or his or her duly authorized representative, if that representative is responsible for the overall operation of the facility described in the application form..*

The signature of Cynthia Vodopivec on behalf of Illinois Power Generating Company can be found in the permit applications located in Section 3.

1.3. Legal Description

> <u>Section 845.210(c):</u> *All permit applications must contain a legal description of the facility boundary and a description of the boundaries of all units included in the facility.*

A legal description has been developed in compliance with Section 845.210(c) and is included in Attachment A.

1.4. Previous Assessments

> <u>Section 845.210(d):</u> *Previous Assessments, Investigations Plans, and Programs*

Previous assessments were performed in accordance with 40 CFR § 257 and are referenced within the permit application and included in the appropriate Attachments.

> <u>Section 845.210(d)(1):</u> *The Agency may approve the use of any hydrogeologic site investigation or characterization, groundwater monitoring well or system, or groundwater monitoring plan, bearing the seal and signature of an Illinois Licensed Professional Geologist or Licensed Professional Engineer, completed before April 21, 2021 to satisfy the requirements of this Part.*

A previous hydrogeologic site investigation or characterization, groundwater monitoring well or system, or groundwater monitoring plan have been completed with a seal from an Illinois Licensed Professional Geologist or Licensed Professional Engineer. However, field investigations have been completed that supplement that work that will be utilized in the following sections of this report.

Section 845.210(d)(2): For existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas) provided that the previously completed assessments meet the applicable requirements of those Sections.

Previous assessments are provided for Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas) in Attachment D.

Section 845.210(d)(3): For existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed assessment to serve as the initial assessment required by Section 845.440 (Hazard Potential Classification Assessment), Section 845.450 (Structural Stability Assessment) and Section 845.460 (Safety Factor Assessment) provided that the previously completed assessment: A) Was not completed more than five years ago; and B) Meets the applicable requirements of those Sections.

Previous assessments are provided for Section 845.440 (Hazard Potential Classification Assessment), Section 845.450 (Structural Stability Assessment) and Section 845.460 (Safety Factor Assessment) in Attachments O, P, and Q respectively. The addendum and certification for the Hazard Potential Classification Assessment, Structural Stability Assessment and Safety Factor Assessment are located in Attachment U.

Section 845.210(d)(4): For inactive closed CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a post-closure care plan previously approved by the Agency.

No post-closure care plan was previously approved by the Agency.

2. OPERATING PERMIT

2.1. Initial Operating Permit

Section 845.230(d): Initial Operating Permit for Existing, Inactive and Inactive Closed CCR Surface Impoundments

The Newton Primary Ash Pond as defined by IEPA is an existing CCR surface impoundment that has not completed post-closure care. Per Part 845, Dynegy is submitting an initial operating permit application to IEPA by October 31, 2021. The following sections contain information or references to documents required for the Operating Permit application (Section 845.230).

2.2. History of Construction

Section 845.230(d)(2)(A): The history of construction specified in Section 845.220(a)(1);

The history of construction prepared in 2016 pursuant to 40 CFR § 257.73(c) is provided in Attachment B. An amendment to the history of construction has been prepared in compliance with Section 845.220(a)(1) and is provided in Attachment U.

2.3. Chemical Constituents

Section 845.230(d)(2)(B): An analysis of the chemical constituents found within the CCR to be placed in the CCR surface impoundment;

An analysis of the chemical constituents found within the CCR placed within the Newton Primary Ash Pond is provided in Attachment C.

Section 845.230(d)(2)(C): An analysis of the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained in the CCR surface impoundment;

An analysis of the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained within the Newton Primary Ash Pond is provided in Attachment C.

2.4. Location Standards Demonstration

Section 845.230(d)(2)(D): A demonstration that the CCR surface impoundment, as built, meets, or an explanation of how the CCR surface impoundments fails to meet, the location standards in the following Sections:

The Newton Primary Ash Pond location standards as specified in Section 845.230(d)(2)(D) are described in the following sections.

Section 845.230(d)(2)(D)(i): Placement Above the Uppermost Aquifer;

The previous upper aquifer demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.60. The requirements described in 40 C.F.R. § 257.60 are identical to the requirements contained in Section 845.300. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed upper aquifer demonstration is included in Attachment D.

Section 845.230(d)(2)(D)(ii): Wetlands;

The previous wetlands demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.61. The requirements described in 40 C.F.R. § 257.61 are identical to the requirements contained in Section 845.310. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed wetlands demonstration is included in Attachment D.

Section 845.230(d)(2)(D)(iii): Fault Areas;

The previous fault area demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.62. The requirements described in 40 C.F.R. § 257.62 are identical to the requirements contained in Section 845.320. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed fault area demonstration is included in Attachment D.

Section 845.230(d)(2)(D)(iv): Seismic Impact Zone; and

The previous seismic impact zone demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.63. The requirements described in 40 C.F.R. § 257.63 are identical to the requirements contained in Section 845.330. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed seismic impact zone demonstration is included in Attachment D.

Section 845.230(d)(2)(D)(v): Unstable Areas and Floodplains;

The previous unstable area demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.64. The requirements described in 40 C.F.R. § 257.64 are identical to the requirements contained in Section 845.340. Pursuant to Section 845.210(d)(2), a certification is not required for the unstable area demonstration. The previously completed unstable area demonstration is included in Attachment D.

The boundaries of the impoundment were determined by a survey conducted by a professional surveyor licensed in the State of Illinois. The boundaries of the Primary Ash Pond were compared to the existing FEMA floodplain map, and it was determined that the Primary Ash Pond is Pond is located within Zone A of the floodplain according to the 1985 FEMA Floodplain mapping. In order to determine that: "generally accepted engineering practices have been incorporated into the design of the CCR surface impoundment to ensure that the CCR surface impoundment will not restrict the flow of the base flood, reduce the temporary water storage capacity of a floodplain, or result in washout of CCR," the following engineering was involved:

1. Determine the base flood elevation (BFE) and compare to the ash pond embankment elevations,
2. Determine the surface impoundment will not restrict the temporary water storage capacity of the floodplain. and
3. Result in a washout of CCR.

A certification attesting to this is provided in Attachment D.

2.5. Permanent Markers

Section 845.230(d)(2)(E): Evidence of permanent markers required by Section 845.130 have been installed;

Evidence of permanent markers at the Newton Primary Ash Pond as required by Section 845.130 is provided in Attachment E.

2.6. Slope Maintenance

Section 845.230(d)(2)(F): Documentation that the CCR surface impoundment, if not incised, will be operated and maintained with one of the forms of slope protection specified in Section 845.430;

The Newton Primary Ash Pond is not incised. Documentation of slope protection as required by Section 845.430 is provided in Attachment J.

2.7. Initial Emergency Action Plan

> <u>Section 845.230(d)(2)(G):</u> *Initial Emergency Action Plan and accompanying certification (see Section 845.520(e));*

The initial emergency action plan and certification has been completed as specified by Section 845.520(e) and is provided in Attachment F.

2.8. Fugitive Dust Control Plan

> <u>Section 845.230(d)(2)(H):</u> *Fugitive dust control plan and accompanying certification (see Section 845.500(b)(7));*

The fugitive dust control plan and certification has been completed as specified by Section 845.500(b)(7) and is provided in Attachment G.

2.9. Groundwater Monitoring

> <u>Section 845.230(d)(2)(I):</u> *Groundwater monitoring information:*

The groundwater monitoring information for the Newton Primary Ash Pond is described in the following sections.

> <u>Section 845.230(d)(2)(I)(i):</u> *Hydrogeologic site characterization (see Section 845.620);*

Hydrogeologic site characterization for the Newton Primary Ash Pond is provided in Attachment H.

> <u>Section 845.230(d)(2)(I)(ii):</u> *Design and construction plans of a groundwater monitoring system (see Section 845.630);*

Design and construction plans of a groundwater monitoring system are provided in Attachment I.

> <u>Section 845.230(d)(2)(I)(iii):</u> *A groundwater sampling and analysis program that includes selection of the statistical procedures to be used for evaluating groundwater monitoring data (see Section 845.640); and*

A groundwater sampling and analysis program that meets the requirements of Section 845.640 is provided in Attachment I.

> *Section 845.230(d)(2)(I)(iv): Proposed groundwater monitoring program that includes a minimum of eight independent samples for each background and downgradient well (see Section 845.650(b));*

A proposed groundwater monitoring program that meets the requirements of Section 845.650(b) is provided in Attachment I.

2.10. Initial Post-Closure Care Plan

> *Section 845.230(d)(2)(K): Initial written post-closure care plan, if applicable (see Section 845.780(d));*

The Newton Primary Ash Pond closure will be completed by capping the CCR in place. The initial post closure care plan was developed in accordance with Section 845.780 and is provided in Attachment K.

2.11. History of Groundwater Exceedances

> *Section 845.230(d)(2)(M): History of known exceedances of the groundwater protection standards in Section 845.600, and any corrective action taken to remediate the groundwater;*

A history of known exceedances and any corrective action taken is provided in Attachment M.

2.12. Financial Assurance Requirements

> *Section 845.230(d)(2)(N): A certification that the owner or operator meets the financial assurance requirements of Subpart I;*

A certification meeting the requirement of Section 845.230(d)(2)(N) stating that the Owner meets the financial assurance requirements of *Subpart I* is provided in Attachment N.

2.13. Hazard Potential Classification

> *Section 845.230(d)(2)(O): Hazard potential classification assessment and accompanying certification (see Section 845.440(a)(2));*

The previous Hazard Potential Classification Assessment completed in compliance with 40 CFR §257.73(a) is provided in Attachment O. The addendum to the Hazard Potential Classification Assessment and certification as required by Section 845.440(a) is provided in Attachment U.

2.14. Structural Stability Assessment

> <u>Section 845.230(d)(2)(P):</u> *Structural stability assessment and accompanying certification (see Section 845.450(c));*

The previous Structural Stability Assessment completed in compliance with 40 CFR §257.73(d) is provided in Attachment P. The addendum to the Structural Stability Assessment and certification as required by Section 845.450(c) is provided in Attachment U.

2.15. Safety Factor Assessment

> <u>Section 845.230(d)(2)(Q):</u> *Safety factor assessment and accompanying certification (see Section 845.460(b));*

The previous Safety Factor Assessment completed in compliance with 40 CFR §257.73(e) is provided in Attachment Q. The addendum to the Safety Factor Assessment and certification as required by Section 845.460(b) is provided in Attachment U.

2.16. Inflow Design Flood Control System Plan

> <u>Section 845.230(d)(2)(R):</u> *Inflow design flood control system plan and accompanying certification (see Section 845.510(c)(3));*

The previous Inflow Design Flood Control System Plan Assessment completed in compliance with 40 CFR §257.82 is provided in Attachment R. The addendum to the Inflow Design Flood Control Plan Assessmentas required by Section 845.510(c)(3) is provided in Attachment U.

2.17. Safety and Health Plan

> <u>Section 845.230(d)(2)(S):</u> *Safety and health plan (see Section 845.530); and*

The safety and health plan in accordance with Section 845.530 is included in Attachment S.

2.18. Proposed Closure Priority Categorization

> <u>Section 845.230(d)(2)(T):</u> *For CCR surface impoundments required to close under 845.700, the proposed closure priority categorization required by Section 845.700(g).*

A CCR Surface Impoundment Category Designation and Justification letter was submitted to IEPA on May 19, 2021. The Newton Primary Ash Pond was designated as Category 5 Existing CCR surface impoundment with exceedances of the groundwater protection standards in Section 845.600. This letter is provided in Attachment T.

3. PERMIT APPLICATION

All permit applications must be made on the forms prescribed by the Agency and must be mailed or delivered to the address designated by the Agency on the forms. The permit applications (CCR-1 and CCR-2E) are provided below.

Form CCR 1	Illinois Environmental Protection Agency CCR Surface Impoundment Permit Application Form CCR 1 – General Provisions

Bureau of Water ID Number: W0798070001 **CCR Permit Number:** Initial Permit **Facility Name:** Newton Power Plant	For IEPA Use Only

SECTION 1: FACILITY, OPERATOR, AND OWNER INFORMATION (35 Ill. Adm. Code 845.210(b))

Facility, Operator, and Owner Information

1.1	Facility Name		
	Illinois Power Generating Company - Newton Power Plant		
1.2	Illinois EPA CCR Permit Number (if applicable)		
	Initial Permit		
1.3	Facility Contact Information		
	Name (first and last) Phil Morris	Title Senior Director - Environmental	Phone Number 618-343-7794
	Email address phil.morris@vistracorp.com		
1.4	Facility Mailing Address		
	Street or P.O. box 1500 Eastport Plaza Dr		
	City or town Collinsville	State IL	Zip Code 62234
1.5	Facility Location		
	Street, route number, or other specific identifier 6725 North 500th Street		
	County name Jasper	County code (if known)	
	City or town Newton	State IL	Zip Code 62448
1.6	Name of Owner/Operator		
	Illinois Power Generating Company		

Facility, Operator, and Owner Info				
1.7	Owner/Operator Contact Information			
	Name (first and last) Phil Morris	Title Senior Director - Environmental	Phone Number 618-343-7794	
	Email address phil.morris@vistracorp.com			
1.8	Owner/Operator Mailing Address			
	Street or P.O. box 1500 Eastport Plaza Dr			
	City or town Collinsville	State IL	Zip Code 62234	

SECTION 2: LEGAL DESCRIPTION (35 Ill. Adm. Code 845.210(c))

Legal Description		
2.1	Legal Description of the facility boundary	
	See Attachment A.	

SECTION 3: PUBLICLY ACCESSIBLE INTERNET SITE REQUIREMENTS (35 Ill. Adm. Code 845.810)

Internet Site				
3.1	Web Address(es) to publicly accessible internet site(s) (CCR website)			
	www.luminant.com/illinois-ccr			
3.2	Is/are the website(s) titled "Illinois CCR Rule Compliance Data and Information"			
	☑	Yes	☐	No

SECTION 4: IMPOUNDMENT IDENTIFICATION

Impoundment Identification			
4.1	List all the impoundment identification numbers for your facility and check the corresponding box to indicate that you have attached a written description for each impoundment.		
	W0798070001-01 (see Attachment A)	☑	Attached written description
		☐	Attached written description
		☐	Attached written description
		☐	Attached written description
		☐	Attached written description
		☐	Attached written description

			☐	Attached written description
			☐	Attached written description
			☐	Attached written description
			☐	Attached written description

SECTION 5: CHECKLIST AND CERTIFICATION STATEMENT

Checklist and Certification Statement

5.1 In Column 1 below, mark the sections of Form 1 that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing.

Column 1		Column 2	
Section 1: Facility, Operator, and Owner Information	✔	w/attachments	☐
Section 2: Legal Description	✔	w/attachments	✔
Section 3: Publicly Accessible Internet Site Requirement	✔	w/attachments	☐
Section 4: Impoundment Identification	✔	w/attachments	✔

5.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name) of Owner/Operator	Official Title
Cynthia Vodopivec	SVP - Environmental
Signature	Date Signed 10/25/2021

Form CCR 2E	Illinois Environmental Protection Agency CCR Surface Impoundment Permit Application Form CCR 2E – Initial Operating Permit for Existing or Inactive CCR Surface Impoundments That Have Not Completed an Agency-approved Closure Before July 30, 2021

Bureau of Water ID Number: W0798070001 **CCR Permit Number:** Initial Permit **Facility Name:** Newton Power Plant	For IEPA Use Only

SECTION 1: CONSTRUCTION HISTORY (35 Ill. Adm. Code 845.220 AND 35 Ill. Adm. Code 845.230)

Construction History		
	1.1	CCR surface impoundment name.
		Primary Ash Pond
	1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).
		W0798070001-01
	1.3	Description of the boundaries of the CCR surface impoundment (35 Ill. Adm. Code 845.210(c)).
		See Attachment A.
	1.4	State the purpose for which the CCR surface impoundment is being used.
		See Attachment B.
	1.5	How long has the CCR surface impoundment been in operation?
		See Attachment B.
	1.6	List the types of CCR that have been placed in the CCR surface impoundment.
		See Attachment C.

Construction History (Continued)	1.7	List name of the watershed within which the CCR surface impoundment is located.
		See Attachment B.
	1.8	Size in acres of the watershed within which the CCR surface impoundment is located.
		See Attachment B.
	1.9	Check the corresponding box to indicate that you have attached the following:
		☑ Description of the physical and engineering properties of the foundation and abutment materials on which the CCR surface impoundment is constructed.
		☑ Description of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR surface impoundment.
		☑ Describe the method of site preparation and construction of each zone of the CCR surface impoundment.
		☑ A listing of the approximate dates of construction of each successive stage of construction of the CCR surface impoundment.
		☑ Drawing satisfying the requirements of 35 Ill. Adm. Code 845.220(a)(1)(F).
		☑ Description of the type, purpose, and location of existing instrumentation.
		☑ Area capacity curves for the CCR Impoundment.
		☑ Description of each spillway and diversion design features and capacities and provide the calculations used in their determination.
		☑ Construction specifications and provisions for surveillance, maintenance, and repair of the CCR surface impoundment.
	1.10.1	Is there any record or knowledge of structural instability of the CCR surface impoundment?
		☐ Yes ☑ No
	1.10.2	If you answered yes to Item 1.10.1, provide detailed explanation of the structural instability.

SECTION 2: ANALYSIS OF CHEMICAL CONSTITUENTS (35 Ill. Adm. Code 845.230(d)(2)(B))

Constituents	2.1	Check the corresponding boxes to indicate you have attached the following:
		☑ An analysis of the chemical constituents found within the CCR to be placed in the CCR surface impoundment.
		☑ An analysis of the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained in the CCR surface impoundment.

SECTION 3: DEMONSTRATIONS AND CERTIFICATIONS (35 Ill. Adm. Code 845.230(d)(2)(D))						
Demonstrations	3.1	Indicate whether you have attached a demonstration that the CCR surface impoundment, as built, meets, or an explanation of how the CCR surface impoundments fails to meet, the location standards in the following sections:				
		35 Ill. Adm. Code 845.300 (Placement Above the Uppermost Aquifer)	☑	Demonstration	☐	Explanation
		35 Ill. Adm. Code 845.310 (Wetlands)	☑	Demonstration	☐	Explanation
		35 Ill. Adm. Code 845.320 (Fault Areas)	☑	Demonstration	☐	Explanation
		35 Ill. Adm. Code 845.330 (Seismic Impact Zones)	☑	Demonstration	☐	Explanation
		35 Ill. Adm. Code 845.340 (Unstable Areas and Floodplains)	☑	Demonstration	☐	Explanation

SECTION 4: ATTACHMENTS			
Attachments	4.1	Check the corresponding boxes to indicate that you have attached the following:	
		☑	Evidence that the permanent markers required by 35 Ill. Adm. Code 845.130 have been installed.
		☑	Documentation that the CCR surface impoundment, if not incised, will be operated and maintained with one of the forms of slope protection specified in 35 Ill. Adm. Code 845.430.
		☑	Initial Emergency Action Plan and accompanying certification required by 35 Ill. Adm. Code 845.520(e).
		☑	Fugitive dust control plan and accompanying certification required by 35 Ill. Adm. Code 845.500(b)(7).
		☐	Preliminary written closure plan as specified in 35 Ill. Adm. Code 845.720(a).
		☑	Initial written post-closure care plan as specified in 35 Ill. Adm. Code 845.780(d), if applicable.
		☐	A certification as specified in 35 Ill. Adm. Code 845.400(h), or a statement that the CCR surface impoundment does not have a liner than meets the requirements of 35 Ill. Adm. Code 845.400(b) or (c).
		☑	History of known exceedances of the groundwater protection standards in 35 Ill. Adm. Code 845.600, and any corrective action taken to remediate the groundwater.
		☑	Safety and health plan, as required by 35 Ill. Adm. Code 845.530.
		☑	For CCR surface impoundments required to close under 35 Ill. Adm. Code 845.700, the proposed closure priority categorization required by 35 Ill. Adm. Code 845.700(g).

SECTION 5: GROUNDWATER MONITORING			
Groundwater	5.1	Check the corresponding boxes to indicate you have attached the following groundwater monitoring information:	
		☑	A hydrogeologic site characterization meeting the requirements of 35 Ill. Adm. Code 845.620.
		☑	Design and construction plans of a groundwater monitoring system meeting the requirements of 35 Ill. Adm. Code 845.630.

		☑	A groundwater sampling and analysis program that includes section of the statistical procedures to be used for evaluating groundwater monitoring data, required by 35 Ill. Adm. Code 845.640.
		☑	Proposed groundwater monitoring program that includes a minimum of eight independent samples for each background and downgradient well, required by 35 Ill. Adm. Code 845.650(b).
SECTION 6: CERTIFICATIONS			
Certifications	6.1	Check the corresponding boxes to indicate you have attached the following certifications:	
		☑	A certification that the owner or operator meets the financial assurance requirements of Subpart I, as required by 35 Ill. Adm. Code 845.230(d)(2)(N).
		☑	Hazard potential classification assessment and accompanying certifications required by 35 Ill. Adm. Code 845.440(a)(2).
		☑	Structural stability assessment and accompanying certification, required by 35 Ill. Adm. Code 845.450(c).
		☑	Safety factor assessment and accompanying certification, as required by 35 Ill. Adm. Code 845.460(b).
		☑	Inflow design flood control system plan and accompanying certification, as required by 35 Ill. Adm. Code 845.510(c)(3).

ATTACHMENT A

ILLINOIS POWER GENERATING COMPANY
NEWTON POWER PLANT

Luminant

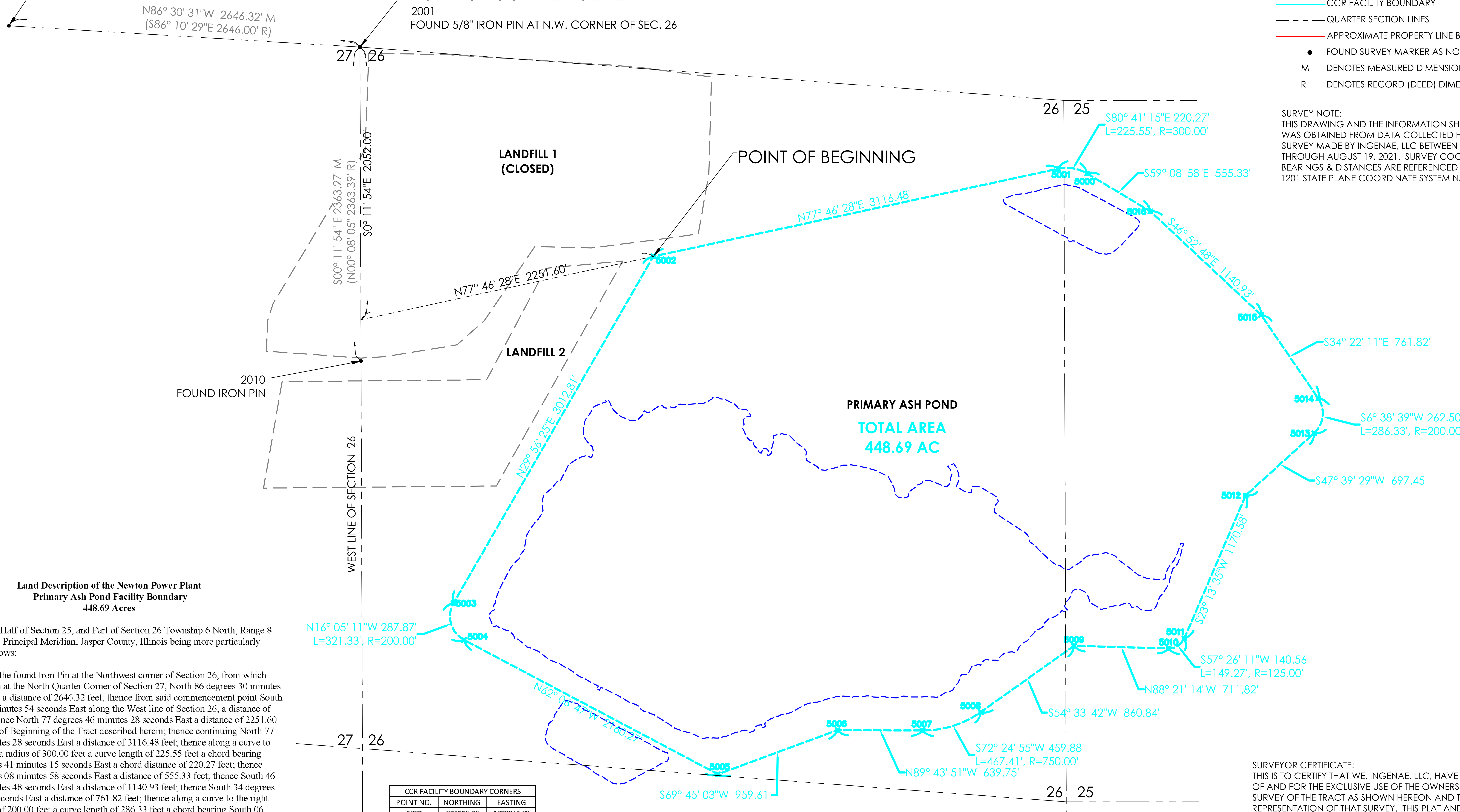
0' 400' 800'

N

LEGEND

- CCR FACILITY BOUNDARY
- QUARTER SECTION LINES
- APPROXIMATE PROPERTY LINE BY OTHERS
- ● FOUND SURVEY MARKER AS NOTED
- M DENOTES MEASURED DIMENSION
- R DENOTES RECORD (DEED) DIMENSION

SURVEY NOTE:
THIS DRAWING AND THE INFORMATION SHOWN HERE ON WAS OBTAINED FROM DATA COLLECTED FROM A FIELD SURVEY MADE BY INGENAE, LLC BETWEEN FEBRUARY 12 THROUGH AUGUST 19, 2021. SURVEY COORDINATES, BEARINGS & DISTANCES ARE REFERENCED TO ILLINOIS EAST 1201 STATE PLANE COORDINATE SYSTEM NAD 1983.



Land Description of the Newton Power Plant
Primary Ash Pond Facility Boundary
448.69 Acres

Part of the West Half of Section 25, and Part of Section 26 Township 6 North, Range 8 East of the Third Principal Meridian, Jasper County, Illinois being more particularly described as follows:

Commencing at the found Iron Pin at the Northwest corner of Section 26, from which bears an Iron Pin at the North Quarter Corner of Section 27, North 86 degrees 30 minutes 31 seconds West a distance of 2646.32 feet; thence from said commencement point South 00 degrees 11 minutes 54 seconds East along the West line of Section 26, a distance of 2052.00 feet; thence North 77 degrees 46 minutes 28 seconds East a distance of 2251.60 feet to the Point of Beginning of the Tract described herein; thence continuing North 77 degrees 46 minutes 28 seconds East a distance of 3116.48 feet; thence along a curve to the right having a radius of 300.00 feet a curve length of 225.55 feet a chord bearing South 80 degrees 41 minutes 15 seconds East a chord distance of 220.27 feet; thence South 59 degrees 08 minutes 58 seconds East a distance of 555.33 feet; thence South 46 degrees 52 minutes 48 seconds East a distance of 1140.93 feet; thence South 34 degrees 22 minutes 11 seconds East a distance of 761.82 feet; thence along a curve to the right having a radius of 200.00 feet a curve length of 286.33 feet a chord bearing South 06 degrees 38 minutes 39 seconds West a chord distance of 262.50 feet; thence South 47 degrees 39 minutes 29 seconds West a distance of 697.45 feet; thence South 23 degrees 13 minutes 35 seconds West a distance of 1170.58 feet; thence along a curve to the right having a radius of 125.00 feet a curve length of 149.27 feet a chord bearing South 57 degrees 26 minutes 11 seconds West a chord distance of 140.56 feet; thence North 88 degrees 21 minutes 14 seconds West a distance of 711.82 feet; thence South 54 degrees 33 minutes 42 seconds West a distance of 860.84 feet; thence along a curve to the right having a radius of 750.00 feet a curve length of 467.41 feet a chord bearing South 72 degrees 24 minutes 55 seconds West a chord distance of 459.88 feet; thence North 89 degrees 43 minutes 51 seconds West a distance of 639.75 feet; thence South 69 degrees 45 minutes 03 seconds West a distance of 959.61 feet; thence North 62 degrees 06 minutes 47 seconds West a distance of 2160.27 feet; thence along a curve to the right having a radius of 200.00 feet a curve length of 321.33 feet a chord bearing North 16 degrees 05 minutes 11 seconds West a chord distance of 287.87 feet; thence North 29 degrees 56 minutes 25 seconds East a distance of 3012.81 feet to the Point of Beginning and containing 448.69 Acres.

CCR FACILITY BOUNDARY CORNERS		
POINT NO.	NORTHING	EASTING
5000	825556.26	1000045.93
5001	825591.91	999828.57
5002	824931.96	996782.76
5003	822321.22	995279.07
5004	822044.63	995358.84
5005	821034.21	997268.24
5006	821366.33	998168.55
5007	821363.33	998808.29
5008	821502.27	999246.68
5009	822001.40	999948.04
5010	821980.96	1000659.57
5011	822056.61	1000778.03
5012	823132.32	1001239.67
5013	823602.09	1001755.18
5014	823862.82	1001785.55
5015	824491.64	1001355.48
5016	825271.49	1000522.69

CONTROL MONUMENTATION				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
2001	826507.15	994575.12	539.73	FOUND IRON PIN - N. 1/4 CORNER SEC. 27
2002	826668.31	991933.71	538.32	FOUND 5/8" IRON PIN - N.W. CORNER OF SEC. 26
2010	824143.94	994583.30	-	FOUND IRON PIN

SURVEYOR CERTIFICATE:
THIS IS TO CERTIFY THAT WE, INGENAE, LLC, HAVE AT THE REQUEST OF AND FOR THE EXCLUSIVE USE OF THE OWNERS, PERFORMED A SURVEY OF THE TRACT AS SHOWN HEREON AND THAT THIS IS A TRUE REPRESENTATION OF THAT SURVEY. THIS PLAT AND THE SURVEY FROM WHICH IT IS BASED WERE DONE IN ACCORDANCE WITH THE "MINIMUM STANDARDS OF PRACTICE" FOR LAND SURVEYING IN THE STATE OF ILLINOIS.

INGENAE, LLC
PROFESSIONAL DESIGN FIRM
LICENSE NO. 184.007588-0010

MICHAEL J. GRAMINSKI
I.P.L.S. NO. 035.002901
EXPIRES: 11/30/2022

DATE

Sept 20, 2021

STATE OF ILLINOIS
MICHAEL J. GRAMINSKI
035-2901
PROFESSIONAL LAND SURVEYOR

IngenAE
502 Earth City Plaza, Suite 120
Earth City, MO 63045
www.ingenae.com

Submissions / Revisions:	Date:
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

Luminant

Project Name & Location:

NEWTON
POWER PLANT
6725 NORTH 500TH STREET
NEWTON, IL 62248

Drawing Name:
CCR FACILITY BOUNDARY EXHIBIT

Date: 09/09/2021	Project No.
Type: SITE	Drawing No. 1
Drawn By: CB	
Approved By: MG	
Scale: AS NOTED	

Luminant

ILLINOIS POWER GENERATING COMPANY
NEWTON POWER PLANT

LEGEND

- CCR FACILITY BOUNDARY
- QUARTER SECTION LINES
- APPROXIMATE PROPERTY LINE BY OTHERS
- ● FOUND SURVEY MARKER AS NOTED
- M DENOTES MEASURED DIMENSION
- R DENOTES RECORD (DEED) DIMENSION

SURVEY NOTE:
THIS DRAWING AND THE INFORMATION SHOWN HERE ON WAS OBTAINED FROM DATA COLLECTED FROM A FIELD SURVEY MADE BY INGENAE, LLC BETWEEN FEBRUARY 12 THROUGH AUGUST 19, 2021. SURVEY COORDINATES, BEARINGS & DISTANCES ARE REFERENCED TO ILLINOIS EAST 1201 STATE PLANE COORDINATE SYSTEM NAD 1983.

IngenAE
502 Earth City Plaza, Suite 120
Earth City, MO 63045
www.ingenae.com

Submissions / Revisions:	Date:
1	
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Luminant

Project Name & Location:

NEWTON
POWER PLANT
6725 NORTH 500TH STREET
NEWTON, IL 62248

Drawing Name:
AERIAL PHOTOGRAPHY

Date: 09/09/2021	Project No.
Type: SITE	Drawing No. 2
Drawn By: CB	
Approved By: MG	
Scale: AS NOTED	

ATTACHMENT B

AECOM

October 2016

Illinois Power Generating Company
6725 North 500th Street
Newton, IL 62448

RE: History of Construction
USEPA Final CCR Rule, 40 CFR § 257.73(c)
Newton Power Station
Newton, Illinois

On behalf of Illinois Power Generating Company, AECOM has prepared the following history of construction for the Primary Ash Pond at the Newton Power Station in accordance with 40 CFR § 257.73(c).

BACKGROUND

40 CFR § 257.73(c)(1) requires the owner or operator of an existing coal combustion residual (CCR) surface impoundment that either (1) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) has a height of 20 feet or more to compile a history of construction by October 17, 2016 that contains, to the extent feasible, the information specified in 40 CFR § 257.73(c)(1)(i)–(xii).

The history of construction presented herein was compiled based on existing documentation, to the extent that it is reasonably and readily available (see 80 Fed. Reg. 21302, 21380 [April 17, 2015]), and AECOM's site experience. AECOM's document review included record drawings, geotechnical investigations, etc. for the Primary Ash Pond at the Newton Power Station.

AECOM

HISTORY OF CONSTRUCTION

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

Owner: Illinois Power Generating Company

Address: 1500 Eastport Drive
Collinsville, IL 62234

CCR Unit: Primary Ash Pond

The Primary Ash Pond does not have a state assigned identification number.

§ 257.73(c)(1)(ii): The location of the CCR unit identified on the most recent USGS $7^1/_2$ or 15 minute topographic quadrangle map or a topographic map of equivalent scale if a USGS map is not available.

The location of the Primary Ash Pond has been identified on an USGS 7-1/2 minute topographic quadrangle map in **Appendix A**.

§ 257.73(c)(1)(iii): A statement of the purpose for which the CCR unit is being used.

The Primary Ash Pond is being used to store and dispose of bottom ash and economizer ash and to clarify non-CCR plant process wastewater. A portion of the bottom ash is reclaimed from the Primary Ash Pond for beneficial reuse.

§ 257.73(c)(1)(iv): The name and size in acres of the watershed where the CCR unit is located.

The entire Primary Ash Pond and most of the Newton Power Station are located in the Weather Creek Watershed with a 12-digit Hydrologic Unit Code (HUC) of 051201140504 and a drainage area of 31,573 acres. The other portion of the Newton Power Station is located in the Newton Lake Watershed with a 12-digit Hydrologic Unit Code (HUC) of 051201140503 and a drainage area of 967 acres (USGS, 2016).

§ 257.73(c)(1)(v): A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.

The foundation materials consist of upper clay and lower clay. The physical characteristics properties of the upper clay layer are described as lean clay, fat clay, clayey sand, fat clay with sand, lean clay with sand, silty sand, silty clay, silty clay with sand, sandy lean clay. The upper clay soils exhibit a stiff to hard consistency. The physical characteristics of the lower clay layer are described as glacial till consisting of sandy lean clay, silty sand, clayey silt with sand, silty clay with sand, well graded sand with silt, lean clay, fat clay, clayey sand, silty clay, lean clay with sand, clayey sand with silt, and fat clay with sand. The consistency of the lower clay is very stiff to hard. A summary of the available engineering properties of the foundation materials is presented in **Table 1** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 1. Summary of Foundation Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		Effective Friction Angle ϕ′ (deg)	Effective Cohesion c′ (psf)	S_u/σ'_c	Minimum C_u (psf)
Upper Clay	130	29	0	0.40 ($\sigma'_c \geq 2{,}000$ psf) 0.63 ($\sigma'_c < 2{,}000$ psf)	-
Lower Clay	130	33	3,700	-	5,000

The Primary Ash Pond is an enclosed impoundment with embankments and does not have abutments.

§ 257.73(c)(1)(vi): A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.

Physical properties for the embankment are described as lean clay, lean clay with sand, silty clay, silty clay with sand, sandy lean clay, fat clay, fat clay with gravel and sand, fat clay with sand and silt, fat clay with sand, and clayey silt. An available summary of the engineering properties of the Primary Ash Pond embankment is presented in **Table 2** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 2. Summary of Construction Material Engineering Properties

Material	Unit Weight (pcf)	Drained Strength		Undrained Strength
		Effective Friction Angle ϕ′ (deg)	Effective Cohesion c′ (psf)	S_u/σ'_c
Embankment Fill	130	31	0	0.41 ($\sigma'_c \geq 500$ psf) 1.39 ($\sigma'_c < 500$ psf)

The method of site preparation and construction of the Primary Ash Pond is not reasonably and readily available.

The approximate dates of construction of each successive stage of construction of the Primary Ash Pond are provided in **Table 3** below.

Table 3. Approximate dates of construction of each successive stage of construction.

Date	Event
1977	Construction of Primary Ash Pond
2009	Both Primary Ash Pond discharge pipes were lined with cured-in-place pipe (CIPP)
2014	Three areas along the interior berm were re-graded and covered with rip-rap

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Drawings that contain items pertaining to the requested information for the Primary Ash Pond are listed in **Table 4** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available record documentation.

Table 4. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).

	Primary Ash Pond
Dimensional plan view (all zones)	S-69
Dimensional cross sections	S-70
Foundation Improvements	Not Applicable
Drainage Provisions	Not Applicable
Spillways and Outlets	S-50
Diversion Ditches	Not Applicable
Instrument Locations	Plate 2, Fig. No. 2A
Slope Protection	S-70
Normal Operating Pool Elevation	Not Available
Maximum Pool Elevation	Not Available
Approximate Maximum Depth of CCR in 2016	49 feet

All drawings referenced in **Table 4** above can be found in **Appendix B** and **Appendix C**.

Based on the review of the drawings listed above, no natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation were identified.

§ 257.73(c)(1)(viii): A description of the type, purpose, and location of existing instrumentation.

Existing instrumentation at the Primary Ash Pond include vibrating-wire and open-standpipe piezometers. The purpose of the piezometers is to measure the pore water pressures within and around the impoundment. Two (2) open-standpipe piezometers (B-2 and B-3) were installed in 2010 and the locations are presented on Plate 2 in **Appendix C**. Fourteen (14) vibrating-wire piezometers were installed in 2015 and the locations are presented on Figure 2A in **Appendix C**.

§ 257.73(c)(1)(ix): Area-capacity curves for the CCR unit.

Area-capacity curves for the Primary Ash Pond are not reasonably and readily available.

§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

The Primary Ash Pond contains two concrete, stop-log weir box structures that discharge to the Secondary Pond. Weir box 1-A is located at the bottom of the embankment and is connected to the lower 30-inch diameter (dia.) cured-in-place pipe (CIPP). Weir Box 1-B is located approximately halfway up the embankment is connected to the upper 30-inch dia. CIPP. Both discharge pipes were originally 30-inch dia. corrugated metal pipe (CMP) and were lined in 2008 (see section § 257.73(c)(1)(xii) below for further information). The lower discharge pipe from weir box 1A passes through the embankment between the Primary Ash Pond and Secondary Pond. The upper discharge pipe from weir box 1B connects to the lower discharge pipe within the embankment. In 2016, the discharge capacity of the Primary Ash Pond was evaluated using HydroCAD 10 software modeling a 1,000-year, 24-hour rainfall event. The results of the HydroCAD 10 analysis are presented below in **Table 5**.

Table 5. Results of HydroCAD 10 analyses

	Primary Ash Pond
Approximate Minimum Berm Elevation[1] (ft)	552.7
Approximate Emergency Spillway Elevation[1] (ft)	Not Applicable
Starting Pool Elevation[1] (ft)	534.0
Peak Elevation[1] (ft)	534.9
Time to Peak (hr)	17.0
Surface Area (ac)	169.0
Storage[2] (ac-ft)	159.4

Note: 1. Elevations are based on NAVD88 datum
2. Storage given is from Starting Pool Elevation to Peak Elevation.

AECOM

§ 257.73(c)(1)(xi): The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.

The construction specifications for the Primary Ash Pond are not reasonably and readily available.

The provisions for surveillance, maintenance, and repair of the Primary Ash Pond are located in *Operation and Maintenance Manual for Primary and Secondary Ash Ponds* (presented in **Appendix D**).

The operations and maintenance plan for the Primary Ash Pond is currently being revised by Illinois Power Generating Company. This section will be updated when the new operations and maintenance plan is available.

§ 257.73(c)(1)(xii): Any record or knowledge of structural instability of the CCR unit.

In September, 2008, a sinkhole was observed over the Primary Ash Pond discharge pipes. After performing a video inspection, it is believed that an open joint in the primary 30-inch dia. CMP discharge pipe allowed for soil to enter the discharge pipe and cause an internal void in the embankment. The sinkhole was backfilled and compacted with soil and a cured-in-place pipe (CIPP) was installed in both the upper and lower discharge pipes to prevent further internal erosion to the embankment. Following completion of the discharge pipe modification, grout was injected at several locations within the sinkhole to ensure any remaining voids were filled surrounding the discharge pipes. Information about this event can be found in the letter presented in **Appendix E**.

There is no record or knowledge of any other structural instability of the Primary Ash Pond at Newton Power Station.

LIMITATIONS

The signature of AECOM's authorized representative on this document represents that to the best of AECOM's knowledge, information and belief in the exercise of its professional judgment, it is AECOM's professional opinion that the aforementioned information is accurate as of the date of such signature. Any recommendation, opinion or decisions by AECOM are made on the basis of AECOM's experience, qualifications and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data and that actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Sincerely,

Claudia Prado

Claudia Prado
Project Manager

Victor Modeer, P.E., D.GE
Senior Project Manager

REFERENCES

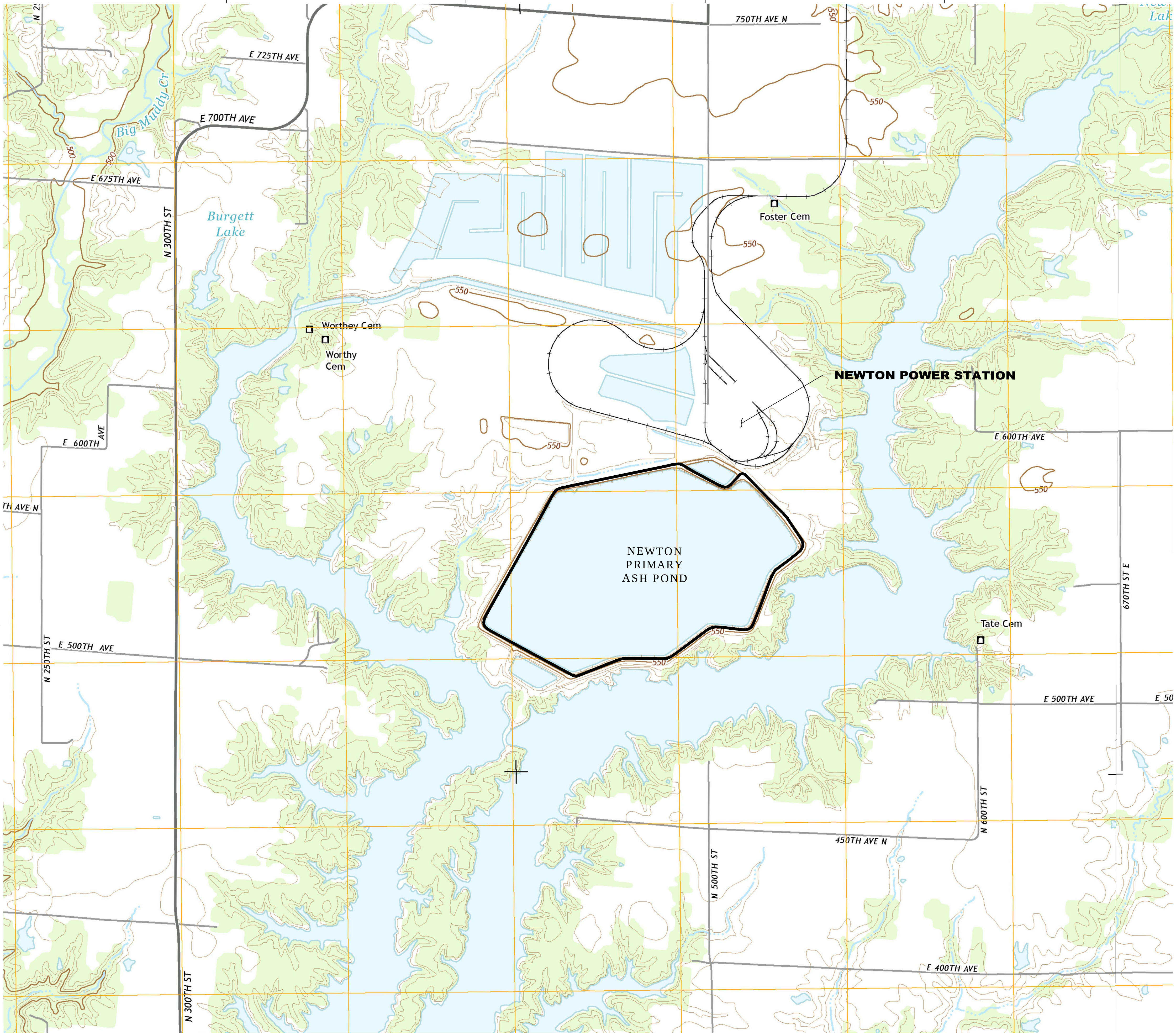
United States Environmental Protection Agency (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule.* 40 CFR Parts 257 and 261, 80 Fed. Reg. 21302, 21380 April 17, 2015.

United States Geological Survey (USGS). (2016). The National Map Viewer. http://viewer.nationalmap.gov/viewer/. USGS data first accessed in March of 2016.

APPENDICES

Appendix A: History of Construction Vicinity Map
Appendix B: Newton Power Station Drawings
Appendix C: Newton Primary Ash Pond Boring and Piezometer Locations
Appendix D: Operation and Maintenance Manual for Primary and Secondary Ash Ponds
Appendix E: Newton Power Plant Site Visit Report 9-12-08, Hanson (2008)

Appendix A: History of Construction Vicinity Map



LEGEND

CCR UNITS

SOURCE:
MAP PROVIDED FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE TOPOGRAPHIC MAP OF NEWTON, ILLINOIS AND LATONA, ILLINOIS, REVISED 2015.

ILLINOIS

QUADRANGLE LOCATION

N

0 1000 2000 3000

SCALE IN FEET

AECOM
1001 Highlands Plaza Drive, Suite 300
St. Louis, Mo. 63110
314 429-0100 (phone)
314-429-0462 (fax)

ILLINOIS POWER GENERATING COMPANY
6725 North 500th St.,
Newton, IL 62448

HISTORY OF CONSTRUCTION

NEWTON POWER STATION
NEWTON, ILLINOIS

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60489731
DRAWN BY:	DJD
DESIGNED BY:	DJD
CHECKED BY:	MN
DATE CREATED:	2016-04-13
PLOT DATE:	
SCALE:	1" = 1000'
ACAD VER:	2014

SHEET TITLE

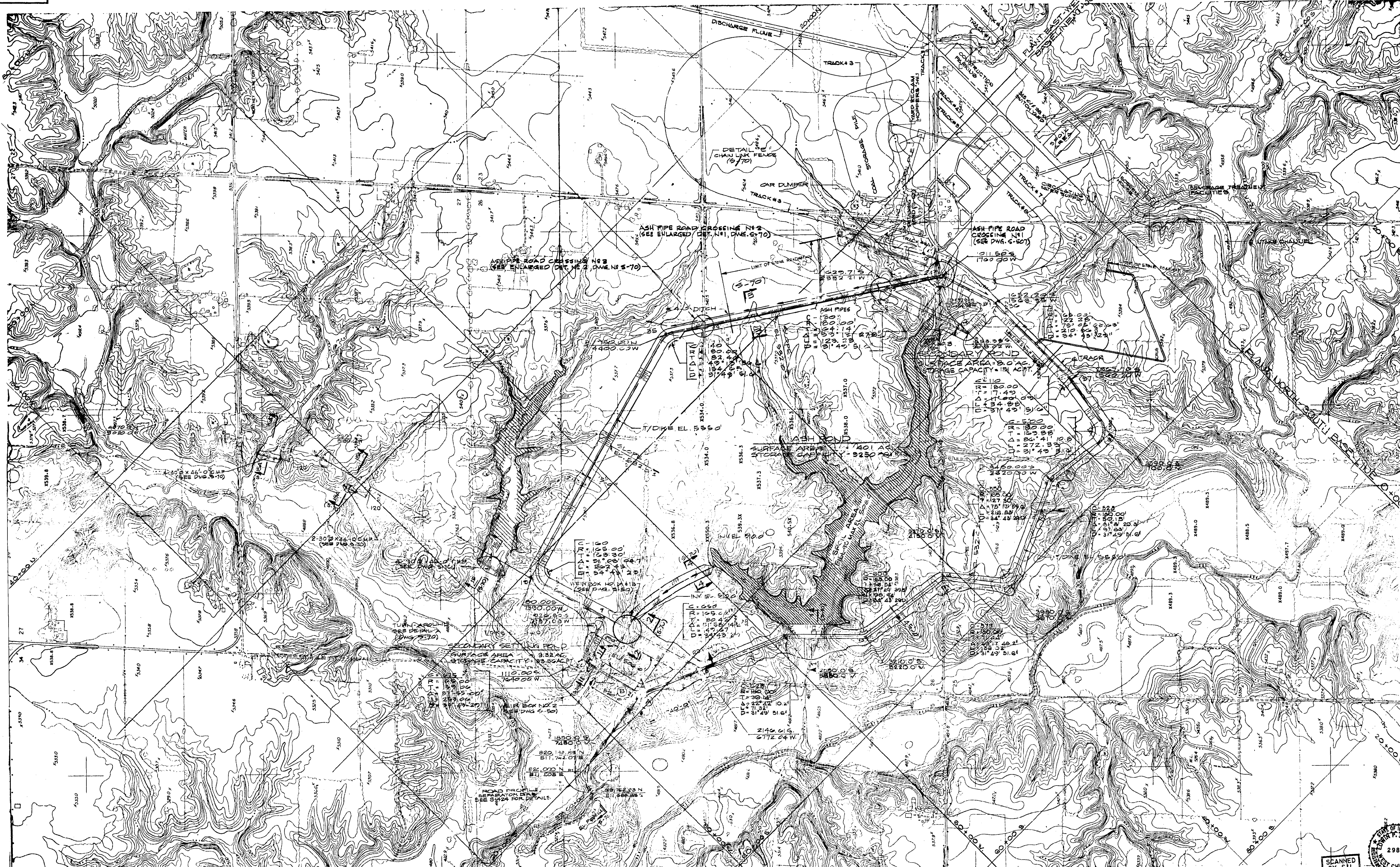
HISTORY OF CONSTRUCTION VICINITY MAP

01

Appendix B: Newton Power Station Drawings

1. "Ash Pond & SO_2 Disposal Pond", Drawing No. S-69, Revision N, 29 July, 1994, Sargent & Lundy Engineers.
2. "Ash Pond Dike, Profile, Details, & Sections", Drawing No. S-70, Revision M, 8 April, 1994, Sargent & Lundy Engineers.
3. "Weir Box Structures at Primary and Secondary Settling Ponds", Drawing No. S-50, Revision K, 25 March, 1994, Sargent & Lundy Engineers.

69-S



POINT No.	SIDE	CURVE No.	R	T	Δ	L	D
8	ASH POND		100'	52.87'	49°43' 13.6"	86.78	57°17' 45.60"
8	SECONDARY ASH POND		65'	140.29'	130°16' 46.4"	147.80	88°08' 51.69"
21	LAKESIDE (A)		165'	49.55	33°25' 06.4"	96.27	34°43' 29.00"
21	LAKESIDE (B)		65'	70.49'	94°36' 00.0"	107.32	88°08' 51.69"
36	ASH POND (A)		57.5'	57.50	90°00' 00.0"	90.27	99°38' 41.53"
36	SECONDARY POND (B)		57.5	77.59	106°54' 52.35"	107.24	99°38' 41.53"
39	SECONDARY POND		57.5	161.37	140°46' 29.17"	141.21	99°58' 41.53"

NOTES

7. THE WATER LEVEL IN ASH POND SHALL BE MAINTAINED AT AN ELEVATION 10'-0" ABOVE THE SEDIMENT LEVEL FOR ENVIRONMENTAL PURPOSES.

NOTES

1. FOR GENERAL NOTES SEE DWG. S-14.
2. ALL WORK SHOWN IN THIS DRAWING SHALL BE DONE BY SUPERSTRUCTURE CONTRACTOR IN ACCORDANCE WITH JOB SPEC. A-3022.
3. ALL EXTERIOR SIDE SLOPES OF DIKE BELOW ELEV. 510.0' THAT IS TO BE CONSTRUCTED BEFORE LAKE FILLING. SHALL BE PROVIDED WITH 24" STONE RIPRAP ON 24" SAND AND GRAVEL FILTER BEDDING AS SHOWN ON DWG. S-70. AND ALL DIKE CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH JOB SPEC. A-3017 AND A-3022.
4. ALL DIKE TOPS AND SIDE SLOPES AND ALL EXTERNAL DITCHES SHALL BE PROVIDED WITH 4" TOPSOIL AND SEEDED IN ACCORDANCE WITH JOB SPEC. A-3017 AND A-3022.
5. EXISTING LOW AREAS SHALL BE FILLED WITH SPOILMATERIAL AS REQUIRED FOR SPOIL DISPOSAL SPOILS SHALL BE PLACED IN LAYERS AND GRADED PROPERLY FOR DRAINAGE.
6. REMOVED "HOLD" FROM SO_2 POND AREAS FOR CLEARING. SLOPE STAKING & CROSS- SECTIONING ONLY.

REFERENCE DRAWINGS

S-19	SITE CONTOURS AND DEVELOPMENT PLAN SHEET 4.
S-39	GRADING AND DRAINAGE PLAN, PLANT AREA SHEET 2.
S-40	GRADING AND DRAINAGE PLAN, PLANT AREA SHEET 3.
S-50	WEIR BOX STRUCTURES AT PRIMARY AND SECONDARY SETTLING PONDS.
S-70	ASH POND DIKE PROFILE DETAILS & SECTION
S-507	GRADING & DRAINAGE PLAN- PLANT AREA- SHT7.

Drawing Release Record

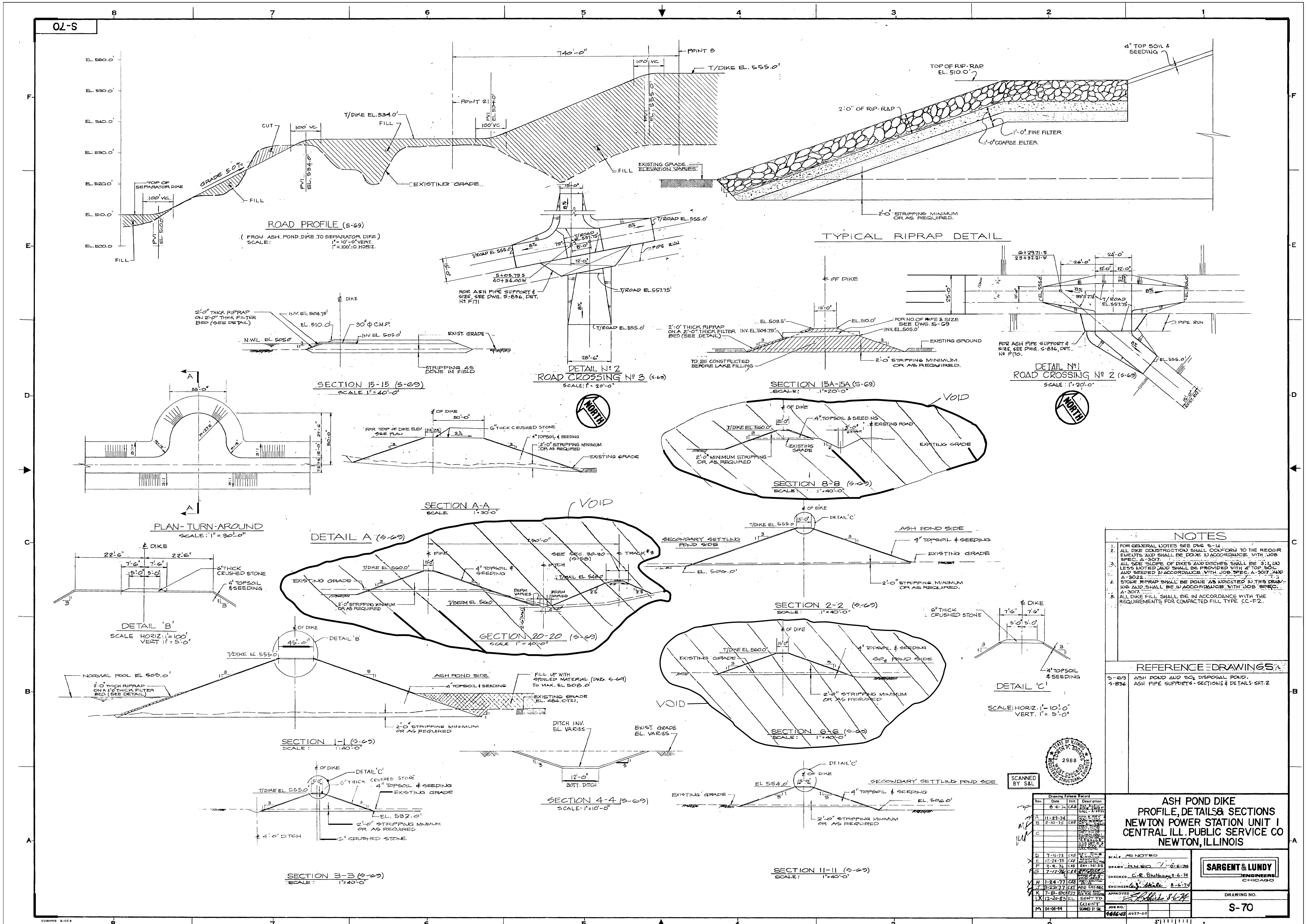
Rev	Date	Init	Description
N	07-29-94	TM	SCANNED BY S&L
A	11-29-74	CRB	[illegible]
B	2-10-75	[illegible]	REMOVED SO_2 [illegible] FOR APPROVAL
C			HOLD SO_2 POND DIKE & REMOVE FENCE
D	7-15-75	[illegible]	[illegible]
E	12-21-75	CRB	REMOVED HOLD OF SO_2 POND
F	7-12-76	CRB	REV. DIKE [illegible]
G	9-13-76	CRB	ADD WEIR BOX [illegible] & REMOVE HOLD ON
	--	-	WEIR BOX # 1 & # 2 [illegible]
	--	-	REV. ROAD [illegible]
H	1-24-77	CRB	ADD. SEC. 15-15
J	10-21-77	SPL	SHOWN LIMIT OF STONE RIPRAP
K	11-8-79	[illegible]	REV. STORAGE CAPACITIES CORRESPONDING TO T/DIKE EL. 535.0
L	7-8-80	RTJ	GEC REVISION
M	2-20-81	[illegible]	SENT TO CLIENT

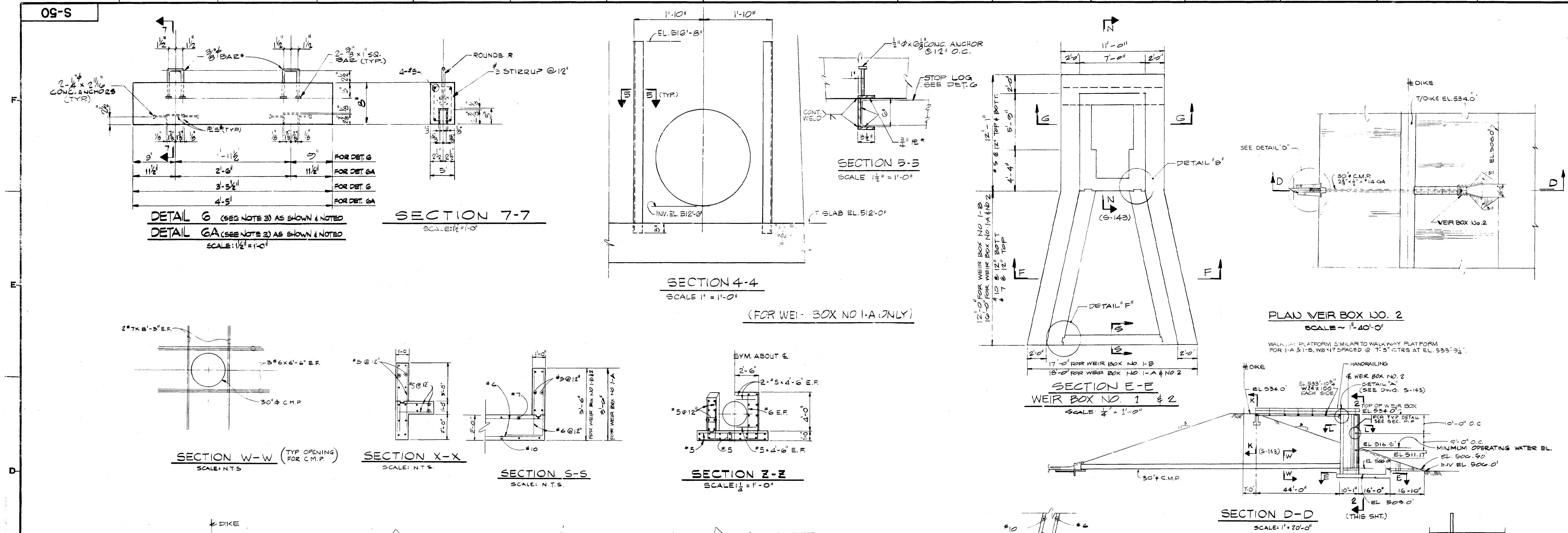
ASH POND & SO_2 DISPOSAL POND
NEWTON POWER STATION UNIT 1
CENTRAL ILL PUBLIC SERVICE CO.
NEWTON, ILLINOIS

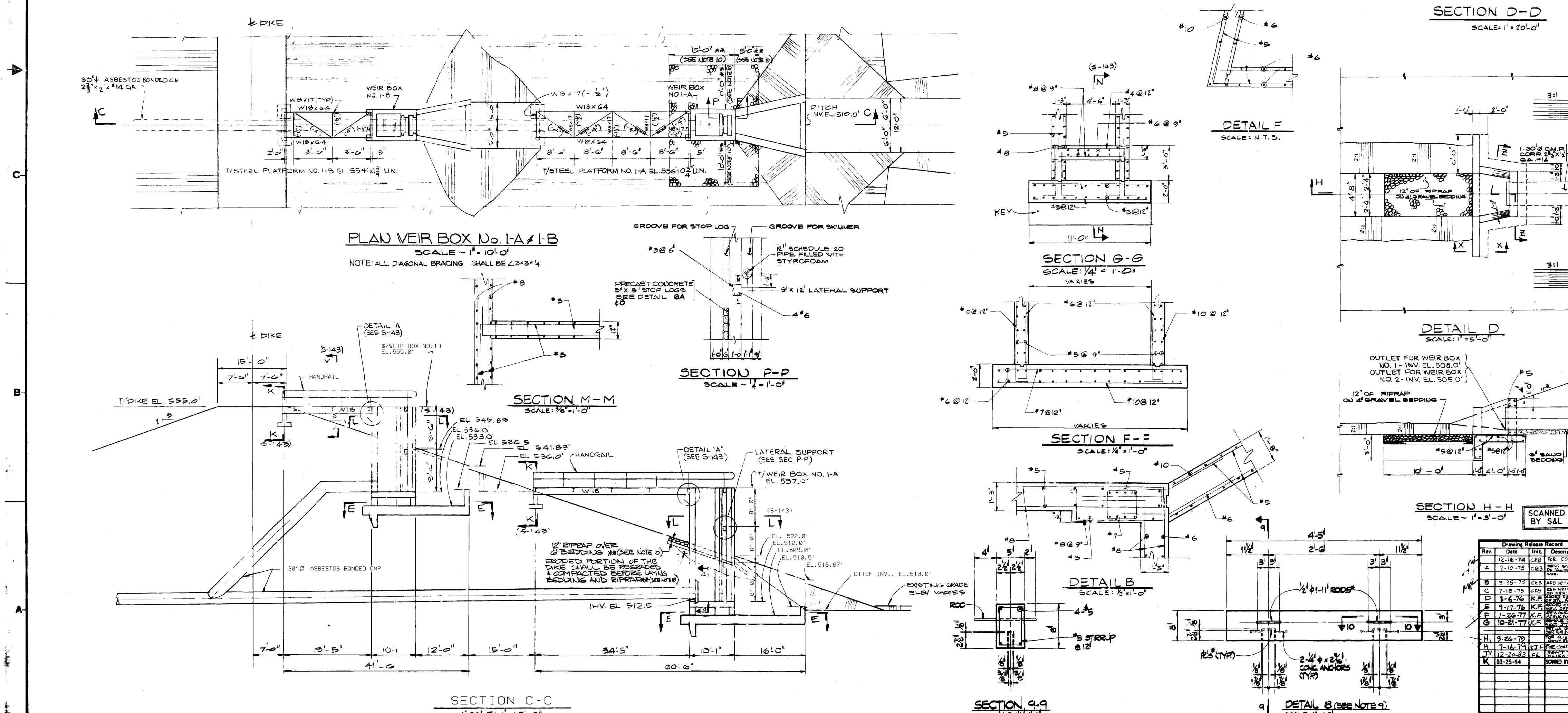
SCALE 1" = 400'-0" & U.N.
DRAWN B. SANCHEZ 8-6-74
CHECKED C. R. Bhattacharya 8-6-74
ENGINEER A. J. Skale 8-6-74
APPROVED [illegible]
JOB NO. 1486-05 1486-15

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-69


S-70
ROAD PROFILE (S-69)
(FROM ASH POND DIKE TO SEPARATOR DIKE)
SCALE: 1" = 10'-0" VERT. 1" = 100'-0" HORIZ.
TYPICAL RIPRAP DETAIL
4" TOP SOIL & SEEDING
TOP OF RIP-RAP EL. 510.0'
2'-0" OF RIP-RAP
1'-0" FINE FILTER
1'-0" COARSE FILTER
EXISTING GRADE ELEVATION VARIES
2'-0" STRIPPING MINIMUM OR AS REQUIRED.
DETAIL Nº 2
ROAD CROSSING Nº 3 (S-69)
SCALE: 1" = 20'-0"
DETAIL Nº 1
ROAD CROSSING Nº 2 (S-69)
SCALE: 1" = 20'-0"
SECTION 15-15 (S-69)
SCALE 1" = 40'-0"
SECTION 15A-15A (S-69)
SCALE: 1" = 20'-0"
PLAN - TURN-AROUND
SCALE: 1" = 30'-0"
SECTION A-A
SCALE 1" = 30'-0
SECTION 8-8 (S-69)
SCALE: 1" = 40'-0"
VOID
DETAIL A (S-69)
SECTION 20-20 (S-69)
SCALE 1" = 40'-0"
DETAIL 'B'
SCALE HORIZ: 1" = 100' VERT: 1" = 5'-0"
SECTION 2-2 (S-69)
SCALE: 1" = 40'-0"
SECTION 6-6 (S-69)
SCALE: 1" = 40'-0"
DETAIL 'C'
SCALE: HORIZ: 1" = 10'-0" VERT. 1" = 5'-0"
SECTION 1-1 (S-69)
SCALE: 1" = 40'-0"
SECTION 4-4 (S-69)
SCALE: 1" = 10'-0"
SECTION 3-3 (S-69)
SCALE: 1" = 40'-0"
SECTION 11-11 (S-69)
SCALE: 1" = 40'-0"
NOTES
1. FOR GENERAL NOTES SEE DWG S-14.
2. ALL DIKE CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS AND SHALL BE DONE IN ACCORDANCE WITH JOB SPEC. A-3017.
3. ALL SIDE SLOPE OF DIKES AND DITCHES SHALL BE 3:1 UNLESS NOTED AND SHALL BE PROVIDED WITH 4" TOP SOIL AND SEEDED IN ACCORDANCE WITH JOB SPEC. A-3017 AND A-3022.
4. STONE RIPRAP SHALL BE DONE AS INDICATED IN THIS DRAWING AND SHALL BE IN ACCORDANCE WITH JOB SPEC. A-3017.
5. ALL DIKE FILL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS FOR COMPACTED FILL TYPE CC-F2.
REFERENCE DRAWINGS
S-69 ASH POND AND SO2 DISPOSAL POND.
S-836 ASH PIPE SUPPORTS - SECTIONS & DETAILS - SHT. 2
SCANNED BY S&L
ASH POND DIKE
PROFILE, DETAILS & SECTIONS
NEWTON POWER STATION UNIT 1
CENTRAL ILL. PUBLIC SERVICE CO
NEWTON, ILLINOIS
SCALE AS NOTED
SARGENT & LUNDY ENGINEERS CHICAGO
DRAWING NO.
S-70





NOTES

1. FOR GENERAL NOTES SEE DWG. S-14
2. NUMBER OF STOP LOGS REQUIRED FOR DET. 6A
   FOR WEIR BOX 1A 19 STOP LOGS REQUIRED
   18 S.L. FUTURE
   FOR WEIR BOX 1B 14 S.L. REQUIRED
   14 S.L. FUTURE
   FOR WEIR BOX 2 20 S.L. REQUIRED
   21 S.L. FUTURE
3. NUMBER OF STOP LOGS REQUIRED FOR DET. 6
   FOR WEIR BOX 1A 4 S.L. REQUIRED
   3 S.L. FUTURE
4. ALL WORKS SHOWN IN THIS DRAWING SHALL BE DONE BY SUPERSTRUCTURE CONTRACTOR IN ACCORDANCE WITH SPECIFICATION A-3094 UNLESS NOTED.
5. STONE RIPRAP SHALL BE DONE TO CONFORM WITH THE DIMENSION AS SHOWN IN THIS DRAWING, UNLESS NOTED, AND SHALL BE IN ACCORDANCE WITH JOB SPECIFICATION A-3017 AND A-3022.
6. WEIR BOX NO. 1-B MAY BE CONSTRUCTED WHEN ASH LEVEL IN THE PRIMARY SETTLING POND REACHES ELEVATION 531.0'.
7. WALKWAY PLATFORM FOR WEIR BOX NO. 1-A HAS BEEN DESIGNED TO BE REUSED FOR WEIR BOX NO. 1-B, AFTER CUTTING OFF 15'-0" FROM THE WEST END. SEE DETAIL "A" AND SECTION S-S (DWG. S-143) FOR END DETAILS.
8. *INDICATES THE STEEL TO BE GALVANIZED ACCORDING TO S&L STANDARD 1743.
9. NUMBER OF STOP LOGS REQUIRED FOR DET. 8.
   FOR WEIR BOX 2-1 S.L. REQUIRED. STOP LOG SHALL BE USED WITH & IMMEDIATELY BELOW THE FLOW MEASURING WEIR ONLY.
10. **DENOTES WORK TO BE DONE BY THE "EROSION REPAIR WORK CONTRACTOR IN ACCORDANCE WITH S&L SPEC. 6121-001.

REFERENCE DRAWINGS

S-64	WEIR BOXES PLANS, SECTIONS & DETAILS
S-69	ASH POND & SO_2 DISPOSAL POND
S-70	ASH POND DIKE, PROFILE, DETAILS & SECTIONS
S-143	OIL SEPARATOR & WEIR BOX SECTIONS & DETAILS

SCANNED BY S&L

Drawing Release Record

Rev.	Date	Init.	Description
	12-16-74	CRB	FOR CONST.
A	2-10-75	CRB	REV. SKIMMER DETAIL FOR 12" ø PIPE.
B	3-25-75	CRB	ADD DETAILS
C	7-16-75	CRB	REV. WEIR BOX ON SEC. POND
D	8-6-76	K.F.	ADDED DETAILS OF STL. EMBMT.
E	9-17-76	K.F.	ADDED KEYS AND REV. DETAILS
F	1-26-77	K.F.	REV. OUTLET WORK STRUCTURE
G	10-21-77	K.F.	REMOVE DET. C & SECT. J-J ADD DET. 6A, DET. 8 SEC. 9-9 & SECT. 10-10
H_1	3-26-79		FOR CLIENT COMMENTS
H	7-16-79	KJF	FOR CONST.
J	12-20-83	FL	SENT TO CLIENT
K	03-25-94		SCANNED BY S&L

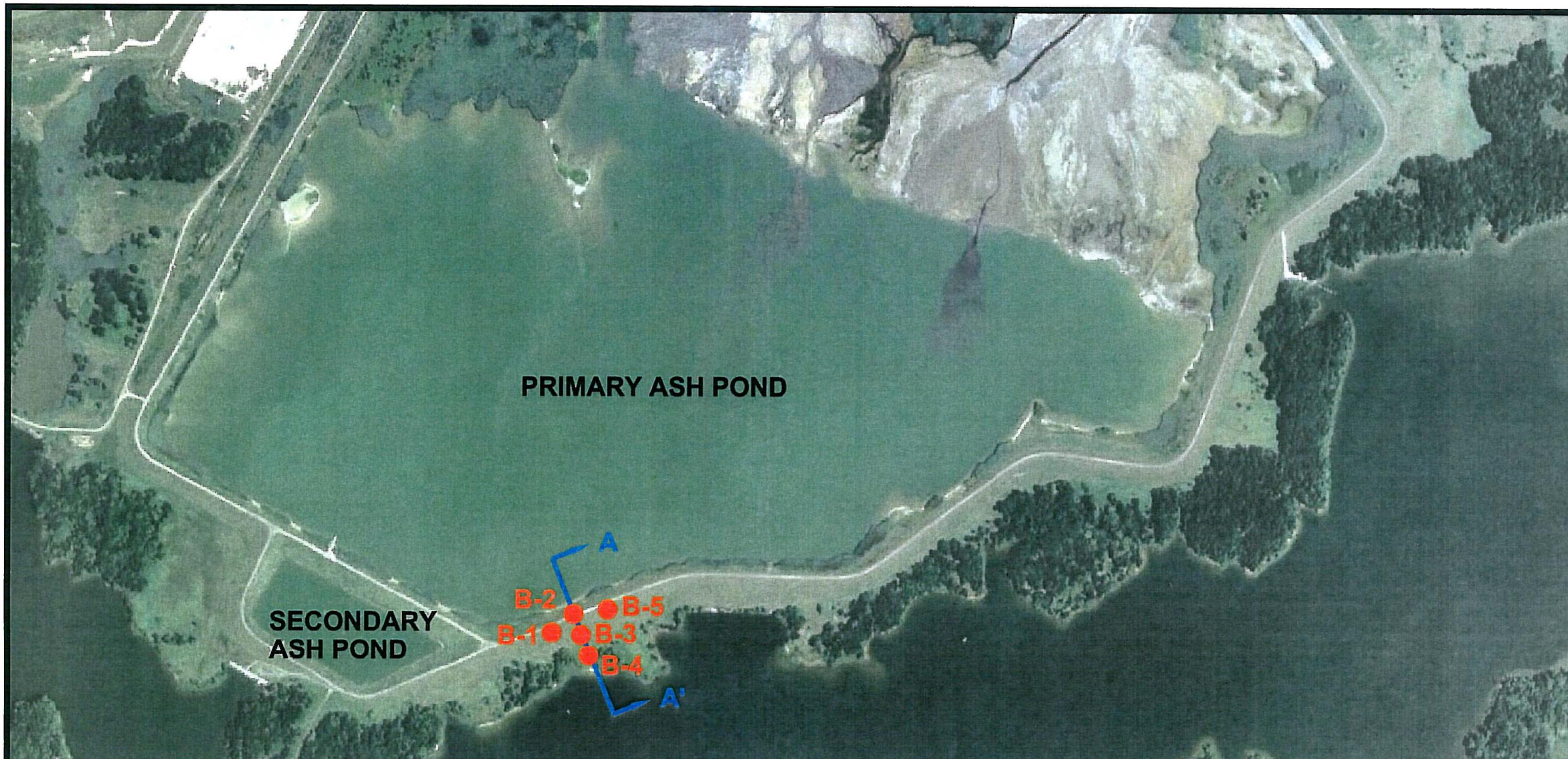
WEIR BOX STRUCTURES AT PRIMARY AND SECONDARY SETTLING PONDS
NEWTON POWER STATION UNIT 1
CENTRAL ILL. PUBLIC SERVICE CO.
NEWTON, ILLINOIS

SCALE AS NOTED
DRAWN B. SANCHEZ 12-16-74
CHECKED C. R. Bhattacharya 12-16-74
ENGINEER A. J. Skale 12-18-74
APPROVED E. P. Shires 11-12-79
JOB NO. 4486-03

SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO.
S-50

Appendix C: Newton Primary Ash Pond Boring and Piezometer Locations



NOTES

1. Plan adapted from an aerial photograph courtesy of Google Earth.

LEGEND

● Boring Location

Slope Stability Cross Section

0 400 800 1,600

SCALE IN FEET

N

Drawn By: SLC	Ck'd By: SLC	App'vd By: SLC
Date: 11-10-10	Date: 12/21/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Newton Power Station
Newton, Illinois

AERIAL PHOTOGRAPH OF SITE AND BORING LOCATIONS

Project Number J017150.01	PLATE 2

XXX-X### — EXPLORATION METHOD (B=BORING, C=CPT, P=PIEZOMETER); ID NUMBER; STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 600
APPROXIMATE SCALE FEET

N

Illinois Power Generating Company		PROJECT NO. 60440378
AECOM		
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Newton Primary Ash Pond Piezometer Locations	FIG. NO. 2A

File: P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A PIEZOMETER LOCATION PLAN (NEWTON PRIMARY ASH POND).DWG Last edited: NOV. 04, 15 @ 1:32 p.m. by: david_deguire

AECOM

Appendix D: Operation and Maintenance Manual for Primary and Secondary Ash Ponds

Ameren Energy Generating

Newton Power Station

Operational Procedure

X-XXX-XXXX--XXX

Operation & Maintenance Manual for Primary and Secondary Ash Ponds

Effective Date: xx/xx/xxxx

Reason for Change: New Procedure

Approved By: *x* Date: xx/xx/xxxx

x
Lindel Wenthe

Responsible Department: Newton Power Station, Technical Services Department

- ☐ This entire document shall be in the field during procedure performance.
- ☐ The following portions of this procedure shall be in the field during procedure performance: ______________________
- ☐ __________ from this procedure shall be in the field during procedure performance.
- ☐ No part of this procedure is required to be in the field during procedure performance.

Table of Contents

1.0 Purpose

1.1 This procedure is intended to ensure the safe and environmentally responsible operation and use of all water impoundment and levee structures at Newton Power Station facility. The primary purpose of Newton's Primary, Secondary Ash Ponds, and SO2 Chemical Pond are for the storage of fly ash and treatment of fly ash sluice water to meet NPDES Permit Conditions. This procedure then assures:

1.1.1 The embankment structures and flow regulating structures are properly operated and maintained.

1.1.2 Inspections of these structures are conducted.

1.1.3 A maintenance program will be performed.

1.1.4 Communication takes place with the Dam Safety Staff regarding the structures' condition and operation.

2.0 Scope

2.1 This procedure applies to all onsite personnel and the Dam Safety Group staff.

3.0 Responsibilities

3.1 On-site Technical Services – Conducts ash pond and levee embankment and structure observations and completes the inspections, reporting any undesirable conditions to the Supervising Engineer, Dam Safety.

3.2 On-site personnel – Operates the facilities as described in this Operational Procedure. Reports any conditions noted during routine activities to the shift supervisor. Coordinates scheduling of maintenance as required to maintain proper operations of the ash pond facility.

3.3 Shift Supervisor (SS) - Calls Technical Service personnel when structure concerns are reported. Make entries into the shift log book indicating the concern and actions taken.

3.4 Supervising Engineer, Dam Safety - Conducts annual detailed dam safety inspections and provides a report with findings and recommendations.

4.0 Historical Information

4.1 Construction began in 1972 and concluded in 1982. Unit 1 was placed in service in 1977; Unit 2 went into commercial operation in 1982.

5.0 Flow Regulating Structures

5.1 Embankments

- Primary Ash Pond (Bottom Ash)
  Top of ash pond berm elevation was designed at Elevation 555.00'. Therefore, normal high pool elevation is 450.00. This allows for 2.9 feet of storage depth over the top of the ash pond outlet structure; or approximately 116 acre-ft storage or 37,850,000 gallons (45% of 89 acres times 2.9' deep).

- Secondary Ash Pond (Bottom Ash)

5.2 Structures

- Primary Ash Pond Outlet Structures - The water level in the pond is regulated by stop logs in the concrete outlet structures on the south side of the Primary Ash pond. Plans showing the outlet structures and walkways are on file. The main pond outlet structure shall be checked regularly (at least weekly or more often if there are excessive rain events) to ensure proper pond discharge. Elevation of the top of the main structure is 537.00'. Elevation of the walkway is 537.00'. Normal depth of flow over the drop structure is 3 to 4 inches during non-rainfall discharge. A 30-inch diameter CMP exits the outlet structure directly to the secondary settling pond.
- Secondary Ash Pond Outlet Structures - The water level in the pond is regulated by the pond outlet structures on the south side of the Secondary Ash pond. Plans showing the outlet structures and walkways are on file. The Secondary Ash Pond outlet structure shall be checked regularly (at least weekly or more often if there are excessive rain events) to ensure proper pond discharge. Elevation of the top of the structure is 534.00'. Elevation of the walkway is 534.00'. Minimum operating water level elevation is 516.50'. Normal depth of flow over the drop structure is 3 to 4 inches during non-rainfall discharge. A 30-inch diameter CMP exits the outlet structure directly to Newton Lake.
- Primary Ash Pond Process Water Discharge Pipe – This culvert regulates the level of water in the Primary Ash Pond. There are two possible inlets in the Primary ash pond outlet structures. Inlet Flowline elevations of the Primary Ash Pond pipe are 512.50' and 536.00'. Both inlets are connected into the same 30" CMP roughly halfway through the embankment. The outlet elevation of these combined pipes is 508.00'. These combined pipes failed once in the past at the point of connection of the top pipe into the main pipe and caused the embankment to erode from the inside and

caused a sinkhole to develop. The solution that was devised to deal with the problem was to line the entire 30” CMP with a cured in place liner. This rehabilitated the corrugated metal pipe and restored the interior integrity of the outlet pipe. The embankment was then filled with clam material and returned to service.

- Secondary Ash Pond Bottom Ash/Process Water Culvert Pipe – This 30” corrugated metal culvert pipe regulates the level of water in the Secondary Ash Pond. This pipe was also lined with a cured in-place liner. Inlet flowline elevation of the Secondary Ash Pond outlet pipe is 506.00’. The outlet elevation of this pipe is 505.00’.

6.0 Operations Requirements

Normal Operation - Plant personnel shall monitor the level of all ash pond basins within the perimeter ash pond berm on a daily basis. If levels within any of the basins exceed the prescribed maximum levels, action shall be taken immediately to remedy the situation.

Normal Operating Levels	
Primary Ash Pond Outlet	508’
Secondary Ash Pond Outlet Structure	505’
Primary Ash Pond Water Level	536’
Secondary Ash Pond Water Level	516.5’

Emergency Conditions – If a condition arises where there is a possibility of an embankment failure, then the following procedures will be followed:

1. Notify the Supervising Engineer Dam Safety immediately.
2. The pond level will be lowered by portable pumps. Monitor the embankment for changed conditions.
3. Initiate Emergency Action Plan

7.0 Maintenance Requirements

7.1 Maintenance Program - The plant’s impoundment and flood prevention structures shall be inspected and maintained in a manner to ensure safe and environmentally responsible operations. A regular maintenance program shall be performed and shall consist of the following inspection items:

1. Earth embankments: Walk the crest, side slopes, and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. Frequency of inspection: Quarterly.

2. Vegetation: Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion form occurring. Note the height of the grass; if greater than one foot a mowing of the area should be scheduled before the next inspection. There should be NO trees on the earth embankment and none within a minimum of 20 feet of the embankment toe or other structures. Frequency of inspection: Weekly.
3. Pond Outlet Structure: Check for any debris or other obstructions around the concrete inlet which may block or restrict the flow of water. Check for the development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check for settlement or cracking in the walkway structure. Frequency of inspection: Monthly.
4. Outlet Pipe Slide Gate: Check the structure for development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check the slide gate stem, grease the stem, and operate the slide gate through its full range of motion to ensure proper operation. Check for buildup of debris in the manhole. Frequency of inspection: Quarterly.
5. Pond/Levee Perimeter: Check the perimeter of the embankment and levee for a distance of at least 100 feet from the toe for signs of seepage or boils. Inspection frequency for levee will be determined by Dam Safety Engineer during flood events. Frequency of ash pond embankment inspection: Quarterly for ash pond embankment.
6. Special Inspections – Special inspections of ash pond berms shall be performed after earthquakes, floods, water level exceedance in the ponds, or heavy rainfall events. Inspection and report shall be equal to an annual inspection level of detail. Water level in the pond should be noted after a heavy rainfall. Dam Safety staff shall accompany plant personnel on special inspections. Frequency: As required.

8.0 Maintenance Logs

8.1 Plant personnel shall maintain an up-to-date log of operations (water levels, gate adjustments, inlet and outlet flows, serpentine channels, etc.), visual observations, unusual occurrences, and maintenance performed. The log book shall be reviewed during the Annual Engineering Inspection. Logs shall be kept for the life of the plant.

9.0 Contact Numbers

Plant Environmental Supervisor: David Heath / 618-783-0311
Plant Shift Supervisors Office: 217-783-0344

Plant Control Room: 217-783-0501 / 217-783-0502
Supervising Engineer Dam Safety: Steve Bluemner / 314-554-6298
Dam Safety Staff Contact: Dan Haarmann / 217-371-4853

10.0 References

10.1 AER - DSP-004, "Dam Safety Program for Non-Illinois Department of Natural Resources (non-IDNR) Regulated Facilities"

10.2 Drawings

Drawing Number	Sheet Name	Date
S-50	Weir Box Structures at Primary and Secondary Settling Ponds	12-16-74
S-69	Ash Pond and SO2 Disposal Pond	8-6-74
S-70	Ash Pond Dike Profile, Details & Sections	8-6-74
S-836	Ash Pipe Supports Sections and Details SHT #2	2-8-80

11.0 Records

	Record Type	Responsible Person	Retention Period	Location
11.1	Copies of weekly inspections	Plant Technical Services	Life of plant	Onsite Environmental Supervisor and Dam Safety Department office
11.2	Copies of Quarterly inspections	Plant Technical Services	Life of plant	Onsite Environmental Supervisor and Dam Safety Department office
11.3	Log Book	Plant Technical Services	Life of plant	Onsite Environmental Supervisor office

AECOM

Appendix E: Newton Power Plant Site Visit Report 9-12-08, Hanson (2008)

MEMORANDUM
(Form QAP 17.2.3, Rev. 2)

TO: Dan Whalen DATE: 9/15/08

FROM: John Jenkins

SUBJECT: Ameren Newton Power Plant
Site Visit Report 9-12-08

On Friday September 12, 2008, I made a site visit to Newton Power Station to observe a sinkhole that has developed on the ash pond dike. I was accompanied by Matt Frerking and Jim Marshall of Ameren.

The sinkhole has developed on the downstream crest of the dike between the primary (upper) and secondary (lower) ash ponds (see attached photos). The sinkhole was first observed the morning of September 12, 2008 after a heavy rain. The sinkhole is circular in shape with a diameter of approximately 12 ft. The depth to the bottom of the sinkhole is estimated to be 10 to 12 ft. The sinkhole has developed directly over the location where two discharge pipes between the primary and secondary ponds are joined (see attached Section C-C). The discharge pipes are 30 in. diameter corrugated metal pipes (CMP) installed in the late 1970's. There was no indication of ground movement in the form of settlement or bulging of the dike embankment outside the area of the sinkhole. The water level in the primary ash pond is approximately El. 536 and the water level in the secondary pond is maintained at minimum El. 516.5. There has been no significant fluctuation of the water levels in either pond for over 6 months. The top of the dike is at El. 555 and the top of the discharge pipe below the sinkhole location is approximately El. 514. Therefore, the depth below the ground surface to the top of the pipe at the sinkhole location is approximately 41 ft.

Based on the location of the sinkhole relative to the discharge pipes and considering the age of the metal pipes, it appears that the most likely cause of the sinkhole is due to loss of soil material through a hole or holes in the discharge pipes. In particular, the connection between the two pipes is suspect. The pipe discharges into the secondary pond below the water level and therefore there is no way to visually observe the discharge for soil deposits. If the cause of the sinkhole is due to loss of material through holes in the pipes, this process could have been occurring over several years. There is the possibility that there is a void or voids that extend from the ground surface to the discharge pipes, and it would be expected that the sinkhole would continue to develop over time. It is possible that additional settlement or sloughing of soil material on the downstream crest of the embankment in the immediate vicinity of the sinkhole will occur in the near future. However, considering the relatively low level of water in the primary ash pond relative to the top of the dike embankment, the dike should remain stable even if local failures in the upper portion of the dike occur.

It was agreed that the following actions be taken.

- The existing sinkhole should be filled with soil material to prevent further sloughing and expanding of the sides of the sinkhole. The material should be placed with a backhoe and compacted with the backhoe bucket. No mechanical compaction of the soil should be attempted. The top of the filled area should be crowned to prevent ponding in the area of the sinkhole, and the sinkhole area should be monitored daily for additional settlement or movement.
- The primary ash pond level should be lowered in order to allow the pipes to be dewatered and inspected by camera. Jim Marshall estimates that it may take more than a week to draw the water down to the required depth.
- Based on the results of the camera survey, a plan for repair of the discharge pipes will be developed. The repair plan may include slipform lining of the pipes and/or excavation to repair isolated areas.
- Due to the unknown extent of the sinkhole void and to the possibility of additional voids being present along the length of the discharge pipe, Hanson will evaluate alternative methods for investigating the presence of voids below the ground surface, including the use of ground penetrating radar.

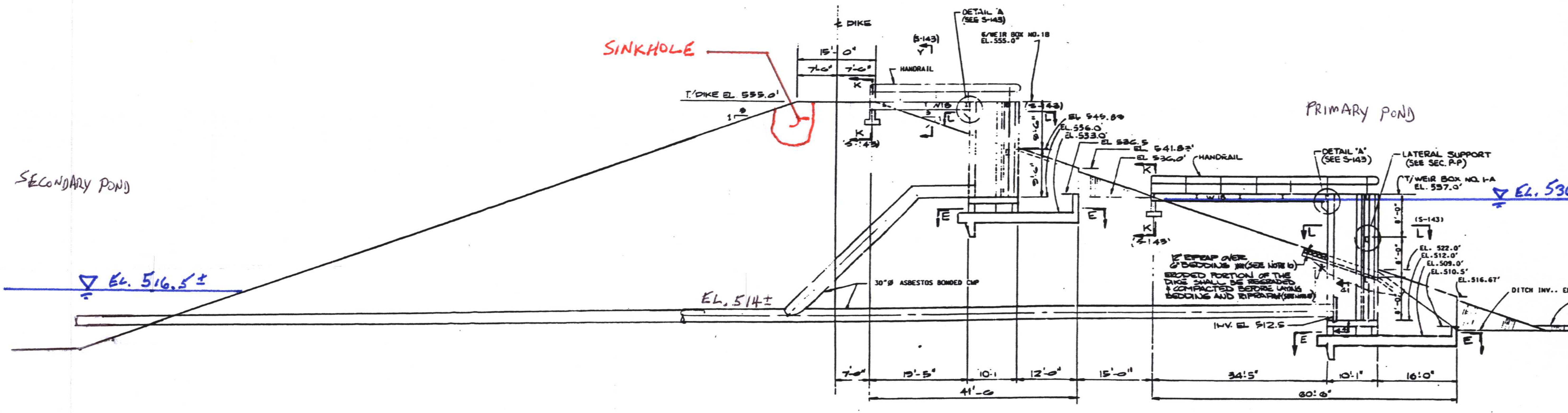
View of Sinkhole Looking Northwest Along Dike

View of Sinkhole Looking Southeast Along Dike

Close-Up of Sinkhole

View of Bottom of Sinkhole

View of Sinkhole Looking Southwest Towards the Secondary Pond and Lake



SECTION C-C
SCALE: 1" = 10'-0"

ATTACHMENT C

Newton Power Plant - Ash Pond's Chemical Constituents

In accordance with 35 I.A.C. 845.230(d)(2)(C), IPGC is submitting available/existing analyses of "the chemical constituents of all waste streams, chemical additives and sorbent materials entering or contained in" the CCR impoundment, Ash Pond.

A list of the chemical constituents' analyses contained in the CCR surface impoundment can be found in Appendix A. As determined through antidegradation studies, this list contains chemical constituents found in the surface free liquid and the subsurface free liquids. IPGC is also including a list of chemical additives, sorbent materials and waste streams that were submitted in the facility's NPDES permit applications to IEPA within the past ten years at a minimum and/or listed in the current NPDES permit (IL0001554) in Appendix B.

Appendix A: Chemical Constituents Contained in the Ash Pond

Pollutant	Units	Surface Free Liquids Average Concentration	Subsurface Free Liquids Average Concentration
Acidity (total)	mg/L	< 20.0	< 20.0
Alkalinity (total)	mg/L	98.3	327
Ammonia Nitrogen	mg/L	< 0.10	3.0
Antimony (dissolved)	mg/L	< 0.00031	0.00105
Antimony (total)	mg/L	< 0.00034	0.0079
Arsenic (dissolved)	mg/L	0.0021	0.0275
Arsenic (total)	mg/L	0.0023	0.0297
Barium (dissolved)	mg/L	0.246	0.191
Barium (total)	mg/L	0.27	0.62
Beryllium (dissolved)	mg/L	< 0.00050	< 0.001
Beryllium (total)	mg/L	< 0.00050	< 0.0011
Boron (dissolved)	mg/L	0.421	4.2
Boron (total)	mg/L	0.416	4.7
Cadmium (dissolved)	mg/L	< 0.00050	0.0007
Cadmium (total)	mg/L	< 0.00050	0.0008
Calcium (total recoverable)	mg/L	19.1	57.9
Chemical Oxygen Demand	mg/L	34.9	46.9
Chloride (total)	mg/L	10.9	19.2
Chromium (dissolved)	mg/L	0.0018	0.00070
Chromium (hexavalent)	mg/L	0.0016	0.0013
Chromium (total)	mg/L	0.002	0.007
Cobalt (dissolved)	mg/L	< 0.00011	0.001
Cobalt (total)	mg/L	< 0.00020	0.016
Copper (dissolved)	mg/L	0.0020	0.001
Copper (total)	mg/L	0.0026	0.0156
Cyanide (dissociable)	mg/L	< 0.010	0.4
Cyanide	mg/L	< 0.010	0.3
Fluoride	mg/L	0.65	0.44
Iron (dissolved)	mg/L	0.055	0.069
Iron (Ferric)	mg/L	0.08	2.89
Iron (Ferrous)	mg/L	< 0.12	< 0.4
Iron (total)	mg/L	0.142	3.1
Kjeldahl Nitrogen (total)	mg/L	1.1	4
Lead (dissolved)	mg/L	< 0.001	0.001
Lead (total)	mg/L	< 0.001	0.005
Lithium (total recoverable)	mg/L	< 0.010	0.028
Magnesium (total recoverable)	mg/L	5.46	2.8
Manganese (dissolved)	mg/L	0.0020	0.003
Manganese (total)	mg/L	0.0083	0.019
Mercury (dissolved)	mg/L	0.000044	0.0023
Mercury (total)	mg/L	0.000095	0.0033

Pollutant	Units	Surface Free Liquids Average Concentration	Subsurface Free Liquids Average Concentration
Molybdenum (dissolved)	mg/L	0.0145	0.267
Molybdenum (total)	mg/L	0.015	0.263
Nickel (dissolved) 200.8 WD	mg/L	< 0.00055	0.007
Nickel (dissolved) 6020 WD	mg/L	< 0.00057	0.007
Nickel (total)	mg/L	< 0.00077	0.0115
Nitrate as N	mg/L	< 0.10	0.09
Nitrite as N	mg/L	< 0.10	0.08
Oil & grease	mg/L	< 5.4	5.1
Oxidation/Reduction Potential	mg/L	-100	-276.7
pH*	SU	9.3	10.0
Phenols	mg/L	< 0.050	0.06
Phosphorus	mg/L	< 0.31	1.8
Potassium (dissolved)	mg/L	7.71	50.9
Potassium (total recoverable)	mg/L	7.7	52.8
Radium - 226	mg/L	0.99	0.63
Radium - 228	mg/L	0.87	1.03
Radium (total)	mg/L	1.87	1.66
Selenium (total)	mg/L	0.0042	0.038
Silica	mg/L	1.75	50.0
Silver (dissolved)	mg/L	< 0.00050	< 0.0009
Silver (total)	mg/L	< 0.00050	0.0009
Sodium (total recoverable)	mg/L	64.6	1365
Specific Conductance	mg/L	430.5	5827
Sulfate	mg/L	117	2554
Sulfide (total)	mg/L	0.051	1.5
Thallium (dissolved)	mg/L	< 0.001	< 0.002
Thallium (total)	mg/L	< 0.001	0.002
Total dissolved solids	mg/L	272	4700
Total Organic Carbon	mg/L	6.5	7.6
Total suspended solids	mg/L	37.9	92.6
Zinc (dissolved)	mg/L	< 0.010	0.013
Zinc (total)	mg/L	< 0.010	0.032

*Used https://calstormcompliance.com/ph-averaging-tool

Appendix B: List of Chemical Additives, Waste Streams and Sorbent Materials

Chemical Additives
Nalco PC-191 or equivalent (Anti-scalant)
Nalco PC-56 or equivalent (Biocide)
Ondeo-Nalco CA-250 or equivalent (Cationic Polymer)
General Chemical Hyper+Ion-1090 or equivalent (Aluminum Chlorohydrate)
Aluminum Chlorohydrate
Sodium Hydroxide (50%)
Sulfuric Acid (93%)
GE Betz Spectrus OX1200 or equivalent (Granular Bromine)
Anhydrous Ammonia
Dust suppression agents for coal
Hydrated Lime
Sodium Bicarbonate
Coal Dust Suppression Products*
Calcium Bromide for mercury control*

* Only a very small percentage of these chemicals would enter the ash pond. A high majority of the product would be consumed in the combustion process. Varying products may be used.

Waste Streams and Sorbent Materials*
Bottom & fly ash sluice water
Wastewater sumps
Water treatment filter backwash
Reverse osmosis reject water
Mixed bed waste water
Air heater wash water
Boiler blowdown
Sewage treatment plant #2 discharge
Coal pile runoff
Stormwater runoff
SCR module wastewater
Non-Chemical Metal Cleaning Wastewater

*No sorbent materials

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Bottom Ash
Synonyms:	Ash; Ashes; Ash residues; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Coal Fly Ash; Pozzolan; Waste solids.
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause respiratory irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*20 - 40%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*Repeat Dose STOT, Category 1* *Carcinogen. Category 1A*
Aluminosilicates[2]	*Various, see Footnote 2*	*10 - 60%*	*Single Exposure STOT, Category 3*
Calcium oxide (CaO)	*1305-78-8*	*10 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Manganese dioxide (MnO_2)	*1313-13-9*	*<2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1 - 10%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant Category 2* *Eye Irritant Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*

[1]The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen 1A has been assigned.

[2]Aluminosilicates (CAS# 1327-36-2) may be in the form of mullite (CAS# 1302-93-8); aluminosilicate glass; pozzolans (CAS# 71243-67-9); or calcium aluminosilicates such as tricalcium aluminate (C3A), or calcium sulfoaluminate (C4A3S). The form is dependent on the source of the coal and or the process used to create the CCP. Pulverized coal combustion would be more likely to create high levels of pozzolans. Aluminosilicates may have inclusions of calcium, titanium, iron, potassium, phosphorus, magnesium and other metal oxides.

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable	0.05	0.05	0.025	0.05
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): 8 - 11	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point and boiling range (°C): Not applicable	**Partition coefficient: n-octane/water:** Not determined
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; no corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined)
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L
Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13
Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica
  - Titanium dioxide

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO_2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency
- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)							
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****	

** Chronic Health Effects*
****** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

This SDS has been prepared in accordance with the Hazard Communication Rule 29 CFR 1910.1200. Information herein is based on data considered to be accurate as of date prepared. No warranty or representation, express or implied, is made as to the accuracy or completeness of this data and safety information. No responsibility can be assumed for any damage or injury resulting from abnormal use, failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

ATTACHMENT D

Memorandum

BURNS McDONNELL

Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 - Fault Area Location Demonstration for Ash Pond at the Newton Power Plant

Illinois Power Generating Company operates the coal fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code (I.A.C.) 845 (Part 845).

This memorandum addresses the requirements of Section 845.320 Fault Areas, which states:

Section 845.320 Fault Areas

a) *Existing and new CCR surface impoundments, and all lateral expansions of CCR surface impoundments must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR surface impoundment.*

b) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).*

Pursuant to Section 845.210(d)(2), for existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas), provided that the previously completed assessments meet the applicable requirements of those Sections.

The previous fault area demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.62. The requirements described in 40 C.F.R. § 257.62 are nearly identical to the requirements contained in I.A.C. Section 845.320. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed fault area demonstration is included in Attachment D.

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration - Fault Areas
Newton Power Station
Primary Ash Pond
Newton, Illinois

Illinois Power Generating Company operates the coal-fired Newton Power Station (Plant) located near Newton, Illinois. The Primary Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.62 *(Fault Areas)* of the US Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.62); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.62).

§257.62(a): New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

A review of available data from the U.S. Geologic Survey, the Illinois State Geological Survey, and other available information was completed for this demonstration. The nearest known mapped faults are the Albion-Ridgeway and Mt. Carmel-New Harmony faults, which are located approximately 42 miles southeast and the timeframe of the most recent activity on theses faults is not known. Based on the available published geologic data and information reviewed, there are no active faults or fault damage zones that have had displacement in Holocene time reported or indicated within 200 feet of the Unit.

§257.62(b): The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration meets the requirements of paragraph (a) of this section.

I, Steven F. Putrich, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the demonstration that the CCR Unit is not located within 60 meters (200 feet) of the outermost damage zone of a fault that has had a displacement in Holocene time as included in the CCR Rule Location Restrictions Evaluation memorandum dated 12 October 2018 meets the requirements of 40 CFR §257.62(a).

Signed: ____________________
Consulting Engineer

Print Name:	Steven F. Putrich
Illinois License No.:	62048779
Title:	Vice President
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

STEVEN F. PUTRICH
062-048-779
REGISTERED
PROFESSIONAL
ENGINEER
10/16/18
STATE OF ILLINOIS

Memorandum

BURNS McDONNELL

Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 - Placement Above the Uppermost Aquifer Location Demonstration for Ash Pond at the Newton Power Plant

Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code (I.A.C.) 845 (Part 845).

This memorandum addresses the requirements of Section 845.300 Placement Above the Uppermost Aquifer, which states:

Section 845.300 Placement Above the Uppermost Aquifer

a) *Existing and new CCR surface impoundments, and all lateral expansions of CCR surface impoundments must, be constructed with a base that is located at least 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR surface impoundment and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table).*

b) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).*

Pursuant to Section 845.210(d)(2), for existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas), provided that the previously completed assessments meet the applicable requirements of those Sections.

The previous upper aquifer demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.60. The requirements described in 40 C.F.R. § 257.60 are nearly identical to the requirements contained in I.A.C. Section 845.300. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed upper aquifer demonstration is included in Attachment D.

HALEY & ALDRICH, INC.
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216.739.0555

MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Placement Above Uppermost Aquifer
Newton Power Station
Primary Ash Pond
Newton, Illinois

Illinois Power Generating Company operates the coal-fired Newton Power Station (Plant) located near Newton, Illinois. The Primary Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.60 *(Placement above the uppermost aquifer)* of the US Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.60); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.60).

§257.60(a): New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). The owner or operator must demonstrate by the dates specified in paragraph (c) of this section that the CCR unit meets the minimum requirements for placement above the uppermost aquifer.

O'Brien & Gere evaluated groundwater conditions and prepared a Top of Uppermost Aquifer contour map (TOA Map) figure dated 25 January 2017 representing the upper limit of the uppermost aquifer for the Unit that included elevations ranging from approximate elevation 528+/- feet to 492+/- feet across the base of the unit. Based on historic document review, field/boring investigation and laboratory testing program at the Unit, Haley & Aldrich, Inc. determined that the lowest portion of the base of the unit is situated at or above 486.5 feet on the base of the unit.

When the critical low points at the base of unit were compared to the corresponding contours on the TOA Map, the resulting minimum separation was determined to exceed the 5.0 feet minimum separation requirement of §257.60(a).

§257.60(b): The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration meets the requirements of paragraph (a) of this section.

I, Steven F. Putrich, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the demonstration regarding the location of the base of the CCR Unit is no less than 1.52 meters above the upper limit of the uppermost aquifer as included in the CCR Rule Locations Restrictions Evaluation memorandum dated 12 October 2018 meets the requirements of 40 CFR §257.60(a).

Signed: ______________________
Consulting Engineer

Print Name:	Steven F. Putrich
Illinois License No.:	62048779
Title:	Vice President
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

Memorandum

BURNS McDONNELL

Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 – Seismic Impact Zone Location Demonstration for Ash Pond at the Newton Power Plant

Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code (I.A.C.) 845.

This memorandum addresses the requirements of Section 845.330 Seismic Impact Zones, which states:

Section 845.330 Seismic Impact Zones

a) *Existing and new CCR surface impoundments, and all lateral expansions of CCR surface impoundments must not be located in seismic impact zones unless the owner or operator demonstrates that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.*

b) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).*

Pursuant to Section 845.210(d)(2), for existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas), provided that the previously completed assessments meet the applicable requirements of those Sections.

The previous seismic impact zone demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.63. The requirements described in 40 C.F.R. § 257.63 are nearly identical to the requirements contained in I.A.C. Section 845.330. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed seismic impact zone demonstration is included in Attachment D.

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MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Seismic Impact Zone
Newton Power Station
Primary Ash Pond
Newton, Illinois

Illinois Power Generating Company operates the coal-fired Newton Power Station (Plant) located near Newton, Illinois. The Primary Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.63 *(Seismic Impact zones)* of the U.S. Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.63); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.63).

§257.63(a): *New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.*

The results of our evaluation indicate that the Unit is in compliance with 40 CFR §257.63(a). Although the Unit is located in a seismic impact zone, it satisfies the demonstration requirements of 40 CFR §257.63(a). The AECOM report entitled "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for the Primary Ash Pond at Newton Power Station" dated October 2016 (AECOM Report), includes engineering analysis, calculations, and findings that support the requirements of 40 CFR §257.63(a), and provides documentation that those requirements have been evaluated by AECOM for the subject CCR unit.

§257.63(b): The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration meets the requirements of paragraph (a) of this section.

I, Steven F. Putrich, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify that the CCR Unit is located in a seismic impact zone as included in the CCR Rule Locations Restriction Evaluation memorandum dated 12 October 2018 and satisfies all requirements of 40 CFR §257.63(a).

By providing this certification demonstration statement, we are not stating or inferring that we have verified or certified the details, assumptions, calculations and/or site condition models developed by AECOM in the subject report; those elements of the report are considered the professional opinions and determinations of AECOM.

Signed: ______________________
Consulting Engineer

Print Name:	Steven F. Putrich
Illinois License No.:	62048779
Title:	Vice President
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

Memorandum

BURNS McDONNELL

Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 – Unstable Areas Location Demonstration for Ash Pond at Newton Power Plant

Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code (I.A.C.) Part 845 (Part 845).

This memorandum addresses the requirements of Section 845.340 Unstable Areas which states:

Section 845.340 Unstable Areas

a) *An existing or new CCR surface impoundment, or any lateral expansion of a CCR surface impoundment must not be located in an unstable area unless the owner or operator demonstrates that recognized and generally accepted engineering practices have been incorporated into the design of the CCR surface impoundment to ensure that the integrity of the structural components of the CCR surface impoundment will not be disrupted.*

b) *The owner or operator must consider all the following factors, at a minimum, when determining whether an area is unstable:*

   1) *On-site or local soil conditions, including liquefaction, that may result in significant differential settling;*

   2) *On-site or local geologic or geomorphologic features; and*

   3) *On-site or local human-made features or events (both surface and subsurface)*

d) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsections (a).*

Demonstration of compliance with Section 845.340(a) and (b) – Unstable Areas:

Pursuant to Section 845.210(d)(2), for existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas), provided that the previously completed assessments meet the applicable requirements of those Sections.

The previous unstable area demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.64. The requirements described in 40 C.F.R. § 257.64 are nearly identical to the requirements contained in I.A.C. Section 845.340. Pursuant to Section 845.210(d)(2), a certification is not required for the unstable area demonstration. The previously completed unstable area demonstration is included in Attachment D.

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Unstable Areas
Newton Power Station
Primary Ash Pond
Newton, Illinois

Illinois Power Generating Company operates the coal-fired Newton Power Station (Plant) located near Newton, Illinois. The Primary Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment at the Plant. This demonstration addresses the requirements of 40 CFR §257.64 *(Unstable Areas)* of the US Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.64); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.64).

<u>§257.64(a)</u>: An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

§257.64(b): The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;
(2) On-site or local geologic or geomorphologic features; and
(3) On-site or local human-made features or events (both surface and subsurface).

Determination of compliance with §257.64(b)(1) - Conditions associated with the potential for significant differential settlement were not identified in the area where the Plant is located. A separate report completed by AECOM entitled "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for the Primary Ash Pond at Newton Power Station" dated October 2016 concluded that the soils under the Unit are not susceptible to liquefaction.

Determination of compliance with §257.64(b)(2) - Based on available United States Geological Survey (USGS) and Illinois State Geological Survey (ISGS) information, karst topography or physiographic features such as sinkholes, vertical shafts, sinking streams, caves, large springs, or blind valleys do not exist at the Plant. To evaluate the susceptibility of landslides, we reviewed readily available USGS and Illinois Department of Energy and Natural Resources (IDENR) data. The USGS data indicates that the

Plant is in an area of low landslide incidence. A review of IDENR data indicated that there has not been a landslide occurrence at or near the Unit. Accordingly, it is our opinion that the Unit is not located in an area that has high susceptibility to landslides.

Determination of compliance with §257.64(b)(3) - Finally, there are no documented surface or subsurface anthropogenic activities that would be indicative of creating unstable foundation conditions. Communication with Illinois Department of Natural Resources (IDNR) indicated that there are no known mine subsidence at or near the Unit.

§257.64(c): The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration meets the requirements of paragraph (a) of this section.

I, Steven F. Putrich, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the demonstration indicating the CCR Unit is not located in an unstable area as included in the CCR Rule Location Restrictions Evaluation memorandum dated 12 October 2018 meets the requirements of 40 CFR §257.64(a).

Signed: ________________________
Consulting Engineer

Print Name:	Steven F. Putrich
Illinois License No.:	62048779
Title:	Vice President
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

STEVEN F. PUTRICH
062-048-779
REGISTERED
PROFESSIONAL
ENGINEER
10/16/18
STATE OF ILLINOIS

Luminant

Office Memorandum

Date: October 17, 2020

To: Cynthia Vodopivec

David Mitchell
Charles Koudelka
cc: Phil Morris

From: Vic Modeer

Illinois Power Resources Generating, LLC
Newton Power Station
Subject: Newton Ash Pond Floodplain Certification

Illinois Power Resources Generating, LLC (IPRG) is the owner of the coal fired Newton Power Station, located in Jasper County near Newton, Illinois. The Ash Pond is an active surface impoundment storing coal combustion residuals (CCR). The requirements for the Ash Pond are found in 35 Ill. Admin. Code 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

Section 845.340 (c): An existing or new CCR surface impoundment, or any lateral expansion of a CCR surface impoundment, must not be located in a floodplain unless the owner or operator demonstrates that recognized and generally accepted engineering practices have been incorporated into the design of the CCR surface impoundment to ensure that the CCR surface impoundment will not restrict the flow of the base flood , reduce the temporary water storage capacity of a floodplain , or result in washout of CCR , so as to pose a hazard to human life, wildlife, or land or water resources.

Engineering Evaluation. The boundaries of the impoundment were determined by a survey conducted by a professional surveyor licensed in the State of Illinois. The boundaries of the Ash Pond were compared to the existing FEMA floodplain map, and it was determined that Bottom Ash Pond is located within Zone A of the floodplain according to the 1985 FEMA Floodplain mapping. In order to determine that: "generally accepted engineering practices have been incorporated into the design of the CCR surface impoundment to ensure that the CCR surface impoundment will not restrict the flow of the base flood, reduce the temporary water storage capacity of a floodplain, or result in washout of CCR," the following engineering was involved:

1. Determine the base flood elevation (BFE) and compare to the ash pond embankment elevations,
2. Determine the surface impoundment will not restrict the temporary water storage capacity of the floodplain. and
3. Result in a washout of CCR.

Elevations. The ash pond embankments were surveyed in 2020. The top of the ash pond embankment is at EL. 550-feet and the toe of the embankment at the lake normal pool level is at EL.504.0-feet. The BFE was determined by the publication "FEMA 256 - Managing Floodplain Development in Zone A Areas, National Flood Insurance Program, FEMA, 1995." The method shown in section V. Developing Base (100-Year) Flood Elevations, Simplified Methods, V-1 was used to conservatively estimate the BFE. The evaluation is attached as Figures 1 and 2. The result shows the BFE at EL. 525-feet. The ash pond is not subject to overtopping by the BFE.

Floodplain Restriction by the Ash Pond. The ash pond is shown to be within Zone A of the 1985 FEMA mapping. The original ground survey of the ash pond was evaluated for determining the volume of the floodplain that the ash pond has removed from Zone A of Newton Lake. The volume calculated from the survey was 1,129,000-cubic feet. The total volume of the lake, less the ash pond, precluded volume, but including the Zone A flood volume is 1,296,720,000-cubic feet. The construction of the ash pond resulted in a "no-rise' condition as the area removed from the BFE is 0.087% of the lake volume or less than 0.1-foot.

Washout of CCR. The ash pond embankment does not overtop. The embankment is constructed with erosion resistant soils (clays) and planted grasses. By design and definition, lake flooding will not cause erosive flow velocities. However, the areas where wave erosion has occurred are covered with riprap further protecting the embankment from releasing CCR.

Based on the above engineering evaluation, the Newton Ash Pond meets the requirements of Section 845.340 (c).

<u>Section 845.330 (d):</u> The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsections (a) and (c).

I, Victor Modeer, being a Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that this floodplain demonstration meets the requirements of 35 Ill. Adm. Code 845.340(c).

Sincerely,

Vic Modeer, PE, D.GE
(IL, MO, IN, KY, OH, LA)
Engineering Manager

VICTOR ALBERT MODEER JR.
062-043112
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

Memorandum

Date: 25 October 2021

Subject: 35 I.A.C. Admin. Code Part 845 - Wetland Location Demonstration for Ash Pond at Newton Power Plant

Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code (I.A.C.) 845 (Part 845).

This memorandum addresses the requirements of Section 845.310 Wetlands, which states:

Section 845.310 Wetlands

a) *Existing and new CCR surface impoundments, and all lateral expansions of CCR surface impoundments must not be located in wetlands unless the owner or operator demonstrates* [that the requirements listed in 845.310(a)(1) through (5) are met.]

b) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of subsection (a).*

Pursuant to Section 845.210(d)(2), for existing CCR surface impoundments, the owner or operator of the CCR surface impoundment may use a previously completed location restriction demonstration required by Section 845.300 (Placement Above the Uppermost Aquifer), Section 845.310 (Wetlands), Section 845.320 (Fault Areas), Section 845.330 (Seismic Impact Zones), and Section 845.340 (Unstable Areas), provided that the previously completed assessments meet the applicable requirements of those Sections.

The previous wetlands demonstration was certified by a qualified professional engineer stating that the demonstration meets the requirements of 40 C.F.R. § 257.61. The requirements described in 40 C.F.R. § 257.61 are nearly identical to the requirements contained in I.A.C. Section 845.310. Pursuant to Section 845.210(d)(2), a certification is not required for this demonstration. The previously completed wetlands demonstration is included in Attachment D.

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration - Wetland Areas
Newton Power Station
Newton Ash Pond
Newton Illinois

Illinois Power Generating Company operates the coal-fired Newton Power Station (Plant) located near Newton, Illinois. The Newton Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.61 *(Wetlands)* of the US Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.61); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.61).

§257.61(a): New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section.

Based on a review of the U.S. Fish and Wildlife Service's National Wetland Inventory mapping, 0.5-meter resolution aerial imagery (2016) and the results of on-site field assessments, the Unit is not located in wetlands as defined by §232.2.

<u>§257.61(b):</u> The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration meets the requirements of paragraph (a) of this section.

I, Steven F. Putrich, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the CCR Unit is not located in wetlands as included in the CCR Rule Location Restrictions Evaluation memorandum dated 12 October 2018 and, therefore, meets the requirements of 40 CFR §257.61(a).

Signed: ______________________
Consulting Engineer

Print Name:	Steven F. Putrich
Illinois License No.:	62048779
Title:	Vice President
Company:	Haley & Aldrich, Inc.

Professional Engineer's Seal:

ATTACHMENT E


NEWTON PRIMARY
ASH POND
STATE ID #: N/A
ID #: W0798070001-01
ILLINOIS POWER
GENERATING COMPANY

ATTACHMENT F

ILLINOIS POWER GENERATING COMPANY

NEWTON POWER PLANT

CITY OF NEWTON, JASPER COUNTY, ILLINOIS

Emergency Action Plan (EAP)

40 C.F.R. § 257.73(a)(3), Ill. Adm. Code 845.520
Coal Combustion Residual (CCR) Impoundment
& Related Facilities

- Primary Ash Pond (NID # IL50719) (IEPA W0798070001-01)

Revision Date: September 16, 2021

Qualified Professional Engineer Certification; Emergency Action Plan for the Newton Power Plant Primary Ash Pond

In accordance with 40 C.F.R. § 257.73(a)(3)(iv) and 35 Ill. Adm. Code 845.520(e), the owner or operator of a CCR unit that is required to prepare a written Emergency Action Plan under 40 C.F.R. § 257.73(a)(3) and 35 Ill. Adm. Code 845.520(a) must obtain a certification from a qualified professional engineer stating that the written Emergency Action Plan meets the requirements of 40 C.F.R. § 257.73(a)(3) and 35 Ill. Adm. Code 845.520.

I, Phil Morris, being a Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that:

1. the information contained in this Emergency Action Plan was prepared in accordance with the accepted practice of engineering; and
2. this Emergency Action Plan meets the requirements of 40 C.F.R. § 257.73(a)(3) and 35 Ill. Adm. Code 845.520.

Phil Morris
Senior Director, Corporate Environmental

9/27/21

Date

PHIL L. MORRIS
062-058763
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS
9/27/21

NEWTON POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENT & RELATED FACILITIES

TABLE OF CONTENTS

Section | Page

PART I – EAP NARRATIVE AND EXHIBITS

List of Tables

Table | Page

List of Figures

Figure | Page

NEWTON POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENT & RELATED FACILITIES

PART I – EAP NARRATIVE AND EXHIBITS

1 STATEMENT OF PURPOSE

The Newton Power Plant (Power Plant) is located near the City of Newton in Jasper County, Illinois. The location is shown in Figure 1-1. The Power Plant is a coal-fired electricity producing power plant owned and operated by the Illinois Power Generating Company, a subsidiary of Dynegy. This Emergency Action Plan (EAP) was prepared in accordance with 40 CFR § 257.73(a)(3) and covers the following Coal Combustion Residual (CCR) surface impoundment located at the site:

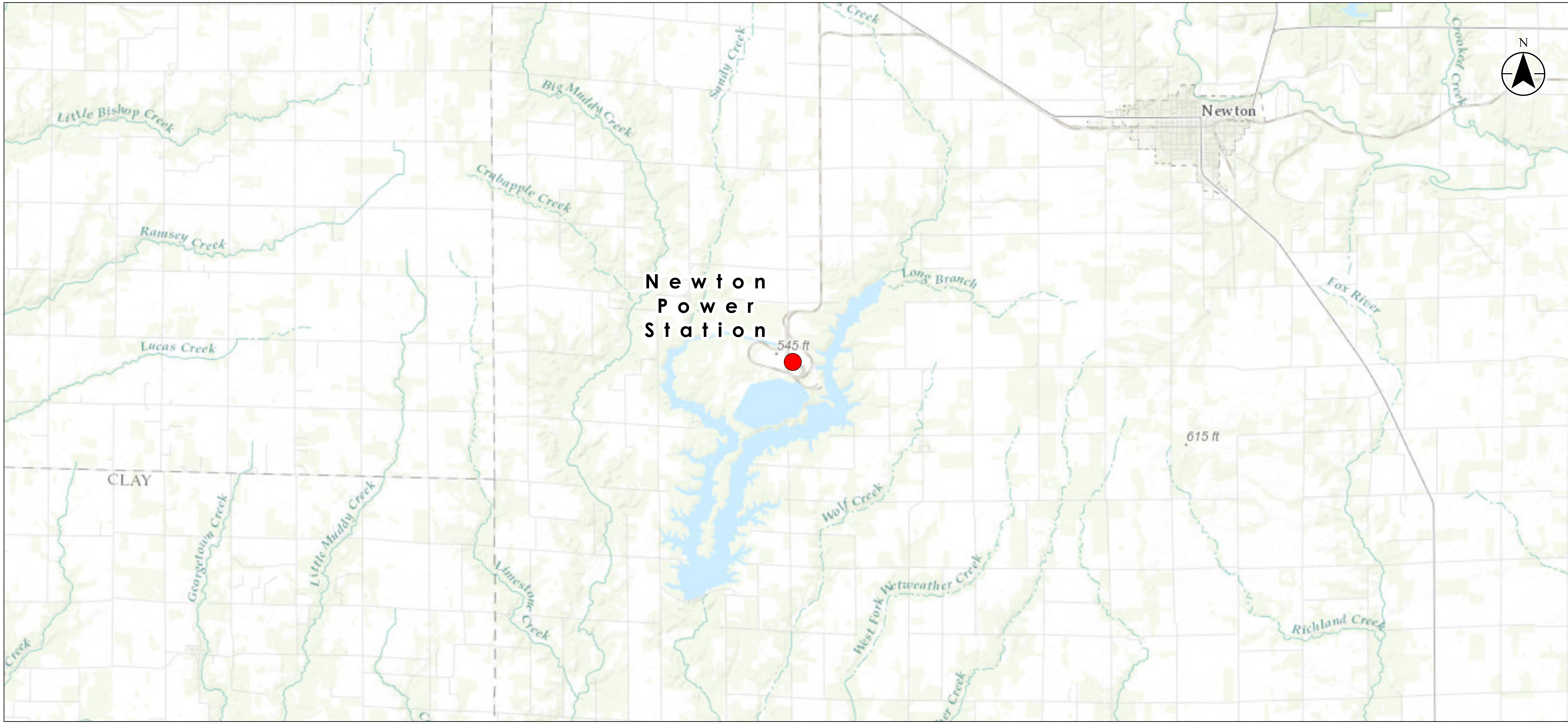
- Primary Ash Pond (NID # IL50719) (IEPA # W0798070001-01)

The location of this impoundment is shown in Figure 1-2. Section 6 of this EAP includes a description of the impoundment.

The purpose of this Emergency Action Plan (EAP) is to:

1. Safeguard the lives, as well as to reduce property damage, of citizens living within potential downstream flood inundation areas of the CCR impoundment and related facilities at the Newton Power Plant.
2. Define the events or circumstances involving the CCR impoundment and related facilities at the Newton Power Plant that represent atypical operating conditions that pose a safety hazard or emergency and how to identify those conditions.
3. Define responsible persons, their responsibilities, and notification procedures in the event of a safety emergency.
4. Provide contact information of emergency responders.
5. Identify emergency actions in the event of a potential or imminent failure of the impoundment.
6. Identify the downstream area that would be affected by failure of the impoundment.
7. Provide for effective facility surveillance, prompt notification to local Emergency Management Agencies, citizen warning and notification responses, and preparation should an emergency occur.

Information provided by Illinois Power Generating Company was utilized and relied upon in preparation of this report.



0 1 2 3 Miles

1:126,720 (1" = 2 miles at original document size of 11x17)

Stantec DYNEGY

Project Location 175605019
Latitude: 38.936621
Longitude: -88.277038
Jasper County, Illinois

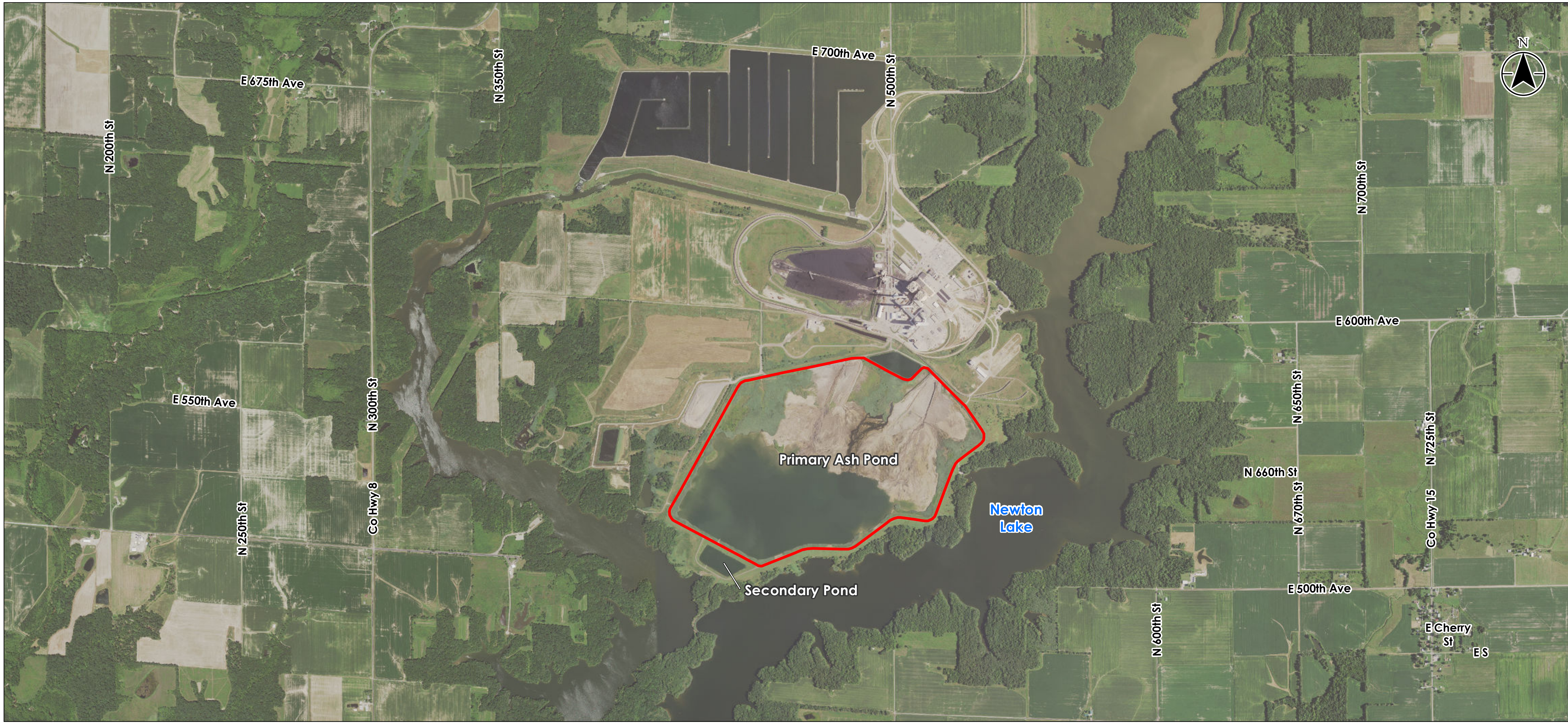
Prepared by EC on 2017-03-08
Technical Review by TS on 2017-03-27
Independent Review by MM on 2017-03-20

Client/Project
Newton Power Station
Emergency Action Plan

Figure No.
1-1

Title
Location Map

Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Basemap Source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Legend

CCR Surface Impoundment Boundary

0 0.5 1 Miles

1:31,680 (1" = 0.5 miles at original document size of 11x17)

Stantec DYNEGY

Project Location
Latitude: 38.936621
Longitude: -88.277038
Jasper County, Illinois

175666013
Prepared by EC on 2017-03-08
Technical Review by TS on 2017-03-27
Independent Review by MM on 2017-03-20

Client/Project
Newton Power Station
Emergency Action Plan

Figure No.
1-2

Title
CCR Impoundment

Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Basemap Source: USDA-FSA-APFO Aerial Photography Field Office, Illinois State Geological Survey
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

St. Louis 175666013_Appendix_B.mxd

2 COMMUNICATION

To facilitate understanding among everyone involved in implementing this EAP, four response levels are used to identify the condition of an impoundment. These are:

Response Levels:

- **Level 0:** Normal conditions and routine operations, including surveillance and initial investigation of unusual conditions and effects of storm events.
- **Level 1:** Potentially hazardous condition exists, requiring investigation and possible corrective action.
- **Level 2:** Potential failure situation is developing; possible mode of failure is being assessed; corrective measures are underway.
- **Level 3:** Failure is occurring or is imminent, public protective actions are required.

The 4-Step Incident Response Process is outlined in Figure 2-1. This should be used in conjunction with the Notification Flowchart (Figure 2-2) and EAP Decision Tree (Figure 2-3). Section 4 provides guidance tables for determining Response Levels and a table providing emergency actions to be taken given various situations. Table 2-1 lists contact information for the emergency responders.

Figure 2-1. Summary/Sequence of Tasks 4-Step Incident Response Process

Step 1: Detection, Evaluation, and Response Level Determination

Sequence of Tasks:

- Notify EAP Coordinator, Plant Manager, and Dam Safety Manager of unusual condition detected and confer on next steps needed.
- Conduct technical evaluation of conditions as needed.
- Determine Response Level based on evaluation. **(Table 4-1)**
- Reset Response Level as revised evaluations warrant.

Step 2: Notification

Sequence of Tasks:

- Notify authorities, designated personnel, and external response partners of change in Response Level, using the Notification Flowchart. **(Figure 2-2)**
- *Re-notify authorities, designated personnel, and external response partners as Response Level is changed.*

Step 3: Emergency Actions

Sequence of Tasks:

- Perform emergency actions with goal of saving the impoundment and minimizing impacts to life, property, and environment. **(Table 4-3)**
- Take continuous actions to include situation assessment, information sharing, remediation, and public safety advisories or warnings, as warranted.
- *Revise action plan as changes in conditions warrant.*

Step 4: Follow-up

Sequence of Tasks:

- Document conditions and decisions in the Emergency Incident Log.
- Notify authorities, designated personnel, and external response partners that condition is stabilized; limit incident termination declarations to conditions at the site.
- Conduct and document after-action review of incident and response.

Figure 2-2. Notification Flowchart

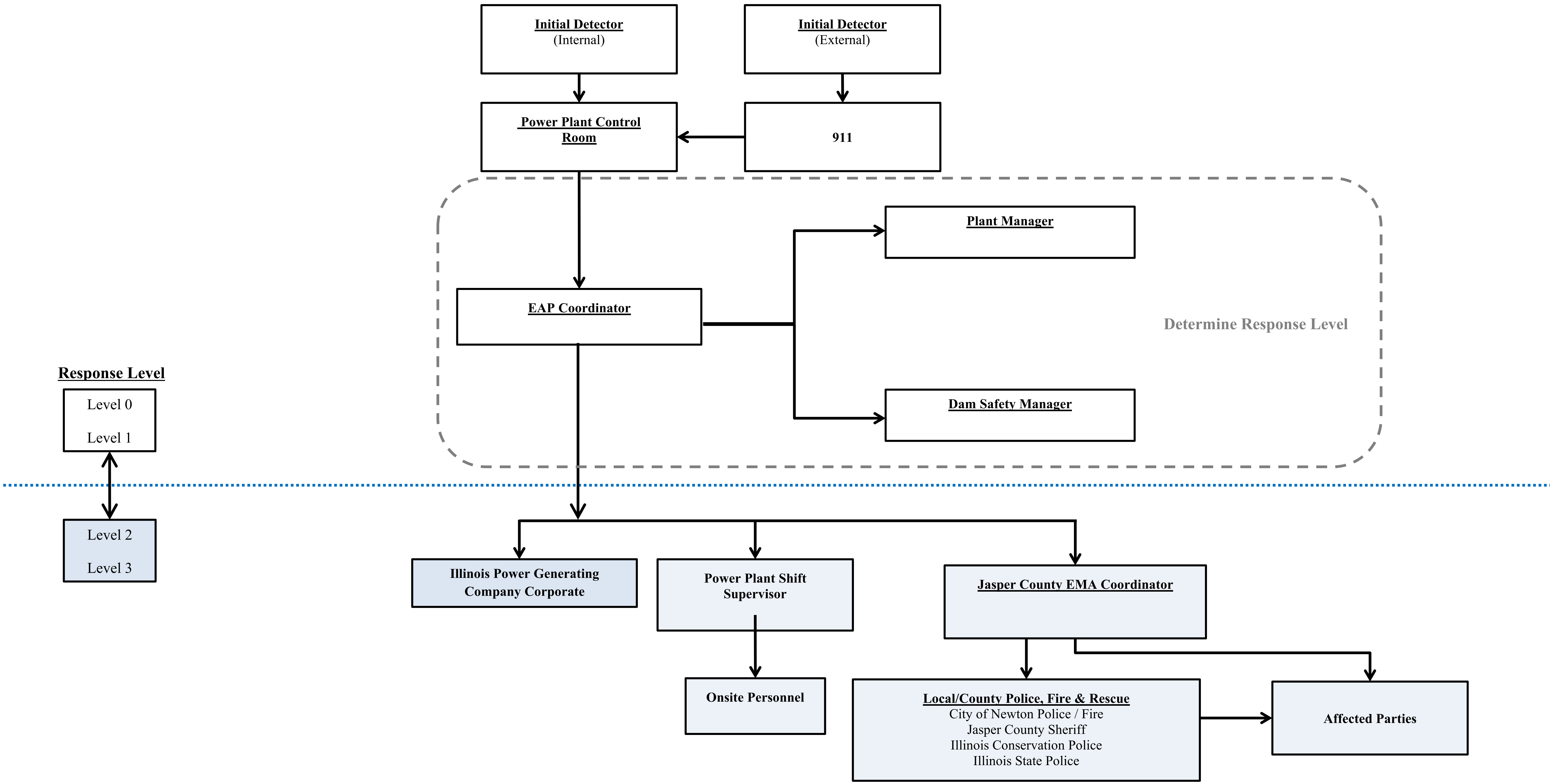


Figure 2-3. EAP Response Process Decision Tree

Note: At any given below, if failure is imminent or actively occurring **CALL 911 IMMEDIATELY** to notify emergency responders and then continue with process afterwards.

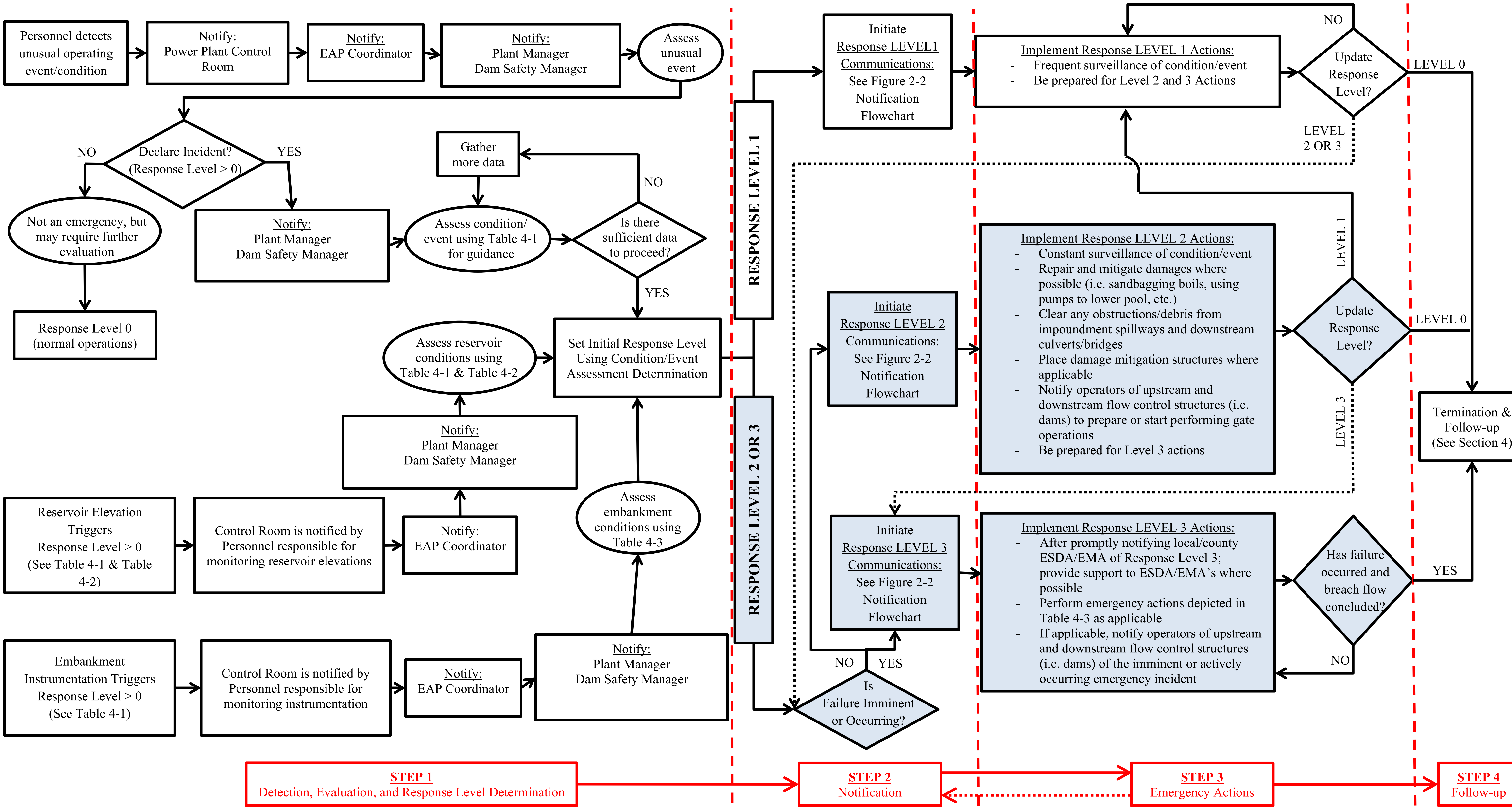


Table 2-1. EAP Emergency Responders

Position	Phone #
Internal Contacts	
Newton Power Plant	
Plant Manager	
EAP Coordinator	(618) 553-4444
Control Room	(618) 783-0501
Corporate Operations	
Dam Safety Manager	(618) 792-8488
External Contacts	
Local / County ESDA/EMA, Police, & Fire	
Jasper County ESDA/EMA	(618) 783-8123, (618) 554-2285
City of Newton Police Dept.	911, (618) 783-4500
City of Newton Fire Dept.	911, (618) 783-3887
Jasper County Sheriff Dept.	911, (618) 783-3057
State Emergency Management Agencies & Organizations	
IDNR-OWR Dam Safety Section Manager	(217) 782-4427
Newton Lake State Fish and Wildlife Area	(618) 783-3478
Illinois Conservation Police	(877) 236-7529
Illinois State Police	911, (618) 542-2171

3 EAP ROLES AND RESPONSIBILITIES

Table 3-1 provides a summary of the EAP roles during an emergency event.

Table 3-1. Summary of EAP Roles

Entity	Role Description
Emergency Response Team (ERT)	**ERT:** personnel responsible for EAP implementation, distribution, updates/maintenance, and training activities. The *ERT* is comprised of the following roles. 1. **Corporate:** corporate entity, committee, team, or position with relevant responsibility for a given generating power plant. 2. **Plant Manager:** Personnel responsible for day-to-day operation and management of the Power Plant. 3. **Dam Safety Manager:** Personnel that is most knowledgeable about the design and technical operation of facilities at a given power plant. 4. **EAP Coordinator:** Personnel responsible for implementing the EAP and associated activities. **Emergency Event – EAP Responsibilities** 1. Respond to emergencies at the Power Plant. 2. Verify and assess emergency conditions. 3. Notify and coordinate as appropriate with participating emergency services disaster agencies or emergency management agencies (ESDA/EMA's), emergency responders, regulatory agencies, and all other entities involved or affected by this EAP. 4. Take corrective action at the Power Plant. 5. Declare termination of emergencies at the Power Plant.
Jasper County ESDA/EMA	1. Receive Response Level reports from *Illinois Power Generating Company Corporate* through *EAP Coordinator*. 2. Coordinate emergency response activities with local authorities: police, fire, and rescue, etc. 3. Coordinate notification of public as necessary through established channels, which may include door-to-door contact. 4. Coordinate notification activities to affected parties within inundation areas. 5. Evaluate risk to areas beyond the inundation areas, communicate needs to the *Illinois Power Generating Company Corporate* and/or *EAP Coordinator*, and coordinate aid as appropriate. 6. Responsible for declaring termination of an emergency condition off-site upon receiving notification of an emergency status termination from the *Illinois Power Generating Company Corporate*. 7. If necessary, coordinate with *State ESDA/EMA*.
City of Newton Police, Fire, and Rescue	1. Receive alert status reports from the *ERT* or the *Jasper County ESDA/EMA*. 2. If necessary, notify affected parties and public within inundation areas (see Section 7). 3. Render assistance to Jasper County ESDA/EMA, as necessary. 4. Render assistance to *Illinois Power Generating Company Corporate and Power Plant Management*, as necessary.
Jasper County Police, Fire and Rescue, and Emergency Services	1. Receive alert status reports from the *ERT* or the *Jasper County ESDA/EMA*. 2. If necessary, notify affected parties within the inundation area. 3. Provide mutual aid to other affected areas, if requested and able.

4 EAP RESPONSE

The 4-Step Incident Response Process is shown in Figure 2-1. The Decision Tree shown in Figure 2-3 provides a flowchart for the various elements of the response process. Upon reaching Step 4 of the response process (termination and follow-up), the EAP Coordinator is responsible for notifying the ESDA/EMA's that the condition of the dam/impoundment has been stabilized. The purpose of this section is to provide specific information that can be used during a response. This information is provided in the following tables:

- Table 4-1 provides guidance for determining the response level.
- Table 4-2 provides impoundment pool level trigger elevations.
- Table 4-3 lists emergency actions to be taken depending on the situation.

Table 4-1. Guidance for Determining the Response Level

Event	Situation	Response Level
Spillway flow (See Table 4-2 for relevant elevations)	Primary spillway flow is not causing active erosion and impoundment water surface elevation is below auxiliary spillway crest elevation (if equipped).	Level 0
	Impoundment water surface elevation is at or above auxiliary spillway crest elevation (if equipped). No active erosion caused by spillway flow.	Level 1
	Spillway flow actively causing minor erosion that is not threatening the control section or dam/impoundment stability.	Level 2
	Spillway flow that could result in flooding of people downstream if the reservoir level continues to rise.	Level 2
	Abnormal operation of the spillway system due to blockage or damage that could lead to flooding.	Level 2
	Spillway flow actively eroding the soil around the spillway that is threatening the control section (e.g., undermining) or dam/impoundment stability.	Level 3
	Spillway flow that is flooding people downstream.	Level 3
Embankment overtopping (See Table 4-2 for relevant elevations)	Impoundment water surface elevation at or below typical normal pool fluctuation elevation.	Level 0
	Impoundment water surface elevation above typical normal pool fluctuation elevation.	Level 1
	Impoundment water surface elevation above high normal pool fluctuation elevation.	Level 2
	Impoundment water surface elevation at or above embankment crest elevation.	Level 3
Seepage	New seepage areas in or near the dam/impoundment with clear flow.	Level 1
	New seepage areas with cloudy discharge or increasing flow rate.	Level 2
	Heavy seepage with active erosion, muddy flow, and/or sand boils.	Level 3
Sinkholes	Observation of new sinkhole in impoundment area or on embankment.	Level 2
	Rapidly enlarging sinkhole and/or whirlpool in the impoundment.	Level 3

Table 4-1. Guidance for Determining the Response Level

Event	Situation	Response Level
Embankment cracking	New cracks in the embankment greater than ¼ inch wide without seepage.	Level 1
	Any crack in the embankment with seepage.	Level 2
	Enlarging cracks with muddy seepage.	Level 3
Embankment movement	Visual signs of movement/slippage of the embankment slope.	Level 1
	Detectable active movement/slippage of the embankment slope or other related effects (tension cracking, bulges/heaves, etc.) that could threaten the integrity of the embankment.	Level 2
	Sudden or rapidly proceeding slides of the embankment slopes.	Level 3
Embankment Monitoring Equipment (piezometers, inclinometers, surface displacement mounts, etc.)	Instrumentation readings beyond historic normal.	Level 1
	Instrumentation readings indicate the embankment is susceptible to failure.	Level 2
	Instrumentation readings indicate embankment is at threshold of failure or is currently failing.	Level 3
Earthquake or another event	Measurable earthquake felt or reported on or within 100 miles of the impoundment.	Level 1
	Earthquake or other event resulting in visible damage to the impoundment or appurtenances.	Level 2
	Earthquake or other event resulting in uncontrolled release of water or materials from the impoundment.	Level 3
Security threat	Verified bomb threat or other physical threat that, if carried out, could result in damage to the impoundment.	Level 2
	Detonated bomb or other physical damage that has resulted in damage to the impoundment or appurtenances.	Level 3
Sabotage/ vandalism	Damage to impoundment or appurtenance with no impact to the functioning of the impoundment.	Level 1
	Modification to the impoundment or appurtenances that could adversely impact the functioning of the impoundment. This would include unauthorized operation of spillway facilities.	Level 2
	Damage to impoundment or appurtenances that has resulted in seepage flow.	Level 2
	Damage to impoundment or appurtenances that has resulted in uncontrolled water release.	Level 3

Table 4-2. Impoundment Trigger Elevations

Impoundment	Embankment Crest Elevation	Auxiliary Spillway Crest Elevation	Normal Pool Fluctuation	
			Typical	High
Primary Ash Pond	554.0 feet	Not Applicable	534.0 ft.	537.0 ft.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
High Water Level/ Large Spillway Release	See Table 4-1 and Table 4-2 for elevations and triggering water levels associated with the impoundment and spillways covered by this EAP.	1. Assess cause of increased reservoir stage, especially during fair weather conditions. 2. Determine Response Level. 3. Make proper notifications as outlined in the Figure 2-2 Notification Flowchart. 4. Perform additional tasks as determined through consultation with the ERT. 5. Make notifications if condition worsens such that downstream flooding is imminent. **Response Level 0**: require enhanced surveillance 3 times per day **Response Level 1**: contact internal chain of command and external response partners as necessary; inspect impoundment minimum 1 time per hour **Response Level 2**: contact internal chain of command; notify ESDA/EMA's and notify external response partners. ESDA/EMA's notify affected parties. **Response Level 3**: contact internal chain of command; notify ESDA/EMA's and notify external response partners. ESDA/EMA's notify affected parties of emergency incident.
Seepage	Localized new seepage or boil(s) observed along downstream face / toe of earthen embankment with muddy discharge and increasing but controllable discharge of water.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 2. Determine Response Level. 3. Make proper notifications as outlined in the Figure 2-2 Notification Flowchart. 4. ERT (with Dam Safety Manager as lead) to determine mitigation actions. The following actions may apply: a) Place a ring of sandbags with a weir at the top towards the natural drainage path to monitor flow rate. If boil becomes too large to sandbag, place a blanket filter over the area using non-woven filter fabric and pea gravel. Attempt to contain flow in such a manner (without performing any excavations) that flow rates can be measured. Stockpile gravel and sand fill for later use, if necessary. b) Inspect the embankment and collect piezometer, water level and seepage flow data daily unless otherwise instructed by the Dam Safety Manager. Record any changes of conditions. Carefully observe embankment for signs of depressions, seepage, sinkholes, cracking or movement. c) Maintain continuous monitoring of feature. Record measured flow rate and any changes of condition, including presence or absence of muddy discharge.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
		5. Make notifications as outlined in the lower portion of the Notification Flowchart (Figure 2-2) if condition worsens such that failure is imminent.
Sabotage and Miscellaneous Other Issues	Criminal action with significant damage to embankment or structures where significant repairs are required and the integrity of the facility is compromised—condition appears stable with time.	1. Contact law enforcement authorities and restrict all access (except emergency responders) to impoundment. Restrict traffic on embankment crest to essential emergency operations only. 2. Determine Response Level. 3. Make internal notifications as outlined in the upper portion of the Notification Flowchart (Figure 2-2). 4. In conjunction with the Dam Safety Manager, assess extent of damage and visually inspect entire embankment and ancillary structures for additional less obvious damage. Based on inspection results, confirm if extent of damage to various components of the impoundment warrants a revised Response Level and additional notifications. 5. Perform additional tasks as directed by the ERT. 6. Make notifications if conditions worsen.
Embankment Deformation	**Cracks:** New longitudinal (along the embankment) or transverse (across the embankment) cracks more than 6 inches deep or more than 3 inches wide or increasing with time. New concave cracks on or near the embankment crest associated with slope movement.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 2. Restrict traffic on embankment crest to essential emergency operations only. 3. Determine Response Level. 4. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 5. ERT (with Dam Safety Manager as lead) to determine mitigation actions. The following actions may apply: a) Place buttress fill against base of slope immediately below surface feature. Stockpile additional fill. b) Place sandbags as necessary around crack area to divert any storm water runoff from flowing into crack(s). 6. As directed by the Dam Safety Manager, additional inspection and monitoring of the dam may be required. Items may include inspect the dam on a schedule determined by the Dam Safety Manager; collect piezometer and water level data; and record any changes of condition. Carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement. 7. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
Embankment Deformation (cont.)	**Slides / Erosion:** Deep slide / erosion (greater than 2 feet deep) on the embankment that may also extend beyond the embankment toe but does not encroach onto the embankment crest and appears stable with time.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection report. 2. Restrict traffic on embankment crest to essential emergency operations only. 3. Determine the Response Level. 4. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 5. ERT (with Dam Safety Manager as lead) to determine mitigation actions. Additional actions may include the following items. a) Place sandbags as necessary around slide area to divert any storm water runoff from flowing into slide(s). b) Increase inspections of the dam; collect piezometer and water level data; and record any changes of condition. During inspections, carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
		6. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
	Sinkholes: Small depression observed on the embankment or within 50 feet of the embankment toe that is less than 5 feet deep and 30 feet wide or which is increasing with time.	1. Slowly open drain gates to lower pool elevation. 2. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 3. Restrict traffic on embankment crest to essential emergency operations only. 4. Determine Response Level. 5. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 6. ERT (with Dam Safety Manager as lead) to determine mitigation actions. Additional actions may include the following items: a) Backfill the depression with relatively clean earth fill (free of organic materials) generally even with surrounding grade and slightly mounded (6 to 12 inches higher) in the center to shed storm water away from the depression. Stockpile additional fill. b) Increase inspections of the dam; collect piezometer and water level data daily unless otherwise instructed by Dam Safety Manager; and record any changes of condition. Carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement. 7. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
Gate Malfunction or Failure	Sluice gate damaged structurally (sabotage, debris, etc.) with uncontrolled release of water at a constant volume. Condition appears stable.	1. Close any other gates, if open. 2. Determine Response Level. 3. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 4. Obtain instructions from the Dam Safety Manager to determine if there are other methods to stop or slow down the flow of water. 5. If conditions worsen such that failure is imminent, make notifications as outlined in the lower portion of the Figure 2-2 Notification Flowchart.

5 PREPAREDNESS

The intent of this section is to provide information that will be utilized during a response. Established emergency supplies and locations, suppliers, and equipment are provided in Table 5-1. Suppliers contact information is listed in Table 5-2.

A coordination meeting shall be conducted annually between representatives of the Illinois Power Generating Company and local emergency responders. This meeting may be in the form of a face-to-face meeting, tabletop exercise, or additional training regarding the EAP.

Table 5-1. Emergency Supplies and Equipment

Item	On-site (Yes/No/Occasionally)	Remarks
Flashlights	Yes	Contact Shift Supervisor(s) for location and availability.
Generator	Yes	Contact Shift Supervisor(s) for location and availability.
Extension Cords	Yes	Contact Shift Supervisor(s) for location and availability.
Fire extinguishers	Yes	Contact Shift Supervisor(s) for location and availability.
Floodlights	Yes	Contact Shift Supervisor(s) for location and availability.
Backhoe		Contact Shift Supervisor(s) for location and availability.
Dozer	Yes	CAT D10R + CAT D9R
Large Equipment (Rental – including excavating equipment, pumps, lighting)		Contact Shift Supervisor(s) for location and availability.
Grader	Yes	CAT 14H
Track Hoe Excavator	Yes	CAT 330L
Scraper	Yes	637D Coal Scraper
Dump Truck	Yes	CAT 730 (30 Ton)
Pump and Hoses	Yes	Contact Shift Supervisor(s) for location and availability.
Sandbags and Sand		Contact Shift Supervisor(s) for location and availability.
Fill (Stone, aggregate, sand)	Yes	Contact Shift Supervisor(s) for location and availability.
Concrete/grout	No	Contact Shift Supervisor(s) for location and availability.
Geotextile Filter Fabric	Yes	2 rolls of 10-ounce, non-woven filter fabric (stock #4906798)
Plastic Sheeting		Contact Shift Supervisor(s) for location and availability.
Rope	Yes	Contact Shift Supervisor(s) for location and availability.
Personal Flotation Devices	Yes	Contact Shift Supervisor(s) for location and availability.

Table 5-2. Supplier Addresses

Supply / Rental Item(s)	Supplier Contact Information	Distance from Site (miles)	Address
Sandbags	NYP Corp.	125	1416 North Broadway, St. Louis, MO. 63102 800-331-2445 800-524-1052 (emergency)
Gravel, Sand, & Riprap	C & H Gravel	27	1682 Co. Rd. 1050 N., Greenup, IL 62428 (217) 849-2323
	Lawrence Gravel Inc.	41	Palestine, IL 62451 (618) 586-5433
Cement, Sand, Grout	Newton Ready-Mix Division	11	8560 IL-360, Newton, IL 62448 (618) 783-8611
Portable Pumps, Rental Equipment	Jensen Equipment Company	19	Newton, Illinois (888) 826-2048
	JJet Rental-Sales & Service	39	905 IL-49, Casey, IL 62420 (217) 932-9033
	RWCI Equipment Sales, Rentals & Services	32	10 Industrial Park, Flora, IL 62839 (618) 662-8941
	Senco Construction Inc.	36	1408 S. Eaton St., Robinson, IL 62454 (618) 546-1485
	Bahrns Equipment	23	1708 S. Banker St., Effingham, IL 62401 (217) 342-2909
Large Capacity Portable Pumps	Xylem / Godwin Pumps Mine Supply Co.	87	1703 Shawnee St., Mt. Vernon, IL 62864 (618) 242-2087
	Water Movers Equipment Rental	125	1800 S. 3rd Street, St. Louis, MO 63104 (636) 717-2220
General Hardware & Supply	Kirchner Building Center	11	401 E. Decatur St., Newton, IL 62448 (618) 783-2388
	Hurn Lumber Company	30	200 W. Butler St., Olney, IL 62450 (618) 395-8576

6 FACILITY / IMPOUNDMENT DESCRIPTION

The impoundment included in this EAP is described as follows and illustrated in Figure 1-2. Table 6-1 contains additional geometric details for the impoundment.

The Newton Power Plant is located on the west bank of Newton Lake in South Muddy Township, Jasper County, Illinois. The Power Plant is located approximately eight miles southwest of the Town of Newton, Illinois.

Primary Ash Pond: A diked earthen impoundment that extends over an area of approximately 400 acres. The crest of the impoundment is about 15 foot wide at an approximate elevation of 555.0 feet with an average adjacent ground elevation outside of the impoundment of about 530.0 feet. The pond has an operating pool about 268.8 acres in size, which currently has a water surface elevation of about 533.5 feet (the interior base of the pond is partially incised). The Primary Ash Pond discharges to the southwest through a concrete control structure to the Secondary Pond.

Table 6-1. Power Plant Impoundment Characteristics

Feature/Parameter	Primary Ash Pond
Maximum Embankment Height	42 feet
Length of Dam	16,600 feet
Crest Width	15 feet
Crest Elevation	554.0 feet
Reservoir Area at Top of Dam	400 acres
Storage Capacity at Top of Dam	9250 acre-feet
Primary Spillway Type	30-inch Coated CMP w/ Concrete Weir Box w/ Stop Logs
Primary Spillway Crest Elevation	533.5 feet
Storage Capacity at Primary Spillway Elevation	1753 acre-feet
Reservoir Area at Normal Water Surface Elevation	162.0 acres
Auxiliary Spillway Type	Secondary Weir Structure
Auxiliary Spillway Crest Elevation	536.0 feet

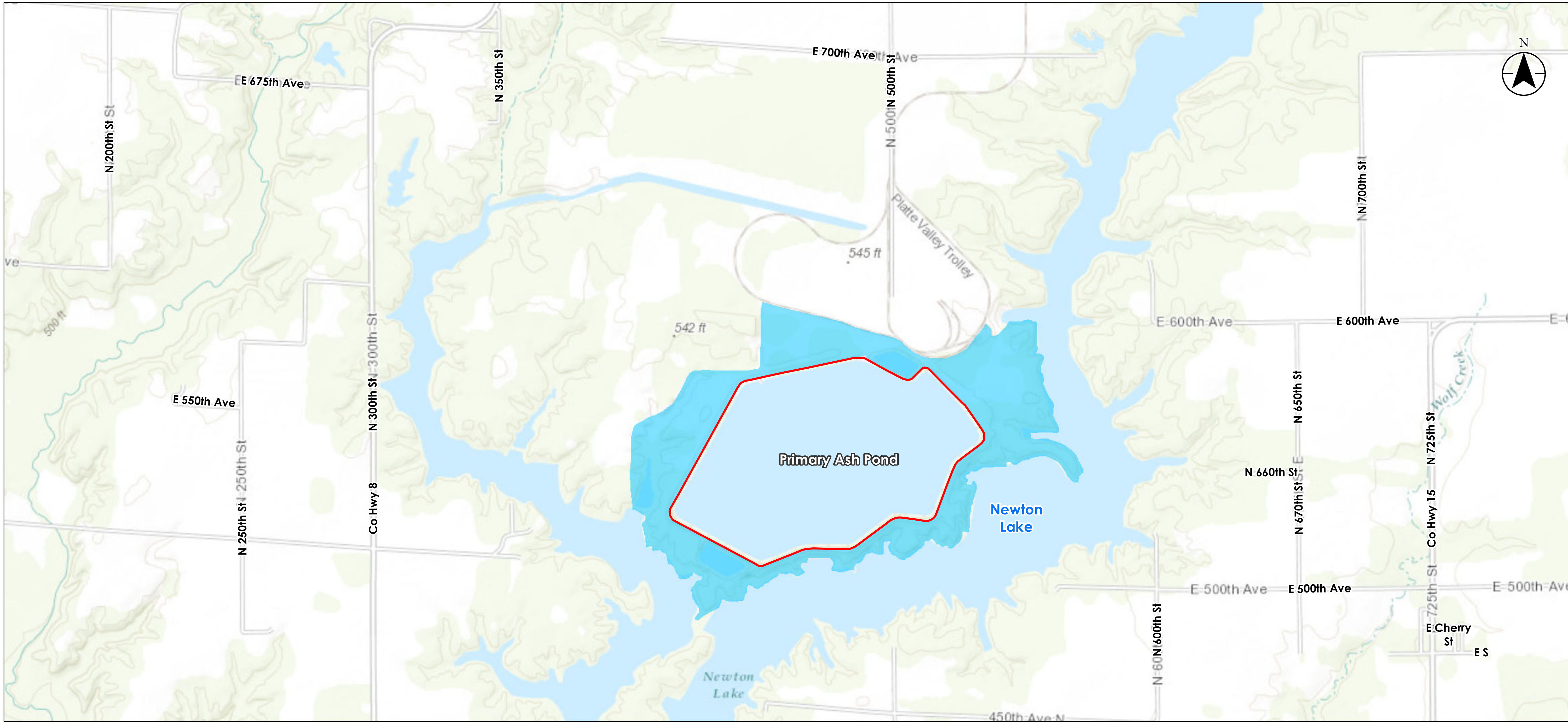
7 BREACH INUNDATION MAP AND POTENTIAL IMPACTS

An inundation map for a potential breach scenario of the Primary Ash Pond is provided as Figure 7-1. It is the Jasper County ESDA/EMA's responsibility to keep a current list of affected parties/properties to contact in the case of emergencies that result in Response Level 2 or 3. This list should encompass all properties within and adjacent to the probable inundation extents shown in the provided map.

The methodology used to identify probable inundation extents for potential breach scenarios varied as a function of the impoundment size, location, surrounding topography, and surrounding structures/facilities/waterbodies.

The methodology used to identify probable inundation extents for the Primary Ash Pond consisted of a visual assessment performed by comparing pond and embankment elevations to surrounding topography using LIDAR elevation data obtained from the Illinois Height Modernization Program. Additionally, an approximate volumetric comparison was evaluated to determine a potential breach of the Primary Ash Pond would not result in an immediate and significant rise in water surface elevations on Newton Lake.

The approximate inundation area is illustrated in Figure 7-1.



Legend

- CCR Surface Impoundment Boundary
- Expected Breach Inundation Area

0 0.5 1 Miles

1:31,680 (1" = 0.5 miles at original document size of 11x17)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Basemap Source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

St. Louis 175666013\...Appendix_B.mxd

Stantec DYNEGY

Project Location
Latitude: 38.936621
Longitude: -88.277038
Jasper County, Illinois

175666013
Prepared by EC on 2017-03-08
Technical Review by TS on 2017-03-27
Independent Review by MM on 2017-03-20

Client/Project
Newton Power Station
Emergency Action Plan

Figure No.
7-1

Title
Inundation Map
Primary Ash Pond

ATTACHMENT G

CCR Fugitive Dust Control Plan

for

Newton Power Plant

Prepared for:

Illinois Power Generating Company

Newton Power Plant
6725 North 500th Street
Newton, IL 62448

Prepared by:

Burns & McDonnell
Kansas City, Missouri

Amendment 1

October 2021

Table of Contents

List of Tables

1 Introduction

This Coal Combustion Residuals (CCR) fugitive dust control plan has been prepared for the Newton Power Plant, located in Jasper County, Illinois. This plan addresses the air criteria in 40 C.F.R. § 257.80 of the United States Environmental Protection Agency's CCR rule, which requires the owner or operator of a CCR unit to "adopt measures that will effectively minimize CCR from becoming airborne at the facility" and to "prepare and operate in accordance with a CCR fugitive dust control plan." The plan also addresses the air criteria in 35 I.A.C. 845.500 of the Illinois Environmental Protection Agency's CCR rule which contains similar requirements to the federal CCR rule.

1.1 Facility Information

- Facility Name: Newton Power Plant
- Facility Address: 6725 North 500th Street, Newton, IL 62448
- Owner/Operator: Illinois Power Generating Company

1.2 Certification

The owner or operator must obtain a certification from a qualified professional engineer that the initial CCR fugitive dust control plan, or any subsequent amendment of it, meets the requirements of 40 C.F.R. § 257.80 and 35 I.A.C. 845.500. See 40 C.F.R. § 257.80(b)(7); 35 I.A.C. 845.500(b)(7).

I certify under penalty of law that, to the best of my knowledge, this plan meets the requirements of 40 C.F.R. § 257.80 and 35 I.A.C. 845.500. This certification is based on my review of the document and conditions at the site and on my inquiry of the person or persons who managed the preparation of this document.

John R. Hesemann
Printed Name of Qualified Professional Engineer

9/09/2021
Signature of Qualified Professional Engineer and Date

062.058523 – Illinois – Expires 11/30/2021
Registration Number and State

JOHN ROBERT HESEMANN
062-058523
LICENSED PROFESSIONAL ENGINEER OF
ILLINOIS

2 CCR Fugitive Dust Control Measures and Appropriateness

CCR fugitive dust has the potential to become airborne at the facility during periods of CCR management in the CCR units, CCR handling and CCR transport. Areas at the facility that have the potential for airborne CCR fugitive dust are CCR surface impoundments, a CCR landfill, CCR handling equipment and CCR transport in trucks. This section identifies and describes the control measures selected and adopted by the facility to minimize CCR from becoming airborne at the facility and explains how the selected measures are applicable and appropriate for site conditions. The control measures may be adjusted or modified based on observed effectiveness of minimizing CCR from becoming airborne and weather conditions.

2.1 Management of CCR in the CCR Units

The facility manages CCR in a surface impoundment and landfill located at the facility. Table 2-1 below identifies CCR fugitive dust control measures that have been selected for use by the facility during CCR management in the CCR units, including placement of CCR into the CCR unit, and explains how the selected measures are applicable and appropriate for site conditions. The facility will use the identified measures during CCR management in the CCR units to minimize CCR from becoming airborne at the facility.

CCR Activity	CCR Fugitive Dust Control Measure	Applicability and Appropriateness of Control Measure
Management of CCR in the facility's CCR units	Condition CCR to be emplaced in the landfill before loading into vehicles for transport to the landfill.	Conditioning CCR to be placed in the landfill allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation when CCR is managed in the landfill. The added moisture content will prevent wind dispersal of the CCR but will not result in free liquids.
	Apply cover to exposed material in the landfill.	Applying approved cover material, such as conditioned fly ash, minimizes wind entrainment of CCR material.
	Wet management of CCR bottom ash and CCR fly ash in CCR surface impoundments.	Wet management of CCR minimizes the potential for CCR fugitive dust generation.
	Water areas of exposed CCR in CCR units, as necessary.	Water will be applied to areas of exposed CCR to maintain moisture content to minimize the potential for CCR fugitive dust generation in excessively dry or windy conditions. Wetting activities will not generate "free liquids" within the landfill.
	Naturally occurring grass vegetation in areas of exposed CCR in CCR surface impoundments.	Vegetation provides a wind screen and/or cover and reduces wind entrainment of CCR.
	Reduce or halt operations during high wind events, as necessary.	Reducing or halting operations during high wind events minimizes the potential for CCR fugitive dust generation.

Table 2-1. Control Measures for CCR Management in CCR Units

2.2 Handling of CCR

CCR is regularly removed from the boiler system and conveyed to the CCR handling system, which includes silos and truck loading areas. CCR fly ash is pneumatically conveyed in an enclosed system from the precipitator hoppers to storage silos. CCR bottom ash and CCR fly ash are wet sluiced into CCR surface impoundments. Prior to transport, dry fly ash is loaded into trucks from CCR fly ash silos utilizing a telescoping chute. When unloading the CCR fly ash silos for transport to and emplacement in the CCR landfill, a mixer is used to condition the CCR fly ash as it is loaded into trucks. Table 2-2 below identifies CCR fugitive dust control measures that have been selected for use by the facility during handling of CCR and explains how the selected measures are applicable and appropriate for site conditions. The facility will use the identified measures when handling CCR to minimize CCR from becoming airborne at the facility.

CCR Activity	CCR Fugitive Dust Control Measure	Applicability and Appropriateness of Control Measure
Handling of CCR at the facility	Wet sluice CCR bottom ash and fly ash to CCR surface impoundments.	Wet sluicing CCR minimizes the potential for CCR fugitive dust generation.
	Pneumatically convey dry CCR fly ash to storage silos in an enclosed system.	Conveying CCR fly ash in an enclosed system minimizes the potential for CCR fugitive dust generation.
	Condition CCR fly ash to be emplaced in the landfill before loading it into trucks for transport to the landfill.	Conditioning allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation while loading CCR into trucks (and during transport and emplacement in the landfill).
	Condition CCR materials to be transported offsite before they are loaded into trucks, as necessary.	Conditioning allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation while loading CCR into trucks (and during transport and emplacement in the landfill).
	Load CCR transport trucks from the CCR fly ash silos in a partially enclosed area.	Partial enclosure of the CCR transport truck loading area reduces the potential for wind to cause CCR fugitive dust to become airborne.
	Load CCR transport trucks from the CCR fly ash silos using a telescoping chute, when applicable.	Use of a telescoping chute while loading dry CCR fly ash reduces the drop height from the end of the chute into the truck and minimizes the potential for CCR fugitive dust to become airborne.
	Perform housekeeping, as necessary, in the fly ash loading area.	Good housekeeping measures, such as sweeping or wetting the loading area, minimizes the potential for CCR fugitive dust generation during handling activities.
	Operate fly ash handling system in accordance with good operating practices.	Operation in accordance with good operating practices minimizes the potential for CCR fugitive dust generation.
	Maintain and repair as necessary dust controls on the fly ash handling and truck load-out system.	Performing maintenance and repairs as needed to maintain dust controls in good operating condition minimizes the potential for CCR fugitive dust generation.
	Reduce or halt operations during high wind events, as necessary.	Reducing or halting operations during high wind events minimizes the potential for CCR fugitive dust generation.

Table 2-2. Control Measures for Handling CCR

2.2.1 Conditioning of CCR Prior to Emplacement in CCR Landfill

Conditioned CCR is CCR that has been wetted with water or an appropriate chemical dust suppressant. Water or a chemical dust suppressant is added to raise the moisture content of the CCR to prevent wind dispersal but will not result in free liquids. Conditioning allows for the CCR to bind together, which minimizes the potential for CCR fugitive dust.

All CCR generated on site that is placed into the facility’s landfill, as well as CCR generated offsite that is authorized for placement in the facility’s landfill, is conditioned in a mixer or otherwise conditioned prior to loading into trucks for transport to the landfill. Therefore, all CCR that is added to the facility’s landfill is emplaced in the landfill as conditioned CCR.

2.3 Transportation of CCR

CCR is transported via truck at the facility using unpaved facility roads. Table 2-3 below identifies CCR fugitive dust control measures that have been selected for use by the facility during transport of CCR. The facility will use the identified measures when transporting CCR to minimize CCR from becoming airborne at the facility.

CCR Activity	CCR Fugitive Dust Control Measure	Applicability and Appropriateness of Control Measure
Transportation of CCR at the facility	Condition CCR to be emplaced in the landfill before loading it into vehicles for transport to the landfill.	Conditioning CCR increases moisture content of the CCR and minimizes the potential for CCR fugitive dust generation during CCR transport (and emplacement in the landfill).
	Condition CCR materials to be transported offsite before they are loaded into trucks, as necessary.	Conditioning allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation while loading CCR into trucks and during transport.
	Cover or enclose trucks used to transport CCR material, as necessary.	Covering or enclosing trucks transporting CCR on facility CCR haul roads minimizes the potential for CCR fugitive dust generation from the CCR transport trucks.
	Limit the speed of vehicles to no more than 15 mph on facility roads.	Limiting the speed of vehicles traveling on facility roads minimizes the potential for CCR fugitive dust generation from the CCR transport trucks.
	Sweep or rinse CCR off of the outside of the trucks transporting CCR, as necessary.	Removing CCR present on the outside of the truck minimizes the potential for movement of the truck or wind to cause CCR fugitive dust to become airborne.
	Remove CCR, as necessary, deposited on facility road surfaces during transport.	Removing CCR deposited on facility road surfaces as a result of transport minimizes the potential for CCR fugitive dust generation from vehicle traffic.
	Condition CCR haul roads with water or dust suppressant, as necessary.	Watering CCR haul roads minimizes the potential for dust generation to occur as a result of CCR hauling traffic and heavy equipment use.
	Reduce or halt operations during high wind events, as necessary.	Reducing or halting operations during high wind events minimizes the potential for CCR fugitive dust generation.

Table 2-3. Control Measures for Transportation of CCR

3 Procedures for Periodic Assessment of Effectiveness of the Plan

The facility conducts inspections associated with CCR fugitive dust control. The facility also uses the procedures identified in section 5 of this plan to log every citizen complaint involving CCR fugitive dust events at the facility. These inspections and the investigations of citizen complaints will be used to periodically assess the effectiveness of the CCR fugitive dust control plan per 40 C.F.R. § 257.80(b)(4) and 35 I.A.C. 845.500(b)(3).

The facility routinely performs inspections to verify the effectiveness of the CCR fugitive dust control measures used at the facility. Inspections are conducted during daylight working hours and include observing for the presence of CCR fugitive dust emissions from vehicles transporting CCR on facility roads, CCR handling and CCR management activities, including CCR placement in CCR units. Inspection records include information such as the name of the person conducting the inspection, the date and time of the inspection, the results of the inspection, and any corrective action taken.

When a CCR fugitive dust event is observed or a citizen complaint involving a CCR fugitive dust event at the facility is received, current CCR management practices will be reviewed to see that the selected control measures are being properly implemented. If the control measures are not being properly implemented, relevant operating personnel will be notified and, as warranted, re-trained in the proper implementation of CCR fugitive dust control measures. If appropriate, use of revised and/or additional control measures will be evaluated. As warranted, revised and/or additional control measures found to be applicable and appropriate to control CCR fugitive dust emissions will be incorporated into an amended CCR fugitive dust control plan.

The plan also will be reassessed in the event of material changes in site conditions potentially resulting in CCR fugitive dust becoming airborne at the facility.

4 Recordkeeping, Notification, Internet Site

The written CCR fugitive dust control plan, any amendment of the written plan, and the annual CCR fugitive dust control report required by 40 C.F.R. § 257.80(c) and 35 I.A.C. 845.500(c) will be placed in the facility's written operating record and posted to the company's CCR website in accordance with 40 C.F.R. § 257.105(g), § 257.107(g) and 845.800(d)(7), (14) and 845.810(e). Notification of the availability of the CCR fugitive dust control plan, any amendment of the plan, and the annual CCR fugitive dust control report will be provided to IEPA in accordance with 40 C.F.R. § 257.106(g). Any amendment of the fugitive dust control plan will be submitted to IEPA in accordance with 845.500(b)(5).

Additionally, pursuant to 845.500(b)(6), this fugitive dust control plan is being placed in facility's operating record and posted to the company's CCR website prior to the submission of any permits for the Newton Power Plant.

5 Procedures to Log Citizen Complaints

In the event the owner or operator of the facility receives a citizen complaint involving a CCR fugitive dust event at the facility, relevant information about the complaint will be logged. Information that will be recorded includes, as applicable:

– Date/Time the complaint is received
– Date/Time and duration of the CCR fugitive dust event
– Description of the nature of the CCR fugitive dust event
– Name of the citizen entering the complaint
– Address & phone number of citizen entering the complaint
– Name of the personnel who took the complaint
– All actions taken to assess and resolve the complaint

All citizen complaints involving CCR fugitive dust events at the facility will be investigated promptly. As deemed appropriate or necessary, corrective measures will be taken and a follow-up response will be provided to the complainant.

Pursuant to 35 I.A.C. 845.500(b)(2), quarterly reports will be submitted to IEPA no later than 14 days from the end of the quarter for all complaints received in that quarter. At a minimum, the quarterly report will include the date of the complaint, the date of the complainant (if given), and all actions taken to assess and resolve the complaint.

6 Amendments

The written CCR fugitive dust control plan may be amended at any time provided the revised plan is placed in the facility's operating record as required by 40 C.F.R. § 257.105(g)(1) and 845.500(b)(6). Any amendment of the fugitive dust control plan will be submitted to IEPA in accordance with 845.500(b)(5). The written CCR fugitive dust control plan must be amended whenever there is a change in conditions that would substantially affect the written plan in effect.

Amendment Number and Date	Pages or Section	Description of Amendment	Professional Engineer Certifying Plan
Version 0 October 2015	--	Initial Plan	Wendy M. Pennington
Amendment 1 October 2021	Various	Administrative changes and adjustments to site condition controls as appropriate.	John R. Hesemann

Table 6-1. CCR Fugitive Dust Control Plan Amendments

ATTACHMENT H

Intended for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-008

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

Bright ideas. Sustainable change.

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT NEWTON POWER PLANT PRIMARY ASH POND

Project Name	**Newton Power Plant Primary Ash Pond**
Project No.	**1940100806-008**
Recipient	**Illinois Power Generating Company**
Document Type	**Hydrogeologic Site Characterization Report**
Revision	**FINAL**
Date	**October 25, 2021**

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CONTENTS

TABLES (WITHIN TEXT)

TABLES (ATTACHED)

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
CCR	coal combustion residuals
cm/s	centimeters per second
CSM	conceptual site model
bgs	below ground surface
ESRI	Environmental Systems Research Institute
ft/day	feet/day
ft/ft	feet per feet
ft/mi	feet per mile
g	horizontal acceleration
GMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standard
HCR	Hydrogeologic Site Characterization Report
HMP	Hydrogeologic Monitoring Plan
HUC	Hydraulic Unit Code
ID	identification
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
ILWATER	ISGS Illinois Water and Related Wells
IPGC	Illinois Power Generating Company
ISGS	Illinois State Geological Survey
ISWS	Illinois State Water Survey
LCU	Lower Confining Unit
LF 1	Phase 1 Landfill
LF 2	Phase 2 Landfill
LVW	Low Volume Wastewater
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
NPDES	National Pollutant Discharge Elimination System

NPP	Newton Power Plant
NRT	Natural Resource Technology, Inc.
OBG	O'Brien and Gere Engineers, Inc.
PAP	Primary Ash Pond
Part 845	Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845
pcf	pounds per cubic foot
pCi/L	picocuries per liter
PMP	Potential Migration Pathway
PWS	Public Water Supply
Ramboll	Ramboll Americas Engineering Solutions, Inc.
Rapps	Rapps Engineering and Applied Science
RCRA	Resource Conservation and Recovery Act of 1976
SI	surface impoundment
Site	Primary Ash Pond
SSURGO	Soil Survey Geographic
SU	standard units
TDS	total dissolved solids
UCU	upper confining unit
UD	upper drift
USEPA	United States Environmental Protection Agency
USCS	Unified Soil Classification System
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

EXECUTIVE SUMMARY

This Hydrogeologic Site Characterization Report (HCR) for the Primary Ash Pond (PAP) at Newton Power Plant (NPP) expands upon the hydrogeology, groundwater quality data, and conceptual site model (CSM) presented in previous hydrogeologic investigation reports prepared for the PAP. This report has been assembled to satisfy the information and analysis requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.620 as summarized in **Table ES-1**. The CSM includes hydrogeologic and groundwater quality data specific to the PAP, which has been collected between 2015 and 2021. The PAP (Vistra identification [ID] number [No.] 501, Illinois Environmental Protection Agency [IEPA] ID No. W0798070001-01, and National Inventory of Dams [NID] No. IL50719) is located at the NPP which is located in Newton, Illinois (**Figure 1-1**).

The PAP is located south of the power plant and situated in a predominantly agricultural area. The PAP is surrounded by Newton Lake on the west, south, and east. Beyond the lake is additional agricultural land. Three coal combustion residuals (CCR) units are present on the NPP property, including the PAP and two landfills: the Phase 1 Landfill (LF 1) is located northwest and west of the PAP, and the Phase 2 Landfill (LF 2) is located west of the PAP. The PAP is located in Section 26 and the western half of Section 25, Township 6 North, Range 8 East.

In addition to the CCR present in the PAP, there are six layers of unlithified material present above the bedrock, these materials were categorized into four hydrostratigraphic units in this report, presented below in descending order:

- **Upper Drift (UD)/Potential Migration Pathway (PMP):** The UD is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member (*i.e.,* PMP).
  - **Hagarstown Member/PMP:** The Hagarstown Member consists of discontinuous sandier deposits of the UD, where present, and overlies the Vandalia Till.
- **Upper Confining Unit (UCU):** This unit consists of the low permeability clay and silt of the Vandalia Till.
- **Uppermost Aquifer:** This unit is composed of the Mulberry Grove Formation, which onsite has been classified as poorly graded sand, silty sand, clayey sand, and gravel.
- **Lower Confining Unit (LCU):** This unit is comprised of low permeability silt and clay of the Smithboro Till (Smithboro Till) and the Banner Formation.

Groundwater migrates downward through the UD and UCU into the uppermost aquifer. Groundwater in the uppermost aquifer flows from north to south/southwest and converges near a former drainage feature located west of the PAP. Groundwater elevations vary seasonally, although generally less than one foot per year. The surface water elevation at Newton Lake (at location SG02) measured between February 15 and March 9, 2021 ranged from 504.42 to 504.84 feet North American Vertical Datum of 1988 (NAVD88). Groundwater elevations in the uppermost aquifer at downgradient wells were observed around 491 feet NAVD88 (approximately 15 feet lower than the Lake elevation). The separation between measured groundwater elevations and Lake elevations (and observed downward vertical gradients) indicates groundwater does not flow into Newton Lake from the uppermost aquifer.

Part 845 parameters were monitored in uppermost aquifer and PMP monitoring wells as part of groundwater quality evaluations performed between 2015 and present. These data were supplemented with installation and sampling of additional locations in 2021. The results indicate that the following parameters were detected at concentrations greater than the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Arsenic at six uppermost aquifer wells, including downgradient wells APW08, APW09, APW15, and APW16 and background wells APW05 and APW06.
- Chloride at upgradient UD well APW05S and downgradient uppermost aquifer well APW15.
- Cobalt at PMP well APW12.
- Fluoride at downgradient uppermost aquifer well APW15 and APW18.
- Lead at downgradient uppermost aquifer wells APW08, APW11, and APW18.
- Lithium at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and two downgradient uppermost aquifer wells APW13 and APW14.
- pH values below the lower range of the GWPS were observed at four PMP wells APW02, APW03, APW04, APW12; one background UA well APW06; and two downgradient uppermost aquifer wells APW11 and APW13.
- Radium 226 and 228 combined at downgradient uppermost aquifer well APW16.
- Sulfate at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and one downgradient uppermost aquifer well APW10
- Thallium at one background well APW06, and two downgradient uppermost aquifer wells APW11 and APW18.
- Total dissolved solids (TDS) at four PMP wells APW02, APW03, APW04, and APW12; and one upgradient UD well APW05S.

Concentration results for the above parameters were compared directly to 35 I.A.C. § 845.600 GWPS to determine potential exceedances. Potential exceedances include results reported during the background groundwater monitoring or prior period that are greater than the GWPS. The results are considered potential exceedances because the results were compared directly to the standard and did not include an evaluation of background groundwater quality and the statistical methodologies proposed in the groundwater monitoring plan (GMP) provided in the Operating Permit application. Exceedances will be determined following IEPA approval of the GMP.

TABLE ES-1. PART 845 REQUIREMENTS CHECKLIST

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

NEWTON POWER PLANT

PRIMARY ASH POND

NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in HCR
845.620(b)	**The hydrogeologic site characterization shall include but not be limited to the following:**	--
845.620(b)(1)	Geologic well logs/boring logs;	Table 3-1 Figure 3-1 Appendix C
845.620(b)(2)	Climatic aspects of the site, including seasonal and temporal fluctuations in groundwater flow;	Sections 3.2.4 & 3.3.1 Figures 3-3 to 3-4
845.620(b)(3)	Identification of nearby surface water bodies and drinking water intakes;	Sections 3.3.2 & 5.2 Appendix B
845.620(b)(4)	Identification of nearby pumping wells and associated uses of the groundwater;	Section 5.1 Appendix B
845.620(b)(5)	Identification of nearby dedicated nature preserves;	Section 5.3 Appendix B
845.620(b)(6)	Geologic setting;	Section 2 Figures 2-1 to 2-5
845.620(b)(7)	Structural characteristics;	Section 2.4.3 Figure 2-4
845.620(b)(8)	Geologic cross-sections;	Figures 2-6 through 2-8
845.620(b)(9)	Soil characteristics;	Section 2.3 Figure 2-2 Tables 2-1 & 2-4

TABLE ES-1. PART 845 REQUIREMENTS CHECKLIST
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in HCR
845.620(b)(10)	Identification of confining layers;	Section 3.2.1
845.620(b)(11)	Identification of potential migration pathways;	Section 3.2.1
845.620(b)(12)	Groundwater quality data;	Section 4.2 Table 4-1
845.620(b)(13)	Vertical and horizontal extent of the geologic layers to a minimum depth of 100 feet below land surface, including lithology and stratigraphy;	Section 2.5 Figures 2-6 to 2-8
845.620(b)(14)	A map displaying any known underground mines beneath a CCR surface impoundment;	Section 2.4.5 Appendix B
845.620(b)(15)	Chemical and physical properties of the geologic layers to a minimum depth of 100 feet below land surface;	Section 2.5 Tables 2-1, 2-2, & 2-4 Appendix E
845.620(b)(16)	Hydraulic characteristics of the geologic layers identified as migration pathways and geologic layers that limit migration, including:	Sections 3.2.4.1, 3.2.5, & 3.2.6 Tables 3-2 to 3-4 Appendix F
845.620(b)(16)(A)	water table depth;	Section 3.2.4 Figures 3-3 & 3-4
845.620(b)(16)(B)	hydraulic conductivities;	Section 3.2.5 Table 3-3 Appendix F

TABLE ES-1. PART 845 REQUIREMENTS CHECKLIST
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in HCR
845.620(b)(16)(C)	effective and total porosities;	Section 2.5 Table 2-1
845.620(b)(16)(D)	direction and velocity of groundwater flow; and	Sections 3.2.4 & 3.2.6 Tables 3-2 & 3-4 Figures 3-3 & 3-4
845.620(b)(16)(E)	map of the potentiometric surface;	Figures 3-3 & 3-4
845.620(b)(17)	Groundwater classification pursuant to 35 I.A.C. § 620	Section 3.2.7

[O: EDP 08/23/21, U: SSW 9/1/21, C: LDC 09/21/21]

Notes:
35 I.A.C. § 620 = Title 35 of the Illinois Administrative Code, Part 620
HCR = Hydrogeologic Characterization Report
-- = reference to main regulation

1. INTRODUCTION

1.1 Overview

In accordance with requirements of the Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (SIs): 35 I.A.C. § 845 (Part 845) (IEPA, April 15, 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this HCR on behalf of NPP (**Figure 1-1**), operated by Illinois Power Generating Company (IPGC). This report will apply specifically to the CCR Unit referred to as the PAP. However, information gathered to evaluate other CCR units at the NPP regarding geology, hydrogeology, and groundwater quality is included, where appropriate. The PAP is a 404-acre unlined CCR SI used to manage stormwater runoff, bottom ash, fly ash, low-volume wastewater (LVW) from the plant's two coal-fired boilers. The PAP discharges into the Secondary Pond, which is used to clarify process water prior to discharge in accordance with the plants National Pollutant Discharge Elimination System (NPDES) permit (No. IL0049191) at the NPP. This HCR includes Part 845 content requirements specific to 35 I.A.C. § 845.620(b) (Hydrogeologic Site Characterization) for the PAP at NPP.

1.2 Part 845 Description

CCR is commonly referred to as coal ash, and CCR SIs are commonly referred to as coal ash ponds. Part 845 contains comprehensive rules for the design, construction, operation, corrective action, closure, and post closure care of these SIs. This rule includes GWPSs applicable at the waste boundary at each CCR SI and requires each owner or operator to monitor groundwater. IEPA's rule includes a permitting program as well as all federal standards for CCR SIs promulgated by the United States Environmental Protection Agency (USEPA). In addition, IEPA's rule includes procedures for public participation, closure alternatives analyses, and closure prioritization, and provides access to records via public website. The rules also include financial assurance requirements for CCR SIs.

A checklist which identifies the specific requirements of 35 I.A.C. § 845.620 is included in **Table ES-1**. The table provides references to sections, tables, and figures included in this document to locate the information that meets specific requirements of 35 I.A.C. § 845.620.

1.3 Previous Investigations and Reports

Numerous hydrogeologic investigations have been performed concerning the CCR Units located at the NPP. The information presented in this HCR includes comprehensive data collection and evaluations from prior hydrogeologic investigation reports (most recent to oldest), including, but not limited to, the following:

- ***Hanson, 2019, Phase 1 Ash Landfill Annual Report, Newton Power Station, Jasper County, Illinois.*** An annual report to provide groundwater and leachate monitoring results for 2019 and proposed activities for 2020, pursuant to 35 I.A.C. § 813.504 and Permit Condition III. Report includes monitoring data, graphical results, and a summary of modifications or changes to the monitoring program.
- ***O'Brien & Gere Engineers, Inc. (OBG), 2017, Hydrogeologic Monitoring Plan, Newton Power Station, Canton, Illinois.*** Although the title refers to Canton, Illinois, the subject of the report is the NPP. The Hydrogeologic Monitoring Plan (HMP) was prepared to provide background information necessary to support the monitoring well network established for development of the Sampling and Analysis Plan requirements of the USEPA Final Rule to

regulate the disposal of CCR as solid waste under Subtitle D of the Resource Conservation and Recovery Act of 1976 (RCRA) for the NPP. The HMP provides site geology and hydrogeology, aquifer properties, and monitoring network placement and rationale.

- ***AECOM, 2016, History of Construction, Newton Power Station, Newton, Illinois.*** This is a construction history compiled to fulfill Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.73(c)(1), which requires that the owner/operator of an existing CCR SI that either (1) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) has a height of 20 feet or more, compile a history of construction that contains, to the extent feasible, the information specified in 40 C.F.R. § 257.73(c)(1)(i) through (xii). The history of construction was based on existing documentation; AECOM's document review included record drawings, geotechnical investigations, etc., for the PAP.
- ***Natural Resource Technology, Inc. (NRT), April 10, 2013, Hydrogeological Assessment Report, Revision 1, Newton Energy Center, Jasper County, Illinois.*** In 2009, Ameren (the former owner/operator) commissioned a hydrogeologic study, water well survey, development of a GMP, and an initial groundwater quality assessment. This report summarizes hydrogeologic information pertinent to the Site, evaluates groundwater quality data to determine if groundwater has been affected adversely, and determines the potential for off-site migration and for potential groundwater receptors in the event of such a migration.
- ***Geotechnology, Inc., February 8, 2011, Initiation of Monitoring Report, Ameren, Newton Power Station, Newton, Illinois.*** This report documents the results of the monitoring well installation and groundwater monitoring activities performed at the Site. Three wells were installed, developed, and sampled.
- ***Rapps Engineering and Applied Science (Rapps), November 2009, Site Characterization and Groundwater Monitoring Plan for CCP Impoundment, Ameren Energy Generating Company, Newton Power Station, Jasper County, Illinois.*** Hydrogeologic study and GMP to assess the potential for constituent migration from this impoundment. Includes an assessment of subsurface hydrogeologic conditions at the Site, identification of private, potable water wells and oil and gas wells within 2,500 feet of the facility, public water supply (PWS) wells within 10 miles of the facility, and plans for a groundwater monitoring well network designed to characterize and monitor groundwater quality.
- ***Rapps, 1997, Hydrogeologic Investigation and Groundwater Monitoring Program, Newton Power Station, Jasper County, Illinois.*** Investigation presents site-specific data obtained through the completion of approximately 40 borings, 20 monitoring wells, and review of regional information and an evaluation of subsurface data from nearby residential wells. Part of Application for Landfill Permit.

A GMP is being prepared for the PAP in conjunction with this report and is included in the Operating Permit to which this Report is attached.

1.4 Site Location and Background

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately seven miles southwest of the town of Newton (**Figure 1-1**). The PAP is located in Section 26 and the western half of Section 25, Township 6 North, Range 8 East. The PAP is located south of the power plant and situated in a predominantly agricultural area. The PAP is surrounded by Newton Lake on the west, south, and east. Beyond the lake is additional agricultural land. LF 1 is located northwest and west of the PAP, and LF 2 is located west of the PAP (**Figure 1-2**). The PAP is the subject of this report and will hereafter be referred to as the Site in this document.

1.5 Site History and Unit Description

The PAP was constructed in 1977 and has a design capacity of approximately 9,715 acre-feet. There is also a non-CCR 83.6 acre-feet Secondary Pond located immediately south of the PAP. The PAP has a surface area of 404 acres and the Secondary Pond has an area of 9.3 acres. The PAP currently receives bottom ash, fly ash, and LVW from the plant’s two coal-fired boilers. The SI is operated per NPDES Permit No. IL0049191, Outfall 001 (located at the Secondary Pond). Areas within the impoundment were excavated during construction for native materials used to build the containment berms. In 2014, three areas along the interior berm were re-graded and covered with riprap (AECOM, 2016).

2. REGIONAL AND LOCAL GEOLOGY

2.1 Topography

The embankments surrounding the PAP are at an elevation of approximately 550 feet NAVD88 (**Figure 2-1**) with the surrounding areas, Newton Lake, generally at an elevation of around 504 to 505 feet NAVD88. Topographic maps drawn prior to construction indicate the area of the PAP was generally between 500 and 550 feet NAVD88, except for the drainage features in the south-central portion of the PAP. The contours in the area of the drainage feature in the south-central portion of the PAP illustrate lower elevations of approximately 475 to 485 feet NAVD88 (**Appendix A**). Prior to creation of Newton Lake, the elevation of the land surface east and southeast of the PAP was approximately 475 to 480 feet NAVD88.

2.2 Regional Geomorphology

The PAP, as well as all of Jasper County, is located within the Springfield Plain of the Till Plains Sections of the Central Lowlands Province. The Springfield Plain physiographic province is comprised largely of Illinoian glacial drift (Willman et al., 1975). The region is characterized by relatively flat to gently rolling topography. The uppermost geologic materials consist primarily of unconsolidated eolian, slopewash, and fluvial deposits underlain by superglacial and subglacial deposits associated with recent glaciations. The topography of these materials is a function of the underlying bedrock surface on which the material was deposited, and eolian and fluvial processes which have been in effect from their deposition to the present.

The Embarras River and its tributaries drain much of the county and eventually flow into the Wabash River. The southwestern portion of the county, including the NPP, lies within the Little Wabash River Basin. Therefore, all surface drainage from the property flows to the Little Wabash River, which then flows into the Wabash River.

The highest point in Jasper County is at Island Grove, at an elevation of 624 feet NAVD88. The lowest elevation, 440 feet NAVD88, is located at the point on the Crawford County line, which is intersected by the Embarras River. With a total relief of only 184 feet, the surface features of Jasper County are nominal and reflect the moderate amount of erosional modification to the post-glacial topographic surface.

2.3 Soils

Surficial soils at the PAP are shown on **Figure 2-2** and based on Jasper County soil survey data, available in the Soil Survey Geographic (SSURGO) by the United States Department of Agriculture's Natural Resources Conservation Service provided by Environmental Systems Research Institute (ESRI) web hosted layer. Soils surrounding the PAP, not including the Urban Land (#533) within the limits of the NPP, are identified as: Orthents (clayey, sloping) along the western, southern, and eastern boundaries of the PAP; Hickory silt loam (18 to 35 percent slopes) and Ava silt loam (2 to 5 percent slopes) adjacent to Newton Lake; Bluford silt loam, Wynoose silt loam (0 to 2 percent slopes), Racoon silt loam (0 to 2 percent slopes) and Atlas silt loam (5 to 10 percent slopes, eroded) west and northwest of the PAP within agricultural land.

2.4 Regional Geology

2.4.1 Regional Unlithified Deposits

The unlithified geologic deposits in Jasper County, Illinois primarily consists of loess overlying glacial drift from the Illinoian and Pre-Illinoian glaciers. The unlithified deposits in the region are derived from recent river deposition (alluvium), glacial outwash, and glacial till deposits. The hydrogeologic investigation conducted by Rapps (1997) is the basis for much of the descriptions provided below. From the surficial deposits downward, there are eight primary unlithified geologic units in the region consisting of:

- **Cahokia Formation:** Holocene stage deposits in floodplains and channels of modern rivers and streams. Generally, consists of poorly sorted sand, silt, and clay with wood and shell fragments with local deposits of sandy gravel.
- **Peoria Silt:** Wisconsinan Age deposits that commonly occur in upland areas and along valley walls in Illinois. They generally grade from sandy silt in the bluffs of major source river valleys (like the Mississippi Valley) to clayey silt away from the bluffs, where it is commonly thinner and relatively weathered (Hansel and Johnson, 1996). They are typically massive and consist predominantly of windblown silt from the valley floor, with local lenses of well-sorted, fine- to medium-grained sand (Willman and Frye, 1970).
- **Sangamon Soil:** Silt and clay soils formed during the interglacial period between the Illinoian and Wisconsinan Stages as a result of weathering of the upper portion of the Illinoian drift.
- **Hagarstown Member of the Glasford Formation:** Gravel, sand, and gravelly diamicton occurring as ice-contact deposits that commonly occurs as ridged drift in a distinctive belt of linear to curved ridges and knolls. Outwash plains of poorly sorted to well-sorted sand and gravel may be present between the ridges in many places (Killey and Lineback, 1983).
- **Vandalia Till Member of the Glasford Formation:** Sandy/silty till with thin, discontinuous lenses of silt, sand, and gravel (Lineback, 1979; Willman and Frye, 1970).
- **Mulberry Grove Member of the Glasford Formation:** Typically consists of a thin, lenticular unit of gray sandy silt (Willman et al., 1975). It represents the interval between the retreat of the glacier that deposited the Smithboro Member and the advance of the glacier that deposited the Vandalia Till.
- **Smithboro Till Member of the Glasford Formation:** Gray, compact, silty clay diamicton that is less friable than the overlying Vandalia Till, and was deposited by ice sheets moving northwest to southeast across the region (Jacobs and Lineback, 1969).
- **Banner Formation:** Undifferentiated diamictons that rest directly on bedrock and consist mostly of glacial diamictons and intercalated sand and gravel outwash.

The surficial Quaternary geologic deposits in the vicinity of the Site that were mapped on a regional scale are shown on **Figure 2-3**.

2.4.2 Regional Bedrock Geology

The unlithified deposits are underlain by Pennsylvanian age bedrock belonging to the Mattoon Formation. The Mattoon Formation is the youngest formation in the Pennsylvanian System in Illinois. It is underlain by the Bond Formation. The Mattoon Formation has a maximum thickness of more than 600 feet in the central part of the Illinois Basin in Jasper County. It is characterized by a complex sequence of thin limestones, coals, black fissile shales, underclays, thick gray shales, and several well-developed sandstones. The lateral extent of many of the named units has not been determined due to widely scattered outcrops and scarce subsurface data. However, coals and limestone units are considered to be as persistent as those in the underlying Bond Formation (Rapps, 1997).

2.4.3 Structure

The major geologic structural features within Illinois are depicted on **Figure 2-4**. The PAP is situated within the Fairfield Basin, one of the major structural features of the encompassing Illinois Basin. The Fairfield Basin, characterized as a smooth floored inner central deep basin, is bound to the west and northwest by the DuQuoin-Louden Monoclinal Belt, to the north and northeast by the LaSalle Anticlinal Belt, and to the south by the Cottage Grove-Rough Creek-Shawneetown Fault Zone (Buschbach and Kolata, 1991). North of the Rouch Creek Fault System, the strata dip gently to the west at approximately 15 to 20 feet per mile (ft/mi), which parallels the general north-south, asymmetrical syncline structure of the Illinois Basin (Hatch and Affolter, 2002).

2.4.4 Seismic Setting

A review of the available data from the United States Geological Survey (USGS), Illinois State Geological Survey (ISGS), and other available regional structural information was completed by Haley & Aldrich, Inc. (2018) for the Location Restriction Demonstration to address the requirements of 40 C.F.R. § 257.62 (Fault Areas). The review found that the Wabash Valley Fault System is located approximately 40 miles southeast of the PAP (**Figure 2-4**). The Wabash Valley Fault system within Illinois extends laterally for approximately 60 miles in a general north-northeastward to south-southwestward trend. Haley & Aldrich, Inc. (2018) found that the timeframe of the most recent activity on the Wabash Fault System is not known. Based on available geologic data and information reviewed, there are no active faults or fault damage zones that have had displacement in the Quaternary period reported within 200 feet of the PAP.

As required by 35 I.A.C. § 845.330, existing and new CCR SIs and lateral expansions of existing SIs must not be located in seismic impact areas, unless owners or operators demonstrate that the SI is designed to resist the maximum horizontal acceleration (g) in lithified earth material. This requirement is identical to that in 40 C.F.R. § 257.63. The definition of a seismic impact zone is "areas having a 2 percent or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitation pull, will exceed 0.10 g in 50 years." Although the PAP is located within a seismic impact zone, it satisfies the demonstration requirements of 35 I.A.C. § 845.330. The AECOM report titled "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Flow Design Control System Plan for the Primary Ash Pond at Newton Power Station", dated October 2016, includes engineering analysis, calculations, and findings that support the requirements of 40 C.F.R. § 257.63 (Haley & Aldrich, Inc., 2018), and, by extension, 35 I.A.C. § 845.330.

2.4.5 Mining Activities

The areas immediately surrounding the facility have never been mined. Based on the directory of coal mines for Jasper County (ISGS, 2021), the nearest coal mines in the vicinity of the PAP are located approximately 6.7 miles to the northeast (**Appendix B**).

2.5 Site Geology

A field investigation was performed in 2021 to collect additional data for the discussion of vertical and horizontal lithology, stratigraphy, chemical properties, and physical properties of geologic layers to a minimum of 100 feet below ground surface (bgs) as specified in 35 I.A.C. § 845.620(b). Field investigation locations are shown on **Figure 2-5**. Boring logs, monitoring well and piezometer construction forms obtained from investigations at the PAP are provided in **Appendix C**.

The Cahokia Formation, described in the regional geology above, occurs in modern river valleys and floodplains. If present, these deposits are expected to occur south of the PAP in areas that are currently beneath the surface water of Newton Lake. The principal types of unlithified materials present above the bedrock in the vicinity of the PAP consist of the following in descending order:

- **CCR and Fill Material:** CCR and reworked surface materials within and adjacent to the various CCR Units.
- **Peoria Silt and Sangamon Soil** (wind-blown deposits and weathered till)**:** Clays and silts, including the Peoria Silt (Loess Unit) in upland areas, underlain by the Sangamon Soil which is comprised of weathered glacial drift.
- **Hagarstown Member:** where present, consists of relatively thin sandy deposits between the clays and silts of the Sangamon Soil and the Vandalia Till.
- **Vandalia Till:** Compacted clay and silt glacial till with varying amounts of sand and gravel (diamicton).
- **Mulberry Grove Member:** Sand, silty sand, and sandy silt/clay units found between the Vandalia Till and the Smithboro Till. These sandy deposits are the first laterally continuous sands observed beneath the PAP.
- **Smithboro Till and Banner Formation:** Thick, gray, compacted silty clay diamicton of the Smithboro Till and the greenish-gray silty clay of the Banner Formation.

Cross-sections showing the subsurface materials encountered at the PAP are included in **Figures 2-6 through 2-8**.

2.5.1 CCR and Fill

CCR is present within most of the PAP at thicknesses between 17 to 19.5 feet thick as observed in XPW01 through XPW04 (**Appendix C**). The lowest bottom-of-ash elevation observed is approximately 486 feet in the center of a former drainage feature oriented north-south through the center of the PAP, whereas ash is potentially highest in elevation at approximately 550 feet along the outer edges of the PAP (**Figure 2-9**)[1]. Note, drawing S-69 (**Appendix A**) indicates the former drainage feature was filled to elevation 508 feet NAVD88 during construction. The bottom of ash surface appears to mirror the former drainage feature. Comparison of the bottom of ash contours and topographic contours indicate CCR fill may be 40 feet or greater within the former drainage feature.

Geotechnical analysis results from six samples collected from ash at soil borings XPW01, XPW03 and XPW04 yielded Unified Soil Classification System (USCS) soil classifications of silty sand and

[1] Base of ash surface is being further evaluated as the construction permit is being developed.

poorly graded sand with silt. Sample locations are shown on **Figure 2-5,** the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from XPW01, XPW03 and XPW04 indicated the following:

- Average moisture content of 21.3 percent, with a range of 12.6 to 31.1 percent.
- Average total porosity (calculated) of 50 percent, with a range of 38 to 56 percent.
- Average dry density of 84.3 pounds per cubic foot (pcf), with a range of 73.9 to 103.6 pcf.
- Average specific gravity of 2.69, with a range of 2.650 to 2.741.
- Average grain size composition of 14 percent gravel, 60 percent sand, and 26 percent fines (silt and clay). The fines content ranged from 11.8 to 61.3 percent, with a median value of 18.9 percent.
- Geometric mean vertical hydraulic conductivity of 3.11 x 10^{-4} centimeters per second (cm/s) and ranged from 1.58 x 10^{-5} to 1.34 x 10^{-3} cm/s.

Solid samples were collected from XPW01, XPW02, XPW03 and XPW04 by Ramboll in 2021 for chemical analysis. The results of solid samples collected from within the PAP are summarized in **Table 2-2**.

Leachate wells were installed in XPW01, XPW02, XPW03 and XPW04 by Ramboll in 2021, and porewater samples were collected. The results of porewater samples collected from within the PAP are summarized in **Table 2-3**.

2.5.2 Peoria Silt and Sangamon Soil

The Peoria Silt and Sangamon Soil is present within the PAP at thicknesses up to approximately 46 feet as measured in APW15 and ranged from 3 to 46 feet thick as observed in APW05 and APW10 (**Appendix C**). The bottom of this geologic unit is at the lowest elevation of 469.5 feet NAVD88 (APW15) along the southern portion of the PAP while highest in elevation of 543.4 feet NAVD88 in the northwest corner of the PAP (**Figures 2-6 and 2-7**). Generally, the elevation of the bottom of this unit decreases from north to south across the PAP.

Geotechnical analysis results from two samples collected from the Peoria Silt and Sangamon Soil at soil borings APW11 and APW15 yielded USCS soil classifications of lean clay. Sample locations are shown on **Figure 2-5,** the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from these samples indicated the following:

- Average moisture content of 18.2 percent, with a range of 17.8 to 18.5 percent.
- Average porosity (calculated) of 33 percent, with a range of 32 to 34 percent.
- Average dry density of 110.8 pcf, with a range of from 109.8 to 111.7 pcf.
- Average specific gravity of 2.67 with a range of 2.65 to 2.69.
- Grain size composition of 0.6 percent gravel, 43 percent sand, and 56.5 percent fines (silt and clay).

Soil samples collected from the Peoria Silt and Sangamon Soil (APW11, APW13 and APW15) were also analyzed for chemical parameters. The results of soil samples collected from the Peoria Silt and Sangamon Soil are summarized in **Table 2-4**.

2.5.3 Hagarstown Member

A discontinuous sandy unit, the Hagarstown Member of the Pearl Formation was encountered at elevations ranging from approximately 497 feet NAVD88 (APW08) to 533 feet NAVD88 (APW12). The unit was encountered at thicknesses up to approximately 6.9 feet at APW18, but generally the thickness is less than 2 feet, where present.

Geotechnical analysis results from three samples collected from the Hagarstown Member at soil borings APW12 and APW13 yielded a USCS soil classification of poorly graded sand with silt. Sample locations are shown on **Figure 2-5,** the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from these samples indicated the following:

- Average moisture content of 14.9 percent, with a range of 8.4 to 21.2 percent.
- Average porosity (calculated) of 36 percent, with a range of 30 to 47 percent.
- Average dry density of 106.1 pcf, with a range of 87.1 to 118.3 pcf.
- Average specific gravity of 2.70, with a range of 2.649 to 2.694.
- Grain size composition of 10.6 percent gravel, 68.4 percent sand, and 21.0 percent fines (silt and clay).

Soil samples collected from the Hagarstown Member (APW12, APW13 and APW15) were also analyzed for chemical parameters. The results of soil samples collected from the Hagarstown Member are summarized in **Table 2-4**.

2.5.4 Vandalia Till

Thick glacial deposits of the Vandalia Till, which are laterally continuous beneath the Site and NPP, were encountered at elevations ranging from 425 feet NAVD88 (APW15) to 530 feet NAVD88 (AWP05). The unit was encountered at thicknesses up to 59 feet at APW07, while the average thickness is 26 feet.

Geotechnical analysis results from five samples collected from the Vandalia Till at soil borings APW14, APW17, SB300/APW18, and SB301 yielded a USCS soil classification of lean clay and silty clay. Sample locations are shown on **Figure 2-5**, the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from these samples indicated the following:

- Average moisture content of 14 percent, with a range of 12.4 to 16.6 percent.
- Average porosity (calculated) of 31 percent, with a range of 27 to 36 percent.
- Average dry density of 117.1 pcf, with a range of 108.8 to 122.7 pcf.
- Average specific gravity of 2.70, with a range of 2.697 to 2.709.
- Grain size composition of 1.7 percent gravel, 29.1 percent sand, and 69.2 percent fines (silt and clay).

Soil samples collected from the Vandalia Till (APW11, APW12, APW15 and APW17) were also analyzed for chemical parameters. The results of soil samples collected from the Vandalia Till are summarized in **Table 2-4**.

2.5.5 Mulberry Grove Member

Thin to moderately thick (3 to 17 feet), the Mulberry Grove member was encountered at elevations ranging from approximately 417 feet NAVD88 (APW15) to 483 feet NAVD88 (APW10). The unit generally slopes from approximately 483 feet NAVD88 in the northeast portion of the site near APW10 to 462 feet NAVD88 in the southwest portion of the site near APW08. The unit was encountered at thicknesses up to 30 feet at APW17, while the average thickness is approximately 10 feet. At APW12 (**Figure 2-8**) sand and gravel was not encountered at a similar elevation during drilling.

Geotechnical analysis results from five samples collected from the Mulberry Grove Member at soil borings APW13, APW15, APW17, and SB300/APW18 yielded USCS soil classifications of silty sand, poorly graded sand with silt and well graded sand with silt. Sample locations are shown on **Figure 2-5,** the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from these samples indicated the following:

- Average moisture content of 10.8 percent, with a range of 6.1 to 14.5 percent.
- Average porosity (calculated) of 32 percent, with a range of 30 to 35 percent.
- Average dry density of 113.5 pcf, with a range of 109.6 to 116.8 pcf.
- Average specific gravity of 2.67, with a range of 2.660 to 2.686.
- Grain size composition of 10.4 percent gravel, 69 percent sand, and 20.6 percent fines (silt and clay).

Soil samples collected from the Mulberry Grove Member (APW11, APW13 and APW14) were also analyzed for chemical parameters. The results of soil samples collected from the Mulberry Grove Member are summarized in **Table 2-4**.

2.5.6 Smithboro Till and Banner Formation

Thick glacial till of the Smithboro Till Member and Banner Formation, which are laterally continuous beneath the Site and NPP, was encountered at elevations ranging from approximately 412 feet NAVD88 (APW15) to 475 feet NAVD88 (APW10). The unit was encountered at thicknesses up to 36 feet (APW14), while the average thickness is 32 feet (based upon the two borings that encountered bedrock APW13 and APW14).

Geotechnical analysis results from eight samples collected from the Smithboro Till and Banner Formation at soil borings APW11, APW12, APW14, APW15, SB300/APW18, and SB301 yielded USCS soil classifications of lean clay and silty clay. Sample locations are shown on **Figure 2-5,** the geotechnical results from the most recent investigation are summarized in **Table 2-1**, and laboratory reports are included in **Appendix D**. Geotechnical results from these samples indicated the following:

- Average moisture content of 15.5 percent, with a range of 11.1 to 19.1 percent.
- Average porosity (calculated) of 32 percent, with a range of 29 to 38 percent.

- Average dry density of 115.1 pcf, with a range of 104.6 to 121.3 pcf.
- Average specific gravity of 2.70, with a range of 2.686 to 2.723.
- Grain size composition of 0 percent gravel, 24.2 percent sand, and 75.8 percent fines (silt and clay).

Soil samples collected from the Smithboro Till and Banner Formation (APW11, APW12, APW13, APW14 and APW17) were also analyzed for chemical parameters. The results of soil samples collected from within the PAP are summarized in **Table 2-4**.

2.5.7 Bedrock

Bedrock underlying the PAP is the Pennsylvanian Age Mattoon Formation, which consists of a complex sequence of thin limestones, coals, black fissile shales, underclays, thick gray shales, and several well-developed sandstones. Bedrock was encountered in borings APW13 and APW14 (**Appendix C**). The elevation of the top of bedrock ranged from 445.5 feet NAVD88 (APW13) to 432.9 feet NAVD88 (APW14). The top of bedrock was described as shale in both borings advanced to bedrock.

No bedrock samples were collected for geotechnical testing or chemical analysis. Boring locations are shown on **Figure 2-5**.

3. REGIONAL AND LOCAL HYDROGEOLOGY

3.1 Regional Hydrogeology

Aquifers in the area of the PAP generally fall into two broad categories: (1) unlithified sediments that are glacial or alluvial in origin and contain mostly sand and gravel deposits interbedded with clay and silt; and (2) bedrock aquifers consisting of sandstone and fractured limestone, which vary widely in permeability. To the east of the NPP, water-yielding sandstone formations occur at depths of 100 to 300 feet bgs (Selkregg et al., 1957). Groundwater available from bedrock units is mostly mineralized and rarely used as a source for potable water (Rapps, 2009).

Glacial deposits generally provide enough water for rural and residential water supplies. Sand and gravel deposits within the Glasford Formation and the Pearl Formation have been developed locally for domestic water supplies. Locally occurring discontinuous sand and gravel deposits exist along the bottomlands of Big Muddy Creek, which can sustain domestic and farm groundwater supplies. The water bearing zones at the PAP are the sandy horizons that occur within Mulberry Grove Member of the Glasford Formation and the intermittent sands of the Hagarstown Member of the Pearl Formation.

3.2 Site Hydrogeology

In 2015, a monitoring program consisting of six monitoring wells (APW05, APW06, APW07, APW08, APW09, and APW10) was established to comply with requirements of 40 C.F.R. § 257. In 2021, nine additional monitoring wells (APW05S, and APW11 through APW18) were installed to collect information to meet the requirements of Part 845. Construction details for monitoring wells and piezometers is provided in **Table 3-1** and locations are depicted in **Figure 3-1**. Boring logs, monitoring well and piezometer construction forms are provided in **Appendix C**.

3.2.1 Hydrostratigraphic Units

Materials have been categorized into six hydrostratigraphic units at the PAP based on stratigraphic relationships, geologic composition, and common hydrogeologic properties. The units, listed from surface downward, are summarized as follows:

- **CCR**: CCR consisting of fly and bottom ash within the PAP. CCR may be present from the surface (approximately 545 to 555 feet NAVD88) to a minimum elevation of approximately 475 feet NAVD88. Water elevations measured in piezometers screened within the PAP indicate the phreatic surface ranges from approximately 535 to 547 feet NAVD88, which is higher than surrounding monitoring wells.
- **UD/PMP:** The UD is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member (*i.e.,* PMP).
  - **Hagarstown Member/PMP**: The Hagarstown Member consists of the discontinuous, sandier deposits of the UD where present and overlies the Vandalia Till.
- **UCU:** The UCU consists of a thick package of the low permeability clay and silt of the Vandalia Till. This unit is a laterally continuous layer between the base of the CCR unit and the top of the uppermost aquifer.
- **Uppermost Aquifer**: The uppermost aquifer is composed of the Mulberry Grove Member, which has been classified as poorly graded sand, silty sand, clayey sand, and gravel.

- **LCU**: The LCU is comprised of low permeability silt and clay of the Smithboro Till Member and the Banner Formation.
- **Bedrock Confining Unit**: Bedrock was classified as shale of the Mattoon Formation in locations it was encountered in soil borings during 2021 investigation activities (APW13 and APW14).

3.2.2 Uppermost Aquifer

The uppermost aquifer includes saturated portions of the Mulberry Grove Member in the vicinity of the PAP. Groundwater monitoring for the uppermost aquifer is focused on this zone because it is continuous, moderate permeability, and likely to indicate potential impacts from the PAP. The top of uppermost aquifer was evaluated with respect to the location restrictions in 2018 (Haley & Aldrich, Inc., 2018) and provided in **Figure 3-2**. The top of the uppermost aquifer is separated from overlying CCR material by the low permeability Vandalia Till which was encountered at thicknesses up to 59 feet and an average thickness of 26 feet (**Figures 2-6 to 2-8**). The base of the uppermost aquifer is the top of the LCU containing the low permeability Smithboro Till and the Banner Formation.

3.2.3 Potential Migration Pathways

The UD consists of low permeability clays and silts of the Peoria Silt, Sangamon Soil, and discontinuous sand lenses of the Hagarstown Member. Monitoring wells APW02, APW03, APW04, APW05S, and APW12 are screened within the sandier deposits of the UD and may be utilized for monitoring shallow PMPs adjacent to the PAP.

3.2.4 Water Table Elevation and Groundwater Flow Direction

The elevations of water within the PAP (as observed in XPW01 through XPW04 and XSG01) are greater than the surrounding areas. The phreatic surface within the PAP between February and August 2021 averaged 542 feet NAVD88, ranging from 546.69 feet NAVD88 in XPW02 (located along the northern portion of the PAP) to 535.40 feet NAVD88 in XSG01 (located along the southern portion of the PAP) (**Figures 3-3 and 3-4)**.

Groundwater flow in the uppermost aquifer is generally from north to south. However, uppermost aquifer wells also display flow converging towards a former surface drainage feature located west of the PAP (**Figure 3-3 and 3-4**) and an area where the uppermost aquifer is lowest in elevation. Groundwater elevations vary seasonally, generally less than one foot per year, while across the PAP they range from approximately 490 to 530 feet NAVD88, although flow directions are generally consistent (historic contour maps are included in **Appendix E**).

Groundwater elevations in PMP wells are above those in the uppermost aquifer and range from approximately 518 feet NAVD88 (APW05S) to 535 feet NAVD88 (APW05S). Groundwater elevations within the UCU, LCU, and bedrock confining unit were not contoured because no wells are screened within these units.

3.2.4.1 Vertical Hydraulic Gradients

Vertical hydraulic gradients were calculated using available groundwater elevation data from February to August 2021 at nested well locations within the UD (*i.e.,* PMP) and uppermost aquifer wells. Vertical hydraulic gradients are presented in **Table 3-2**. The results of the vertical hydraulic gradient calculations for these hydrostratigraphic units are summarized below:

- UD (*i.e.,* PMP) to uppermost aquifer:
  - Gradients calculated between APW05 (uppermost aquifer) and APW05S (PMP) were downward for all events.
  - Gradients calculated between APW10 (uppermost aquifer) and APW04 (PMP) were downward for all events.
  - Gradients calculated between APW09 (uppermost aquifer) and APW03 (PMP) were downward for all events.

These results are consistent with previous vertical gradient calculations (OBG, 2017).

3.2.4.2 Impact of Existing Ponds and Ash Saturation

Water levels collected from XPW01 through XPW04 indicate the phreatic surface is above water levels observed in the uppermost aquifer; however, the groundwater elevation contours of the uppermost aquifer (**Figures 3-3 and 3-4)** illustrate flow towards the south and converges at the former drainage feature along the western edge of the PAP. The absence of a radial component of flow outward indicates the PAP does not significantly impact groundwater flow direction. Furthermore, there is a thick layer of UCU Vandalia Till separating the base of ash and top of uppermost aquifer.

Saturated ash has been observed within the PAP leachate wells (XPW01 through XPW04) located along the northern portion of the unit. The maximum thickness of saturated ash as measured at XPW03 ranged from 11.5 feet in June 2021 to 12.6 feet in February 2021. The minimum thickness of saturated ash as measured at XPW01 ranged from 7.7 feet in July 2021 to 8.2 feet in June 2021. Greater thicknesses of saturated ash are likely in the central portion of the PAP where the former drainage feature was present prior to filling (**Figure 2-9**).

3.2.4.3 Impact of Newton Lake on Groundwater Flow

The surface water elevation at Newton Lake measured from February 15 to March 9, 2021 ranged from 504.42 to 504.84 feet NAVD88 at location SG02 near the outfall from the Secondary Pond. Groundwater flow in the uppermost aquifer generally flows southwest across the PAP with potentiometric surface elevations at downgradient wells around 491 feet NAVD88 (approximately 15 feet lower than the Newton Lake elevation). This separation in groundwater and Lake elevations (and observed downward vertical gradients) indicates groundwater within the uppermost aquifer does not flow into Newton Lake.

Groundwater elevations observed at APW10 are approximately 2-feet higher than surface water in Newton Lake (506 feet NAVD88 versus 504 feet NAVD88). The uppermost aquifer also approaches the former land surface, now beneath Newton Lake, in this area. As illustrated in cross-section B-B’ (**Figure 2-7**), the uppermost aquifer may intersect the base of Newton Lake and interact with groundwater upgradient of the PAP.

3.2.5 Hydraulic Conductivities

3.2.5.1 Field Hydraulic Conductivities

Field hydraulic conductivity tests were conducted by Ramboll during the 2021 investigation. The results are summarized in **Table 3-3**, provided in **Appendix F**, and discussed below:

- **CCR**: Results of field hydraulic tests in wells screened within the CCR (XPW01 through XPW04) ranged from 1.0×10^{-3} to 2.3×10^{-1} cm/s, with a geometric mean of 2.0×10^{-2} cm/s.
- **UD**: No field hydraulic conductivity tests were performed by Ramboll in 2021 in wells screened within the Sangamon Soil of the UD. Previous field hydraulic conductivity tests conducted by NRT in 2017 in wells screened within the Sangamon Soil of the UD (APW02, APW03, and APW04) ranged from 5.14×10^{-6} to 4.53×10^{-5} cm/s, with a geometric mean hydraulic conductivity of 1.5×10^{-5} cm/s (OBG, 2017).
- **PMP**: Results of field hydraulic tests in wells screened within the Hagarstown PMP (APW05S and APW12) ranged from 6.1×10^{-4} to 1.5×10^{-2} cm/s, with a geometric mean hydraulic conductivity of 3.1×10^{-3} cm/s.
- **UCU**: No field hydraulic conductivity tests were performed as there are no wells screened within the UCU.
- **Uppermost Aquifer**: Results of field hydraulic tests in wells screened within the uppermost aquifer (APW11, APW13, APW14, APW15, APW16, APW17, and APW18) ranged from 2.0×10^{-4} to 1.5×10^{-1} cm/s, with a geometric mean of 6.8×10^{-3} cm/s. Previous field hydraulic conductivity tests conducted by NRT in 2017 obtained similar results with a geometric mean hydraulic conductivity of 1.2×10^{-3} cm/s (OBG, 2017). The highest conductivities are measured in APW15, APW16, and APW17, which is consistent with groundwater flow toward these wells. In addition, the grain-size analyses of the uppermost aquifer materials from two samples collected at APW17 were amongst the highest observed at the Site, with sand and gravel contents of 91.1 and 93.3 percent.
- **LCU**: No field hydraulic conductivity tests were performed as there are no wells screened within the LCU.
- **Bedrock**: No field hydraulic conductivity tests were performed as there are no wells screened within the bedrock unit.

3.2.5.2 Laboratory Hydraulic Conductivities

Falling head permeability tests (ASTM D5084 Method F) were performed in the laboratory on samples collected during the 2021 investigations. Sample locations are shown in **Figure 2-5**. The geotechnical laboratory report is provided in **Appendix D**. The results are summarized in **Table 2-1** and discussed below.

- **CCR**: Eight samples were collected from CCR borings XPW01 through XPW04. However, the two samples collected from XPW02 (8 to 8.5 and 16.5 to 17 feet bgs) were not representative of the ash and are not included in summary of CCR characteristics. Laboratory falling head permeability test results for the six CCR samples indicated a geometric mean vertical hydraulic conductivity of 3.1×10^{-4} cm/s with a range of 1.6×10^{-5} to 1.3×10^{-3} cm/s.
- **UD**: One sample was collected from the Sangamon Soil at borings APW11 and APW15. Laboratory falling head permeability test results in the UD indicated a geometric mean vertical hydraulic conductivity of 5.9×10^{-8} cm/s and ranged from 3.1×10^{-8} to 8.6×10^{-8} cm/s. These values are lower than previous samples collected by NRT in 2017, with a geometric mean hydraulic conductivity of 1.3×10^{-5} cm/s (OBG, 2017).
- **PMP**: Three samples were collected from the Hagarstown Member, a PMP within the UD, at borings APW12 and APW13. Laboratory falling head permeability test results for the

Hagarstown Member indicated a geometric mean vertical hydraulic conductivity of 3.5 x 10^{-5} cm/s and ranged from 1.1 x 10^{-7} to 9.6 x 10^{-5} cm/s.

- **UCU**: Four samples were collected from the Vandalia Till at borings APW14, APW17, SB300/APW18, and SB301. Laboratory falling head permeability test results for the UCU samples indicated a geometric mean vertical hydraulic conductivity of 6.7 x 10^{-8} cm/s and ranged from 3.3 x 10^{-8} to 9.7 x 10^{-8} cm/s. These values are similar to a previous investigation completed by Rapps (1997) with hydraulic conductivity values ranging from 6.3 x 10^{-9} to 2.1 x 10^{-8} cm/s with a geometric mean hydraulic conductivity of 1.1 x 10^{-8} cm/s (Rapps, 1997).
- **UA**: Five samples were collected from the Mulberry Grove Formation at borings APW13, APW15, APW17, and APW18. Laboratory falling head permeability test results for the Mulberry Grove Formation indicated a geometric mean vertical hydraulic conductivity of 3.2 x 10^{-4} cm/s and ranged from 3.5 x 10^{-6} to 7.2 x 10^{-4} cm/s.
- **LCU**: Eight samples were collected from the glacial tills of the Smithboro Till at borings APW11, APW12, APW14, APW15, APW18, and SB301. Laboratory falling head permeability test results for the Smithboro Till indicated a geometric mean vertical hydraulic conductivity of 9.3 x 10^{-8} cm/s and ranged from 2.4 x 10^{-8} to 2.7 x 10^{-7} cm/s. No samples were collected from the Banner Formation of the LCU.
- **Bedrock**: No bedrock samples were analyzed.

3.2.6 Horizontal Groundwater Gradients and Flow Velocity

In the vicinity of the PAP, groundwater generally flows from north to south/southwest in the uppermost aquifer. Groundwater elevations and flow directions near the PAP are illustrated in 2021 contour maps (**Figures 3-3 and 3-4**). There is little seasonal variation in groundwater flow direction in the unlithified materials regardless of the lake elevation, as illustrated in **Figures 3-3 and 3-4** (historic contour maps are included in **Appendix E**). Horizontal gradients determined in 2021 across the PAP between wells APW10 and APW17 were very stable around the average of 2.5 x 10^{-3} feet/feet (ft/ft) with an average groundwater velocity of 1.88 feet per day (ft/day) (**Table 3-4**).

Horizontal gradients determined in 2021 across the northeastern portion of the CCR unit were very stable around the average of 7.1 x 10^{-3} ft/ft with an average groundwater velocity of 0.04 ft/day (**Table 3-4**).

3.2.7 Groundwater Classification

Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the PAP meets the definition of Class I – Potable Resource Groundwater based on the following criteria:

- Groundwater is located more than 10 feet bgs and within an unconsolidated silty sand and gravel unit which is five feet or more in thickness.
- Hydraulic conductivity exceeds the 1 x 10^{-4} cm/s criterion (**Table 3-3**).
- Groundwater is not downgradient of or underlying previously mined out areas.

Testing of the unconsolidated materials of the Mulberry Grove Member averaged 21 percent fines, which is greater than the 12 percent fines criterion (Section 2.5.5); however, this was not deemed prohibitive of the Class I Classification.

3.3 Surface Water Hydrology

3.3.1 Climate

Jasper County has a humid and temperate climate with a normal annual total precipitation of approximately 40 inches. Approximately two-thirds of the precipitation falls from April through September and is produced primarily by thunderstorms, with May having the highest average monthly precipitation. The average annual snowfall for the area is approximately 15 inches.

Average climatic data was obtained from the Illinois State Water Survey (ISWS). The data was recorded between 1989 and 2020 from Olney, Illinois, which is located approximately 16.5 miles southeast of the NPP. The data includes monthly maximum and minimum temperatures (degrees Fahrenheit [°F]) and monthly average rainfall calculated from daily values collected over the 31-year period. The data is summarized in **Table A**.

Table A. Average Monthly Temperature Extremes and Precipitation for Olney, IL

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max Temperature (ºF)	38.8	43.5	54.0	65.6	74.9	83.8	86.4	85.2	79.8	67.9	54.1	42.4	64.7
Min Temperature (ºF)	23.2	26.4	35.0	44.7	54.8	63.4	66.6	64.3	56.4	45.2	35.2	26.9	45.2
Precipitation (inches)	3.10	2.39	3.37	4.23	4.64	3.82	4.04	2.73	2.97	3.66	3.81	3.25	42.0
https://www.isws.illinois.edu/warm/stationmeta.asp?site=OLN&from=wx													

3.3.2 Surface Waters

The major surface water body in the vicinity of the PAP is Newton Lake, an elongated body of water that borders the PAP on three sides (south, east, and west). The southern boundary of the PAP runs parallel to the north shore of the lake and is located approximately 250 to 700 feet from the water's edge (**Figure 1-1**). The surface water elevation measured from February 15 to March 9, 2021 ranged from 504.42 to 504.84 feet NAVD88 at location SG02 near the outfall from the Secondary Pond. Surface water elevations in Newton Lake are not expected to fluctuate greatly as a result of the lake elevation being controlled by a dam to provide cooling water for the NPP.

The phreatic surface within the PAP as measured at XSG01 and XPW01 through XPW04 ranged from 535.4 to 546.69 feet NAVD88 between February and July in 2021. Other surface waters in the vicinity include small freshwater ponds.

Other primary drainage ways in the area are Big Muddy Creek and Wolf Creek, which lie approximately 2.3 miles west and 1.7 miles east of the Site, respectively. In addition, minor streams and drainage channels cut across the drift plain in the area.

4. GROUNDWATER QUALITY

4.1 Summary of Groundwater Monitoring Activities

4.1.1 IEPA Program Monitoring

In accordance with NPDES Permit No. IL0049191 (effective October 1, 2015), samples are collected quarterly from four monitoring wells (G116, APW02, APW03, and APW04) for laboratory and/or field parameters listed in Special Condition No. 19 of the NPDES Permit. Groundwater monitoring results from sampling of these four wells are reported to IEPA annually in accordance with the NPDES Permit. Of the four wells monitored as part of the NPDES Permit monitoring, two wells (APW03 and APW04) are located downgradient of the PAP. The results of NPDES Permit monitoring wells APW03 and APW04 are not included in the discussion in **Section 4.2** as the groundwater samples were not analyzed for total metals.

4.1.2 40 C.F.R. § 257 Program Monitoring and Well Network

The 40 C.F.R. § 257 monitoring well network consists of six groundwater monitoring wells screened in the uppermost aquifer, including two background monitoring wells (APW05 and APW06) and four compliance wells (APW07, APW08, APW09, and APW10). The boring logs, well construction forms, and other related monitoring well forms for the well network are included in **Appendix C** of this HCR. The well locations are shown on **Figure 3-1**.

Groundwater is being monitored at the PAP in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.95. Details of the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Sampling and Analysis Plan for the PAP (NRT, 2017). Results are discussed in Section 4.2.

Groundwater samples are collected semi-annually and analyzed for the field and laboratory parameters from Appendix III of 40 C.F.R. § 257, summarized in **Table B** below.

Table B. 40 C.F.R. § 257 Groundwater Monitoring Program Parameters

Field Parameters[1]		
Groundwater Elevation	pH	
Appendix III Parameters (Total, except TDS)		
Boron	Chloride	Sulfate
Calcium	Fluoride	TDS

[1]Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity are recorded during sample collection.

4.1.3 Part 845 Well Installation and Monitoring

In 2021, nine additional monitoring wells (APW11, APW12, APW13, APW14, APW15, APW16, APW17, APW18, and APW5S) were installed along the perimeter of the PAP to assess the vertical and horizontal lithology, stratigraphy, chemical properties, and physical properties of geologic layers to a minimum of 100 feet bgs as specified in 35 I.A.C. § 845.620(b). Additionally, four leachate monitoring wells (XPW01, XPW02, XPW03, and XPW04) were installed within the PAP unit to characterize CCR materials and leachate. These locations and samples were discussed in **Section 2.5.1**. The boring logs, well construction forms, and other related monitoring well forms for the well network are included in **Appendix C** of this HCR. The well locations are shown on **Figure 3-1**.

Prospective monitoring wells (APW02, APW03, APW04, APW05, APW05S, APW06, APW11, APW12, APW13, APW14, APW15, APW16, APW17, and APW18) were sampled for eight rounds between February and August 2021 and the results were used to develop this HCR and assess well locations for inclusion in the PAP Part 845 monitoring well network.

Groundwater samples were analyzed for 35 I.A.C. § 845.600 parameters summarized in **Table C** below. Part 845 groundwater monitoring results are included below in **Section 4.2**. A summary of groundwater analytical results is presented in **Table 4-1**.

Table C. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Turbidity	Groundwater Elevation	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1]Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

4.2 Groundwater Monitoring Results and Analysis

Groundwater data collected from the 40 C.F.R. § 257 network monitoring wells between 2015 and 2021 and from the wells installed in 2021 were evaluated with respect to standards included in 35 I.A.C. § 845.600(a)(1). This data set was selected because it includes parameters (total metals) consistent with the parameter list in 35 I.A.C. § 845.600(a)(1). The groundwater analytical results are summarized in **Table 4-1** and discussed in the subsections below. Groundwater elevations and field parameters are included in **Table 4-2**. Results indicate that the parameters discussed in the following sections were detected at concentrations greater than the applicable 35 I.A.C. § 845.600(a)(1) standards and are considered potential exceedances[1].

[1] Potential exceedances include results reported during the eight rounds of baseline groundwater monitoring that are greater than the applicable 35 I.A.C. § 845.600(a)(1) standards. The results are considered potential exceedances because they were compared directly to the standard and did not include an evaluation of background groundwater quality or apply the statistical methodologies proposed in the Groundwater Monitoring Plan (GMP). For simplicity, "GWPS" will be used hereafter in discussing potential exceedances. Exceedances will be determined following IEPA approval of the GMP.

4.2.1 Arsenic

Arsenic was detected at concentrations greater than the GWPS (0.01 milligrams per liter [mg/L]) at six uppermost aquifer wells: downgradient wells APW08, APW09, APW15, and APW16; and background wells APW05 and APW06. Arsenic concentrations in downgradient wells ranged from 0.0039 to 0.022 mg/L. Arsenic concentrations in background wells ranged from 0.003 to 0.022 mg/L.

4.2.2 Chloride

Chloride was detected at concentrations greater than the GWPS (200 mg/L) in upgradient UD well APW05S and downgradient uppermost aquifer well APW15. Chloride concentrations in APW05S ranged from 180 to 550 mg/L. Chloride concentrations in uppermost aquifer well APW15 ranged from 230 to 260 mg/L.

4.2.3 Cobalt

Cobalt was detected at concentrations greater than the GWPS (0.006 mg/L) at PMP well APW12 with concentrations ranging from 0.0032 to 0.0073 mg/L. Concentrations have been below the GWPS for the last four consecutive sampling events.

4.2.4 Fluoride

Fluoride was detected at concentrations greater than the GWPS (4.0 mg/L) at downgradient uppermost aquifer well APW15 during one event (8.16 mg/L) and at APW18 with concentrations ranging from 0.597 to 7.02 mg/L.

4.2.5 Lead

Lead was detected at concentrations greater than the GWPS (0.0075 mg/L) at downgradient uppermost aquifer wells APW08, APW11, and APW18 with concentrations ranging from less than the reporting limit to 0.014 mg/L. Concentrations are less than the GWPS for the last five consecutive events.

4.2.6 Lithium

Lithium was detected at concentrations greater than the GWPS (0.04 mg/L) at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and two downgradient uppermost aquifer wells APW13 and APW14. Lithium concentrations in the PMP wells ranged from 0.02 to 0.3 mg/L. Lithium concentrations in the upgradient well APW05S ranged from 0.038 to 0.091 mg/L. Lithium concentrations in the downgradient uppermost aquifer wells ranged from 0.024 to 0.054 mg/L.

4.2.7 pH

Groundwater samples collected with pH measurements below the lower range of the GWPS (6.5 standard units [SU]) were observed at four PMP wells APW02, APW03, APW04, APW12, one background well APW06, and two downgradient uppermost aquifer wells APW11 and APW13. Observed pH measurements in these PMP wells ranged from 5.4 to 7.7 SU. Observed pH measurements in the background well ranged from 6.4 to 7.8 SU. Observed pH measurements in these downgradient uppermost aquifer wells ranged from 6.1 to 7.4 SU.

4.2.8 Radium 226 and 228 Combined

Radium 226 and 228 combined was detected at concentrations greater than the GWPS (5 picocuries per liter [pCi/L]) at downgradient uppermost aquifer well APW16 with concentrations ranging from 0.946 to 5.85 pCi/L.

4.2.9 Sulfate

Sulfate can be a primary indicator parameter of CCR leachate impacts on groundwater quality. Sulfate was detected at concentrations greater than the GWPS (400 mg/L) at three PMP wells APW02, APW04, and APW12; upgradient UD well APW05S; and one downgradient uppermost aquifer well APW10. Concentrations of sulfate in these PMP wells ranged from 290 to 3,200 mg/L. Concentrations of sulfate in the upgradient well ranged from 200 to 2,100 mg/L. Concentrations of sulfate in the downgradient uppermost aquifer well (APW10) ranged from 390 to 540 mg/L.

4.2.10 Thallium

Thallium was detected at concentrations greater than the GWPS (0.002 mg/L) at one background well APW06, and two downgradient uppermost aquifer wells APW11 and APW18. Concentrations of thallium in the background well ranged from less than the reporting limit to 0.0025 mg/L. Concentrations of thallium in these downgradient uppermost aquifer wells ranged from less than the reporting limit to 0.0036 mg/L.

4.2.11 Total Dissolved Solids

TDS was detected at concentrations greater than the GWPS (1,200 mg/L) at four PMP wells APW02, APW03, APW04, and APW12; and one upgradient UD well APW05S. Concentrations of TDS at these PMP wells ranged from 540 to 5,300 mg/L. Concentrations at this upgradient well ranged from 3,200 to 3,800 mg/L.

5. EVALUATION OF POTENTIAL RECEPTORS

5.1 Water Well Survey

A potable water well inventory was completed in 2021 utilizing state databases to assess nearby pumping wells, drinking water receptors, and other uses of water in the vicinity of the PAP. The following sources of information were queried to identify well locations, drinking water receptors, and other uses of water within 1,000 meters of the PAP boundary:

- ISGS Illinois Water and Related Wells (ILWATER) Map[2]

A search of the ILWATER Map identified two wells located within 1,000-meters of the PAP (Well Nos. 120790038600 and 120790043600). Both wells are located to the southeast, or side-gradient, of the PAP and are listed as dry and abandoned. The assessment concluded there are no existing off-site water wells, potable or non-potable, that could potentially be impacted by groundwater from the PAP. The water well potential receptors are detailed in **Appendix B**.

5.2 Surface Water

A search was performed utilizing the United States Fish and Wildlife Service (USFWS) Wetlands Mapper[3] and the USGS National Map[4] for surface water bodies within 1,000 meters of the PAP. The predominant surface water body nearest the PAP is Newton Lake. Newton Lake is an approximately 1,648-acre freshwater lake partially encircling the PAP along the east, west, and south sides and at its closest point is approximately 240 feet downgradient from the PAP.

Additional surface water features indicated in the USFWS Wetlands Mapper and USGS National Map include several freshwater ponds ranging from 0.27 acres to 6.16 acres located generally north, west, and south of the PAP, riverine wetlands located north and northwest of the PAP, and an approximately 13.7-acre lake located to the north of the PAP.

The USGS National Map places the PAP within the Weather Creek Watershed (Hydrologic Unit Code [HUC] 051201140504), which is part of the Big Muddy Creek Watershed (HUC 0512011405) and located within the larger Little Wabash subbasin (HUC 05120114). The HUC watershed location is presented in **Appendix B**.

A Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Jasper County (Map No. 1709900125B; Effective Date: January 17, 1985 is attached in **Appendix G** and can also be viewed online at: https://www.illinoisfloodmaps.org/dfirm.aspx?county=jasper. No base flood elevation has been established for this region.

5.3 Nature Preserves, Historic Sites, Endangered/Threatened Species

A search of the Illinois Department of Natural Resources (IDNR) Natural Heritage Database[5] for natural areas and protected areas within 1,000 meters of the PAP was performed. No natural or protected areas were identified within 1,000 meters of the PAP (**Appendix B**).

[2] ISGS ILWATER Map: https://prairieresearch.maps.arcgis.com/apps/webappviewer/index.html?id=e06b64ae0c814ef3a4e43a191cb57f87
[3] USFWS Wetlands Mapper: https://www.fws.gov/wetlands/data/mapper.html
[4] USGS National Map: https://apps.nationalmap.gov/viewer/
[5] IDNR Natural Heritage Database: https://www2.illinois.gov/dnr/conservation/NaturalHeritage/Pages/NaturalHeritageDatabase.aspx

The IDNR Natural Heritage Database Threatened and Endangered Species by County[6] lists 25 threatened and endangered species as located within Jasper County, including 18 endangered and 7 threatened species. Habitats for endangered or threatened species are identified at the county level only (**Appendix B**).

Additionally, a search of the IDNR Historic Preservation Division[7] databases for historic sites in the vicinity of the PAP yielded no results within 1,000 meters of the PAP. The Illinois State Archaeological Survey (ISAS)[8] databases that do not require credentials to access were also searched and yielded no results within 1,000 meters of the PAP.

[6] Illinois Threatened and Endangered Species by County: https://www2.illinois.gov/dnr/ESPB/Documents/ET_by_County.pdf
[7] IDNR Historic Preservation Division: https://www2.illinois.gov/dnrhistoric/Pages/default.aspx
[8] ISAS: https://www.isas.illinois.edu/

6. CONCLUSIONS

Hydrogeologic characterization of the PAP was originally developed as part of the *Hydrogeologic Investigation and Groundwater Monitoring Program, Newton Power Station, Jasper County, Illinois* (Rapps, 1997) and most recently updated for this HCR. Results of these hydrogeologic studies were reintroduced in this HCR and updated to include geologic, hydrogeologic, and groundwater quality data collected with a focus on the PAP (Part 845 regulated) CCR Unit and subject of this HCR.

The data were summarized and evaluated for changes in groundwater conditions since the previous investigations; available groundwater quality data for the PAP was compared to the to the Part 845 Standards.

The results of the hydrogeologic and groundwater quality evaluation are:

- There are six types of unlithified material present in the vicinity of the PAP, these include the following in descending order:
  - **CCR and Fill Material:** CCR and reworked surface materials within and adjacent to the various CCR Units.
  - **Peoria Silt and Sangamon Soil** (wind-blown deposits and weathered till)**:** Clays and silts, including the Peoria Silt (Loess Unit) in upland areas, underlain by the Sangamon Soil which is comprised of weathered glacial drift.
  - **Hagarstown Member:** Where present, consists of relatively thin sandy deposits between the clays and silts of the Sangamon Soil and the Vandalia Till.
  - **Vandalia Till Member:** Compacted clay and silt glacial till with varying amounts of sand and gravel (diamicton).
  - **Mulberry Grove Member:** Sand, silty sand, and sandy silt/clay units found between the Vandalia Till and the Smithboro Till. These sandy deposits are the first laterally continuous sands observed beneath the PAP.
  - **Smithboro Till Member and Banner Formation:** Thick, gray compacted silty clay diamicton of the Smithboro Till and the greenish-gray silty clay of the Banner Formation.
- Bedrock underlying the PAP is the Pennsylvanian Age Mattoon Formation, which consists of a complex sequence of thin limestones, coals, black fissile shales, underclays, thick gray shales, and several well-developed sandstones.
- Six hydrostratigraphic units have been identified at the PAP based on stratigraphic relationships and common hydrogeologic characteristics, these include the following in descending order:
  - **CCR**: CCR consisting of fly and bottom ash within the PAP.
  - **UD/PMP**: The UD is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member (*i.e.,* PMP).
    - **Hagarstown Member/PMP**: The Hagarstown Member consists of the discontinuous, sandier deposits of the UD where present and overlies the Vandalia Till.
  - **UCU**: This unit consists of the low permeability clay and silt of the Vandalia Till.

  - **Uppermost Aquifer**: This unit is composed of the Mulberry Grove Formation, which onsite has been classified as poorly graded sand, silty sand, clayey sand, and gravel.
  - **LCU**: This unit is comprised of low permeability silt and clay of the Smithboro Till and the Banner Formation.
  - **Bedrock Confining Unit**: Bedrock was classified as shale of the Mattoon Formation in locations it was encountered during 2021 investigation activities (APW13 and APW14).
- Groundwater within the uppermost aquifer flows generally from north to south. However, uppermost aquifer wells also display flow converging towards a former surface drainage feature located west of the PAP (resulting in a southwest flow direction). Groundwater elevations vary seasonally, generally less than one foot per year, while across the PAP they range from approximately 490 to 530 feet NAVD88, although flow directions are generally consistent.
- The surface water elevation at Newton Lake measured from February 15 to March 9, 2021 ranged from 504.42 to 504.84 feet NAVD88 at location SG02. Groundwater flow in the uppermost aquifer generally flows southwest across the PAP with potentiometric surface elevations at downgradient wells around 491 feet (approximately 15 feet lower than the lake elevation). This separation in groundwater and Lake elevations (and observed downward vertical gradients) indicates groundwater does not flow into Newton Lake.
- Groundwater velocities in the uppermost aquifer range from 0.04 ft/day in the north and east portion of the site to 1.9 ft/day in the south and west portion of the PAP.
- The phreatic surface within the PAP is higher than groundwater elevations; however, there is a significant thickness of low permeability Vandalia Till (UCU) that separates the base of the unit from the uppermost aquifer. Groundwater flow within the uppermost aquifer does not appear to be influenced by the PAP.
- Based on the detailed geologic information provided, and the hydrogeologic and groundwater quality data, groundwater within the uppermost aquifer at the PAP is classified as Class I – Potable Resource Groundwater.
- Arsenic, chloride, fluoride, lead, lithium, pH, radium 226 and 228 combined, sulfate, and thallium were detected at concentrations/measurements greater than the GWPS in downgradient uppermost aquifer wells. Cobalt, lithium, pH, sulfate, and TDS were detected at concentrations/measurements greater than the GWPS at PMP wells. Arsenic, chloride, lithium, pH, sulfate, thallium, and TDS were detected at concentrations/measurements greater than the GWPS in background monitoring wells.

This HCR satisfies Part 845 content requirements specific to 35 I.A.C. § 845.620(b) (Hydrogeologic Site Characterization) for the PAP at the NPP.

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TABLES

TABLE 2-1. GEOTECHNICAL DATA SUMMARY
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample ID	Field Location ID	Top of Sample (ft bgs)	Bottom of Sample (ft bgs)	HSU	Moisture Content (%)	Dry Density (pcf)	Specific Gravity	Calculated Porosity [1] (%)	Vertical Hydraulic Conductivity (cm/s)	LL	PL	PI	Laboratory USCS	Gravel (%)	Sand (%)	Fines (%)
Sangamon Soil																
APW11	APW11	10	12	UD	17.8	111.7	2.645	32	8.57E-08	28	12	16	CL	1.1	45.1	53.8
APW15	APW15	20	22	UD	18.5	109.8	2.686	34	3.21E-08	33	10	23	CL	0.0	40.8	59.2
Hagarstown Member																
APW12	APW12	20	22	UD/PMP	15.1	118.3	2.694	30	1.07E-07	27	12	15	SC	7.4	46.8	45.8
APW12	APW12	25.5	26	UD/PMP	8.4	113.0	2.654	32	8.43E-06	10	13	NP	SP-SM	24.3	69.5	6.2
APW13	APW13	25	27	UD/PMP	21.2	87.1	2.649	47	9.63E-05	9	10	NP	SP-SM	0.0	88.9	11.1
Vandalia Till Member																
APW14	APW14	45	47	UCU	12.4	119.6	2.706	29	9.65E-08	26	14	12	CL	4.4	32.3	63.3
APW17	APW17	40	42	UCU	16.6	108.8	2.709	36	3.34E-08	26	13	13	CL	1.3	27.6	71.1
SB300	APW18	50	52	UCU	12.9	122.7	2.700	27	7.29E-08	32	12	20	CL	0.8	22.4	76.8
SB301	SB301	48	50	UCU	14.1	117.3	2.697	30	6.63E-08	27	14	13	CL	0.4	34.2	65.4
Mulberry Grove Member																
APW13	APW13	60.5	61	UA	14.5	114.3	2.661	31	2.18E-04	8	13	NP	SM	0.3	75.2	24.5
APW15	APW15	100.5	101	UA	12.1	116.4	2.665	30	3.50E-06	15	12	3	SM	4.4	49.8	45.8
APW17	APW17	71	71.5	UA	7.8	110.2	2.660	34	7.21E-04	5	9	NP	SW-SM	14.3	76.8	8.9
APW17	APW17	90.5	91	UA	6.1	116.8	2.672	30	6.39E-04	6	8	NP	SP-SM	28.2	65.1	6.7
SB300	APW18	61	61.5	UA	13.6	109.6	2.686	35	1.85E-05	5	9	NP	SM	4.7	78.2	17.1
Smithboro Till Member																
APW11	APW11	61	61.5	LCU	17.8	110.5	2.686	34	1.87E-07	27	18	9	CL	0.0	21.4	78.6
APW11	APW11	80	82	LCU	16.5	116.1	2.705	31	2.94E-08	32	14	18	CL	0.0	21	79
APW12	APW12	85	87	LCU	14.4	116.4	2.711	31	2.36E-08	29	14	15	CL	0.3	19.5	80.2
APW14	APW14	55.5	56	LCU	18.0	104.6	2.709	38	2.74E-07	25	15	10	CL	0.0	27.8	72.2
APW15	APW15	105	107	LCU	19.1	107.8	2.695	36	8.20E-08	29	13	16	CL	0.0	23.8	76.2
SB300	APW18	62.5	63	LCU	11.1	124.6	2.659	25	4.32E-06	20	14	6	CL-ML	0.0	42.4	57.6
SB300	APW18	105	107	LCU	14.1	116.4	2.710	31	4.28E-08	28	13	15	CL	0.0	30.7	69.3
SB301	SB301	68.5	69	LCU	13.1	121.3	2.723	29	4.05E-08	23	14	9	CL	0.0	31.3	68.7
SB301	SB301	98	100	LCU	15.7	118.2	2.720	30	6.13E-08	37	15	22	CL	0.0	17.8	82.2
CCR																
XPW01	XPW01	8.5	9	CCR	18.6	87.7	2.675	47	1.71E-04	47	57	NP	SP-SM	37.1	51.1	11.8
XPW01	XPW01	15.5	16	CCR	12.6	84.4	2.741	51	1.58E-05	35	17	18	CL	4.6	34.1	61.3
XPW03	XPW03	6	6.5	CCR	17.4	75.3	2.663	55	1.34E-03	33	27	6	SM	6.8	71.7	21.5
XPW03	XPW03	15.5	16	CCR	16.7	103.6	2.689	38	9.70E-05	12	19	NP	SM	16.4	67.3	16.3
XPW04	XPW04	6.5	7	CCR	31.1	73.9	2.697	56	1.61E-04	41	38	3	SM	1.6	84.5	13.9
XPW04	XPW04	15.5	16	CCR	31.1	80.8	2.650	51	7.83E-05	46	42	4	SM	15.7	51	33.3

TABLE 2-1. GEOTECHNICAL DATA SUMMARY
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample ID	Field Location ID	Top of Sample (ft bgs)	Bottom of Sample (ft bgs)	HSU	Moisture Content (%)	Dry Density (pcf)	Specific Gravity	Calculated Porosity [1] (%)	Vertical Hydraulic Conductivity (cm/s)	LL	PL	PI	Laboratory USCS	Gravel (%)	Sand (%)	Fines (%)
Fill																
XPW02	XPW02	8	8.5	CCR	29.1	92.9	2.691	45	6.07E-08	36	16	20	CL	0.3	44.8	54.9
XPW02	XPW02	16.5	17	CCR	21.8	103.7	2.694	38	7.38E-08	36	14	22	CL	0.0	19.8	80.2

[O: SSW 04/22/21, U:EDP 08/23/21, U: SSW 08/26/21, C: LDC 08/31/21; U: LDC 09/16/21, C: SSW 09/21/21]

Notes:
[1] Porosity calculated as relationship of bulk density to particle density (n = 100[1- (pb/pd)])
% = Percent
bgs = below ground surface
CCR = coal combustion residuals
cm/s = centimeters per second
ft = foot/feet
in = inch
LL = Liquid limit
NP = Non Plastic
pcf = pounds per cubic foot
PI = Plastic Index
PL = Plasticity Limit

HSU = Hydrostratigraphic Unit
LCU = lower confining unit
PMP = potential migration pathway
UA = uppermost aquifer
UCU = upper confining unit
UD = upper drift

USCS = Unified Soil Classification System
CL - Lean Clay
CL-ML = Silty Lean Clay
SC = Clayey Sand
SM = Silty Sand
SP-SM = Poorly Graded Sand with Silt
SW-SM = Well Graded Sand with Silt

TABLE 2-2. ASH ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Depth (ft BGS)	Sample Date	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Boron (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)
XPW01	6-8	01/20/2021	<4.1	7.5	1800	1.6	260	<1.4	27	12	21	15	0.53	3.3	5.8	<1.4
XPW01	13-15	01/20/2021	<4	12	2400	2	390	<1.3	33	18	24	21	0.74	4.5	8.1	<1.3
XPW02	9-10	01/19/2021	<3	2.6	1900	1.2	94	<1	13	6.7	5	10	<0.2	1.2	<1	<1
XPW02	11.5-13.5	01/19/2021	<4.6	19	570	<1.5	69	<1.5	14	5	6.9	<7.7	<0.31	21	2.1	<1.5
XPW03	7.5-9	01/19/2021	<4.4	7.4	3600	1.8	280	<1.5	31	15	21	16	<0.29	3.6	3	<1.5
XPW03	17-19	01/19/2021	<3.6	27	490	1.3	95	<1.2	22	3.1	6.3	6.7	<0.24	3.4	1.3	<1.2
XPW04	13-15	01/19/2021	<3.4	9.4	1100	1.9	310	<1.1	26	13	21	18	0.69	3.6	5.9	<1.1
XPW04	17-19	01/19/2021	<5.6	9	4100	2.2	320	<1.9	33	15	21	18	<0.37	3.7	3.4	<1.9

Notes:
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method.
BGS = below ground surface
ft = feet
mg/kg = milligrams per kilogram

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TABLE 2-3. POREWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)
XPW01	02/17/2021	<0.003	0.042	0.035	<0.001	9.5	<0.004	62	49	<0.004	<0.008	2.17	<0.001	0.11	0.015	0.66	12.3	0.0059	0.23	19000	<0.001
XPW01	03/09/2021	<0.003	0.049	0.14	<0.001	11	<0.001	63	38	<0.004	<0.002	2.37	<0.001	0.13	0.014	0.59	12.4	0.211	0.21	14000	<0.001
XPW01	03/30/2021	<0.003	0.049	0.064	<0.001	9.9	<0.001	54	32	<0.004	<0.002	2.7	<0.001	0.14	0.011	0.54	12.4	0	0.19	19000	<0.001
XPW01	04/28/2021	<0.003	0.054	0.46	<0.001	10	<0.001	61	33	0.008	0.003	2.61	0.0039	0.074	0.013	0.53	12.3	0.157	0.17	12000	<0.001
XPW01	06/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.19	--	--	--
XPW01	07/14/2021	<0.003	0.052	0.039	<0.001	12	<0.001	31	27	<0.004	<0.002	1.92	<0.001	0.15	0.012	0.38	12.2	0.167	0.12	11000	<0.001
XPW02	02/17/2021	<0.003	0.092	0.017	<0.001	2.3	<0.001	15	10	<0.004	<0.002	0.762	<0.001	<0.02	<0.0002	0.093	8.6	0.096	<0.001	160	<0.001
XPW02	03/09/2021	<0.003	0.091	0.024	<0.001	2.5	<0.001	20	9.6	<0.004	<0.002	0.61	<0.001	<0.02	<0.0002	0.097	9.2	0.705	<0.001	150	<0.001
XPW02	03/30/2021	<0.003	0.085	0.05	<0.001	2.4	<0.001	22	9.9	<0.004	<0.002	0.575	<0.001	0.026	<0.0002	0.1	8.9	0.832	<0.001	160	<0.001
XPW02	04/28/2021	<0.003	0.082	0.042	<0.001	2.6	<0.001	25	9.7	<0.004	<0.002	0.637	<0.001	0.023	<0.0002	0.11	9.9	0.668	<0.001	190	<0.001
XPW02	06/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.026	--	--	--
XPW02	07/14/2021	<0.003	0.077	0.025	<0.001	2.5	<0.001	21	10	<0.004	<0.002	0.508	<0.001	0.028	<0.0002	0.086	9.7	0.388	<0.001	160	<0.001
XPW03	02/17/2021	<0.003	0.036	0.069	<0.001	1.3	<0.001	42	14	<0.004	<0.002	0.466	<0.001	0.032	<0.0002	0.061	10.9	0.204	0.0023	92	<0.001
XPW03	03/09/2021	<0.003	0.031	0.11	<0.001	1.2	<0.001	47	9.2	<0.004	<0.002	0.569	<0.001	0.024	<0.0002	0.054	10.8	0.576	0.0038	93	<0.001
XPW03	03/30/2021	<0.003	0.014	0.088	<0.001	0.84	<0.001	44	13	<0.004	<0.002	0.384	<0.001	0.025	<0.0002	0.027	10.2	0.451	0.0019	94	<0.001
XPW03	04/28/2021	<0.003	0.035	0.37	<0.001	1.2	<0.001	55	11	0.0055	<0.002	0.598	0.0027	0.029	<0.0002	0.054	11.3	0.613	0.0017	96	<0.001
XPW03	06/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.47	--	--	--
XPW03	07/14/2021	<0.003	0.032	0.44	<0.001	1.3	<0.001	72	11	0.0068	0.0021	0.372	0.0036	0.04	<0.0002	0.055	11.2	0.57	0.0019	120	<0.001
XPW04	02/17/2021	<0.003	0.0065	0.13	<0.001	2.5	<0.001	80	62	<0.004	<0.002	0.618	<0.001	0.021	0.00029	0.37	10.8	0.0723	0.055	2200	<0.001
XPW04	03/09/2021	<0.003	0.0067	0.15	<0.001	2.4	<0.001	65	34	<0.004	<0.002	0.602	<0.001	<0.02	<0.0002	0.19	10.0	0.374	0.028	1400	<0.001
XPW04	03/29/2021	<0.003	0.0062	0.3	<0.001	2.1	<0.001	53	31	0.005	<0.002	0.605	<0.001	<0.02	<0.0002	0.059	9.1	0.62	0.0074	600	<0.001
XPW04	04/28/2021	<0.003	0.0071	0.22	<0.001	2.8	<0.001	120	37	<0.004	<0.002	0.628	<0.001	0.02	0.00027	0.52	11.5	0.0889	0.083	3800	<0.001
XPW04	06/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.66	--	--	--
XPW04	07/14/2021	<0.003	0.0067	0.089	<0.001	2.3	<0.001	60	34	<0.004	<0.002	0.542	<0.001	<0.02	<0.0002	0.14	10.0	0.36	0.02	1600	<0.001

TABLE 2-3. POREWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)

Notes:
Field readings are reported with as many significant figures as provided by analytical laboratory.
-- = data not available
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method.
mg/L = milligrams per liter
pCi/L = picocuries per liter
SU = standard units

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TABLE 2-4. SOIL ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Geologic Unit	Sample Depth (ft BGS)	Sample Date	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Boron (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)
APW11	Peoria Silt/Sangamon Soil	8-10	01/23/2021	<3.6	4.3	45	<1.2	<12	<1.2	7.3	9.4	8.5	<6.1	<0.24	<1.2	<1.2	<1.2
APW11	Mulberry Grove Member	62-64	01/23/2021	<3.5	2.8	16	<1.2	<12	<1.2	7.1	4.3	5.7	7.3	<0.23	<1.2	<1.2	<1.2
APW11	Smithboro Till Member	94-96	01/23/2021	<3.6	8.9	86	<1.2	<12	<1.2	9.8	5.7	8.6	<6	<0.24	1.2	<1.2	<1.2
APW12	Hagarstown Member	22-23.5	01/21/2021	<3.6	2.4	46	<1.2	<12	<1.2	13	7.4	8.4	10	<0.24	<1.2	<1.2	<1.2
APW12	Hagarstown Member	23.5-25	01/21/2021	<3.8	1.4	9.7	<1.3	<13	<1.3	<5.1	<2.5	1.7	<6.3	<0.25	<1.3	<1.3	<1.3
APW12	Smithboro Till Member	83-85	01/21/2021	<3.2	22	65	<1.1	<11	<1.1	11	9.4	13	7.8	<0.21	1.3	<1.1	<1.1
APW13	Sangamon Soil	23-25	01/22/2021	<3.1	2.4	41	<1	<10	<1	11	5.5	8.6	10	<0.21	<1	<1	<1
APW13	Mulberry Grove Member	58-60	01/22/2021	<4	4.6	25	<1.3	<13	<1.3	10	6.7	8.6	<6.6	<0.26	2.3	<1.3	<1.3
APW13	Banner Formation	78-80	01/22/2021	<3.1	5.9	57	<1	<10	<1	16	9.7	12	20	<0.21	2.5	<1	<1
APW14	Mulberry Grove Member	48-50	01/23/2021	<3.2	3.7	11	<1.1	<11	<1.1	6.6	3.9	6	6.3	<0.21	1.4	<1.1	<1.1
APW14	Smithboro Till Member	88-90	01/23/2021	<3.2	4.1	83	<1.1	<11	<1.1	12	7.2	15	9.6	<0.21	<1.1	1.2	<1.1
APW15	Hagarstown Member	23-25	01/21/2021	<3	<1	42	<1	<10	<1	5.1	<2	7.5	<5.1	<0.2	<1	<1	<1
APW15	Vandalia Till Member	85-87	01/21/2021	<3	1.8	14	<1	<10	<1	<4	<2	3.2	<5	<0.2	<1	<1	<1
APW15	Smithboro Till Member	102-104	01/22/2021	<3.5	1.8	14	<1.2	<12	<1.2	<4.7	<2.3	3.5	<5.9	<0.23	<1.2	<1.2	<1.2
APW17	Vandalia Till Member	38-40	01/22/2021	<3.1	3.4	21	<1	<10	<1	7.5	5.7	7.7	7	<0.21	1.5	<1	<1
APW17	Mulberry Grove Member	68-70	01/22/2021	<3	1.8	12	<1	<10	<1	<4	<2	2.8	<5	<0.2	<1	<1	<1
APW17	Mulberry Grove Member	88-90	01/22/2021	<3	5.9	37	<1	<10	<1	7.8	10	6.9	<5	<0.2	1.4	<1	<1

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TABLE 2-4. SOIL ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Geologic Unit	Sample Depth (ft BGS)	Sample Date	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Boron (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)
APW17	Smithboro Till Member	94-96	01/22/2021	<3.5	4.2	75	<1.2	<12	<1.2	8.6	4.6	7.4	7.6	<0.24	<1.2	<1.2	<1.2
XPW02	Fill	9-10	01/19/2021	<3	2.6	1900	1.2	94	<1	13	6.7	5	10	<0.2	1.2	<1	<1
XPW02	Fill	11.5-13.5	01/19/2021	<4.6	19	570	<1.5	69	<1.5	14	5	6.9	<7.7	<0.31	21	2.1	<1.5

Notes:
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method.
BGS = below ground surface
ft = foot or feet
mg/kg = milligrams per kilogram

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TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
APW02	UD	06/19/2010	533.61	533.61	Top of Riser	529.90	9.70	19.70	520.20	510.20	20.00	509.90	10	2	38.925918	-88.293907
APW03	UD	06/18/2010	532.41	532.41	Top of Riser	528.37	9.70	19.70	518.67	508.67	20.00	508.40	10	2	38.922322	-88.281567
APW04	UD	06/19/2010	525.06	525.06	Top of Riser	521.45	7.70	17.70	513.75	503.75	18.00	503.50	10	2	38.927444	-88.273113
APW05	UA	10/22/2015	544.07	544.07	Top of Riser	541.08	62.64	67.44	478.44	473.64	67.84	473.10	4.8	2	38.933958	-88.280983
APW05S	UD	01/19/2021	543.94	543.94	Top of PVC	541.05	10.00	20.00	531.05	521.05	20.00	518.10	10	2	38.933958	-88.281033
APW06	UA	10/21/2015	546.07	546.07	Top of Riser	542.89	67.67	72.48	475.22	470.41	72.88	468.90	4.8	2	38.933746	-88.286276
APW07	UA	11/05/2015	538.37	538.37	Top of Riser	535.72	77.89	82.70	457.83	453.02	83.10	452.60	4.8	2	38.928233	-88.292076
APW08	UA	10/28/2015	528.97	528.97	Top of Riser	526.26	71.40	81.06	454.86	445.20	81.53	444.30	9.7	2	38.923154	-88.292286
APW09	UA	11/03/2015	531.52	531.52	Top of Riser	528.33	56.66	61.46	471.67	466.87	61.85	466.30	4.8	2	38.922319	-88.281585
APW10	UA	11/06/2015	524.25	524.25	Top of Riser	521.49	40.74	45.54	480.75	475.95	45.94	475.60	4.8	2	38.927435	-88.273127
APW11	UA	01/23/2021	538.63	538.63	Top of PVC	536.05	60.00	65.00	476.05	471.05	65.00	436.10	5	2	38.932811	-88.27545
APW12	UD	02/21/2021	546.29	546.29	Top of PVC	543.33	20.00	30.00	523.33	513.33	30.00	456.30	10	2	38.92975	-88.272058
APW13	UA	01/22/2021	537.99	537.99	Top of PVC	535.16	58.50	63.50	476.66	471.66	63.50	445.20	5	2	38.92566	-88.274416
APW14	UA	01/23/2021	526.29	526.29	Top of PVC	523.85	50.00	55.00	473.85	468.85	55.00	428.90	5	2	38.924057	-88.277994
APW15	UA	01/22/2021	524.69	524.69	Top of PVC	522.06	98.00	103.00	424.06	419.06	103.00	412.10	5	2	38.921593	-88.285226
APW16	UA	01/20/2021	531.18	531.18	Top of PVC	529.16	80.50	85.50	448.66	443.66	85.50	419.20	5	2	38.920317	-88.291291
APW17	UA	01/22/2021	532.52	532.52	Top of PVC	529.84	87.00	92.00	442.84	437.84	92.00	429.80	5	2	38.925916	-88.293928
APW18	UA	01/21/2021	543.27	543.27	Top of PVC	540.55	75.00	80.00	465.55	460.55	80.00	433.60	5	2	38.930979	-88.290122
G48MG	UA	10/20/2015	545.53	545.53	Top of Riser	542.68	71.80	76.65	470.88	466.03	77.06	465.60	4.9	2	38.939248	-88.296012
G202	UA	10/16/1996	539.69	539.69	Top of Riser	536.85	64.00	74.00	472.85	462.85	74.00	462.90	10	2	38.930876	-88.290559
G203	UA	11/15/1996	533.13	533.13	Top of Riser	530.73	62.50	72.50	468.23	458.23	72.50	458.20	10	2	38.928597	-88.292217
G208	UA	10/13/2011	535.03	535.03	Top of Riser	533.19	74.93	94.71	458.26	438.48	94.80	438.20	19.8	2	38.929632	-88.298182
G217S	UD	08/26/1997	537.98	537.98	Top of Riser	535.54	9.00	19.00	526.54	516.54	19.00	510.50	10	2	38.932171	-88.290041

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
G217D	UA	12/09/2014	537.92	537.92	Top of Riser	535.51	--	--	--	--	69.30	--	--	--	38.932174	-88.29008
G222	UA	10/25/2011	534.32	534.32	Top of Riser	532.38	64.57	79.24	467.81	453.14	79.30	452.40	14.7	2	38.927194	-88.299669
G223	UA	10/11/2011	533.60	533.60	Top of Riser	531.68	79.09	88.75	452.59	442.93	89.10	442.60	9.7	2	38.93016	-88.293451
G224	UA	10/05/2011	534.31	534.31	Top of Riser	532.31	63.51	73.17	468.80	459.14	73.50	458.30	9.7	2	38.931767	-88.292396
R202	UA	--	--	--	--	--	--	--	--	--	--	--	--	--	38.930879	-88.290581
R217D	UA	09/26/2017	538.18	538.18	Top of Riser	535.60	60.10	65.03	475.50	470.57	65.24	470.40	4.9	2	38.932191	-88.290118
XPW01	CCR	01/20/2021	551.76	551.76	Top of PVC	548.62	7.00	17.00	541.62	531.62	17.00	528.60	10	2	38.932212	-88.285525
XPW02	CCR	01/19/2021	554.43	554.43	Top of PVC	551.97	6.00	16.00	545.97	535.97	16.00	532.00	10	2	38.932343	-88.28289
XPW03	CCR	01/19/2021	553.65	553.65	Top of PVC	550.81	10.00	20.00	540.81	530.81	20.00	530.80	10	2	38.931062	-88.27641
XPW04	CCR	01/19/2021	554.51	554.51	Top of PVC	551.90	10.00	20.00	541.90	531.90	20.00	531.90	10	2	38.929888	-88.274073
XSG01	CCR	--	--	536.17	Staff gauge	--	--	--	--	--	--	--	--	--	38.923218	-88.29067
SG02	SW	--	--	506.89	Staff gauge	--	--	--	--	--	--	--	--	--	38.921234	-88.292057

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
-- = data not available
BGS = below ground surface
CCR = Coal Combustion Residual
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
SW = surface water
UA = uppermost aquifer
UD = upper drift
generated 10/05/2021, 4:23:16 PM CDT

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TABLE 3-2. VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER STATION
PRIMARY ASH POND
NEWTON, IL

Date	APW05S Groundwater Elevation (ft NAVD88)	APW05 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	PMP	UA				
2/15/2021	533.90	529.83	4.07	50.01	0.081	down
3/9/2021	533.71	529.61	4.10	50.01	0.082	down
3/29/2021	533.91	529.68	4.23	50.01	0.085	down
4/27/2021	533.56	529.73	3.83	50.01	0.077	down
5/25/2021	533.23	529.51	3.72	50.01	0.074	down
6/15/2021	532.54	529.42	3.12	50.01	0.062	down
6/24/2021	531.93	529.38	2.55	50.01	0.051	down
7/14/2021	532.16	529.33	2.83	50.01	0.057	down
			Middle of screen elevation APW05S			526.05
			Middle of screen elevation APW05			476.04

Date	APW04 Groundwater Elevation (ft NAVD88)	APW10 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	PMP	UA				
2/15/2021	518.19	506.65	11.54	30.40	0.38	down
3/9/2021	519.50	505.10	14.40	30.40	0.47	down
3/29/2021	520.34	506.94	13.40	30.40	0.44	down
4/27/2021	519.87	506.53	13.34	30.40	0.44	down
5/24/2021	519.73	506.35	13.38	30.40	0.44	down
6/15/2021	519.68	506.26	13.42	30.40	0.44	down
6/24/2021	529.51	506.12	23.39	30.40	0.77	down
7/14/2021	519.99	506.59	13.40	30.40	0.44	down
			Middle of screen elevation APW04			508.8
			Middle of screen elevation APW10			478.4

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TABLE 3-2. VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

NEWTON POWER STATION

PRIMARY ASH POND

NEWTON, IL

Date	APW03 Groundwater Elevation (ft NAVD88)	APW09 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	PMP	UA				
2/15/2021	523.58	504.93	18.65	47.00	0.40	down
3/9/2021	524.93	505.10	19.83	47.00	0.42	down
3/29/2021	526.00	505.23	20.77	47.00	0.44	down
4/27/2021	524.25	504.74	19.51	47.00	0.42	down
5/25/2021	523.85	- - -	- - -	- - -	- - -	- - -
6/15/2021	523.41	504.63	18.78	47.00	0.40	down
6/24/2021	523.18	504.48	18.70	47.00	0.40	down
7/14/2021	523.70	505.24	18.46	47.00	0.39	down
			Middle of screen elevation APW03			518.7
			Middle of screen elevation APW09			471.7

[O:SSW 09/09/21; U:SSW 08/31/21; C: LDC 08/31/21]

Notes:

[1] Distance change was calculated using the midpoint of the piezometer screen and water table surface. If the water table surface was above the top of the monitoring well screen, then distance change was calculated using the midpoint of both screens.

[2] Vertical gradients between ±0.0015 are considered flat, and typically have less than 0.02 foot difference in groundwater elevation between wells.

- - - = no data collected on date / no vertical gradient calculated

dh = head change

dl = distance change

ft = foot/feet

LCU = lower confining unit

NAVD88 = North American Vertical Datum of 1988

PMP = potential migration pathway

UA = uppermost aquifer

TABLE 3-3. FIELD HYDRAULIC CONDUCTIVITIES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

NEWTON POWER STATION

PRIMARY ASH POND

NEWTON, ILLINOIS

Well ID	Gradient Position	Bottom of Screen Elevation (ft NAVD88)	Screen Length [1] (ft)	Field Identified Screened Material	Slug Type	Analysis Method	Falling Head (Slug In) K (cm/s)			Rising Head (Slug Out) K (cm/s)			Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
							1	2	3	1	2	3			
Upper Drift Unit/Potential Migration Pathway															
APW5S	U	521.05	10	SP	Solid	C-B-P	8.9E-04	7.4E-04		6.1E-04	8.5E-04		6.1E-04	1.5E-02	3.1E-03
APW12	U	513.33	10	SP	Solid	C-B-P	1.3E-02	9.8E-03		1.3E-02	1.5E-02				
Uppermost Aquifer															
APW11	U	471.05	5	SP-SC/GP	Solid	KGS Model	6.8E-03	5.9E-03		3.5E-03	7.8E-03		2.0E-04	1.5E-01	6.8E-03
APW13	D	471.66	5	SM	Solid	C-B-P	1.6E-03	1.5E-03	3.3E-03	3.8E-03	3.4E-03				
APW14	D	468.85	5	SC	Solid	KGS Model	3.9E-03	4.3E-03		3.2E-04	3.2E-04	2.8E-03			
APW15	D	419.06	5	SP-SM	Solid	KGS Model	4.9E-04	2.0E-04	1.4E-01	1.5E-01	1.5E-01				
APW16	D	443.66	5	SP	Solid	B-Z	1.24E-01	1.41E-01		7.60E-02	7.96E-02				
APW17	D	437.84	5	(SW)g/(SP)g	Solid	C-B-P	1.13E-01	1.15E-02							
APW18	D	460.55	5	(SW)g/SC	Solid	C-B-P	2.67E-04								
Ash Pond															
XPW01	CCR	531.62	10	(SW)g	Solid	Bouwer-Rice	1.8E-01	1.3E-02		2.4E-02	1.4E-02		1.0E-03	2.3E-01	2.0E-02
XPW02	CCR	535.97	10	(SW)g	Solid	Bouwer-Rice	2.0E-03	2.6E-03							
XPW03	CCR	530.81	10	(SW)g/SP	Solid	Bouwer-Rice	5.7E-02	7.2E-02	2.3E-01	1.5E-01	1.2E-01	1.4E-01			
XPW04	CCR	531.90	10	(SW)g	Solid	KGS Model		2.1E-03		1.2E-03	1.0E-03				

[O: SSW 7/1/20; U:SSW 8/20/21; C:LDC 08/31/21]

Notes:

[1] All wells are constructed from 2 inch PVC with 0.01 inch slotted screens.

Test not analyzed/performed

B-Z = Butler-Zhan Test Solution

C-B-P = Cooper-Bredehoeft-Papadopulos Slug Test Solution

CCR = coal combustion residuals

cm/s = centimeters per second

D = downgradient

ft = foot/feet

K = hydraulic conductivity

KGS = Kansas Geological Survey

NAVD88 = North American Vertical Datum of 1988

U = upgradient

USCS = Unified Soil Classification System

GP = Poorly Graded Gravel

SC = Clayey Sand

SM = Silty Sand

SP = Poorly Graded Sand

SP-SC = Poorly Graded Sand to Clayey Sand

SP-SM = Poorly Graded Sand with Silt

(SW)g = Well Graded Sand with Gravel

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TABLE 3-4. HORIZONTAL HYDRAULIC GRADIENTS AND GROUNDWATER FLOW VELOCITIES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER STATION
PRIMARY ASH POND
NEWTON, IL

$V = K\,i\ /\ n_e$

V = Groundwater Velocity
K = Hydraulic Conductivity [1]
i = hydraulic gradient
n_e = Effective Porosity [2]

East-West Across CCR Unit (APW10 to APW17): Uppermost Aquifer

Distance between Wells (ft): 5941
Hydraulic Conductivity (ft/day): 181
Effective Porosity (%): 24% Assumes: sand and silt

Date	APW10 Groundwater Elevation (ft NAVD88)	APW17 Groundwater Elevation (ft NAVD88)	Change in Elevation (ft)	Horizontal Gradient (ft/ft)	Velocity [3] (ft/day)
2/15/2021	506.65	492.02	14.63	0.0025	1.86
3/9/2021	506.84	491.74	15.10	0.0025	1.91
3/29/2021	506.94	491.95	14.99	0.0025	1.90
4/27/2021	506.53	491.87	14.66	0.0025	1.86
6/15/2021	506.26	491.57	14.69	0.0025	1.86
6/24/2021	506.12	491.52	14.60	0.0025	1.85
7/14/2021	506.59	491.58	15.01	0.0025	1.90
			Average	0.0025	1.88

North-South Across Northeastern Portion CCR Unit (APW05 to APW10): Uppermost Aquifer

Distance between Wells (ft): 3260
Hydraulic Conductivity (ft/day): 1.4
Effective Porosity (%): 24% Assumes: sand and silt

Date	APW05 Groundwater Elevation (ft NAVD88)	APW10 Groundwater Elevation (ft NAVD88)	Change in Elevation (ft)	Horizontal Gradient (ft/ft)	Velocity [3] (ft/day)
2/15/2021	529.83	506.65	23.18	0.0071	0.04
3/9/2021	529.61	506.84	22.77	0.0070	0.04
3/29/2021	529.68	506.94	22.74	0.0070	0.04
4/27/2021	529.73	506.53	23.20	0.0071	0.04
5/24/2021	529.51	506.35	23.16	0.0071	0.04
6/15/2021	529.42	506.26	23.16	0.0071	0.04
6/24/2021	529.38	506.12	23.26	0.0071	0.04
7/14/2021	529.33	506.59	22.74	0.0070	0.04
			Average	0.0071	0.04

[O:SSW 7/15/21; U:SSW 8/19/21; C:LDC 8/31/21]

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TABLE 3-4. HORIZONTAL HYDRAULIC GRADIENTS AND GROUNDWATER FLOW VELOCITIES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

NEWTON POWER STATION

PRIMARY ASH POND

NEWTON, IL

Notes:

[1] Hydraulic conductivity values used above are average of the individual wells used in each velocity calculation as derived from slug tests completed in August 2015 and March and April 2021 by Ramboll.

[2] Effective porosity used in these calculations was derived from an average between estimated values of 0.20 for silt materials, 0.267 for gravel, 0.07 for clay, and 0.28 for sand from Morris, D.A. and A.I. Johnson, 1967. Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Surve, U.S. Geological Survey Water-Supply Paper 1839-D, 42p. and Heath, R.C., 1983. Basic ground-water hydrology, U.S. Geological Survey Water-Supply Paper 2220, 86p. Effective porosity may be as high as maximum total porosity (50%) calculated in Table 2-1.

% = percent

ft= foot/feet

ft/ft = feet per foot

ft/day = feet per day

NAVD88 = North American Vertical Datum of 1988

NM = not measured

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW02	01/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--	--	--	--	4800
APW02	04/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--	--	--	--	5300
APW02	07/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	5200
APW02	10/07/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.7	--	--	--	--	5000
APW02	02/17/2021	<0.003	<0.001	0.0084	<0.001	0.091	<0.001	430	84	<0.004	<0.002	<0.25	<0.001	0.079	<0.0002	<0.001	6.6	0.305	<0.001	2900	<0.001	4800
APW02	03/10/2021	<0.003	0.001	0.0091	<0.001	0.14	<0.001	530	120	<0.004	<0.002	<0.25	<0.001	0.11	<0.0002	0.0014	7.0	0.248	<0.001	3200	<0.001	5100
APW02	03/30/2021	<0.003	<0.001	0.0075	<0.001	0.24	<0.001	490	110	<0.004	<0.002	<0.25	<0.001	0.12	<0.0002	<0.001	6.6	0.193	<0.001	3100	<0.001	5200
APW02	04/29/2021	<0.003	<0.001	0.013	<0.001	0.12	<0.001	490	130	<0.004	<0.002	<0.25	<0.001	0.11	<0.0002	<0.001	6.7	0.924	<0.001	1500	<0.001	5100
APW02	05/25/2021	<0.003	<0.001	0.015	<0.001	0.14	<0.001	520	120	<0.004	<0.002	<0.25	<0.001	0.12	<0.0002	0.0011	6.7	1.01	<0.001	3200	<0.001	5200
APW02	06/16/2021	<0.003	<0.001	0.022	<0.001	0.16	<0.001	540	110	<0.004	<0.002	<0.25	<0.001	0.12	<0.0002	<0.001	6.6	0.34	<0.001	3100	<0.001	5000
APW02	06/30/2021	<0.003	<0.001	0.036	<0.001	0.49	<0.001	510	110	<0.004	<0.002	<0.25	<0.001	0.3	<0.0002	<0.001	6.6	0.618	<0.001	3200	<0.001	4900
APW02	07/15/2021	<0.003	<0.001	0.025	<0.001	0.14	<0.001	480	120	<0.004	<0.002	<0.25	<0.001	0.21	<0.0002	<0.001	6.6	0.33	<0.001	3100	<0.001	5400
APW03	01/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4	--	--	--	--	3000
APW03	04/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	580
APW03	07/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--	--	--	--	580
APW03	10/07/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3	--	--	--	--	680
APW03	02/18/2021	<0.003	<0.001	0.077	<0.001	0.42	<0.00089	120	8.1	<0.004	<0.002	0.276	0.0013	0.022	0.0006	0.0018	6.7	0.126	<0.001	180	<0.001	620
APW03	03/10/2021	<0.003	<0.001	0.073	<0.001	0.4	<0.001	110	8.7	<0.004	<0.002	<0.25	<0.001	0.024	<0.0002	0.0014	7.2	0.238	<0.001	180	<0.001	720
APW03	03/31/2021	<0.003	<0.001	0.07	<0.001	0.44	<0.001	110	8.6	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0012	6.3	0.246	<0.001	170	<0.001	720
APW03	04/29/2021	<0.003	<0.001	0.068	<0.001	0.4	<0.001	110	8.2	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0019	7.0	0.822	<0.001	170	<0.001	660
APW03	05/25/2021	<0.003	<0.001	0.063	<0.001	0.38	<0.001	110	8	<0.004	<0.002	<0.25	<0.001	0.023	<0.0002	0.0015	7.0	0.369	<0.001	170	<0.001	760
APW03	06/17/2021	<0.003	<0.001	0.081	<0.001	0.45	<0.001	120	8.3	<0.004	<0.002	<0.25	<0.001	0.02	<0.0002	0.0014	7.0	0.461	<0.001	170	<0.001	660

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW03	06/30/2021	<0.003	<0.001	0.059	<0.001	0.66	<0.001	110	11	<0.004	<0.002	<0.25	<0.001	0.035	<0.0002	0.0014	7.0	0.0646	<0.001	160	<0.001	600
APW03	07/15/2021	<0.003	<0.001	0.067	<0.001	0.49	<0.001	110	8.5	<0.004	<0.002	<0.25	<0.001	0.03	<0.0002	0.0013	6.9	1.03	<0.001	190	<0.001	710
APW04	01/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2	--	--	--	--	2300
APW04	04/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	3100
APW04	07/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	2400
APW04	10/07/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	2300
APW04	02/18/2021	<0.003	0.0012	0.021	<0.001	0.033	<0.00089	230	36	<0.004	<0.002	<0.25	0.0014	0.022	0.001	<0.001	6.5	0.391	<0.001	860	<0.001	1700
APW04	03/11/2021	<0.003	0.0012	0.022	<0.001	0.024	<0.001	220	33	<0.004	<0.002	<0.25	0.001	0.024	<0.0002	<0.001	6.9	0.104	<0.001	970	<0.001	1800
APW04	03/31/2021	<0.003	<0.001	0.018	<0.001	0.031	<0.001	210	37	<0.004	<0.002	<0.25	<0.001	0.021	<0.0002	<0.001	6.1	0.0836	<0.001	960	<0.001	2000
APW04	04/29/2021	<0.003	<0.001	0.013	<0.001	0.023	<0.001	220	29	<0.004	<0.002	<0.25	<0.001	<0.02	<0.0002	<0.001	6.9	0.0843	<0.001	990	<0.001	1800
APW04	05/25/2021	<0.003	0.0014	0.026	<0.001	0.027	<0.001	220	32	<0.004	<0.002	<0.25	0.0014	0.021	<0.0002	<0.001	6.9	0.0127	<0.001	900	<0.001	1800
APW04	06/17/2021	<0.003	0.0012	0.026	<0.001	0.025	<0.001	240	29	<0.004	<0.002	<0.25	<0.001	0.021	<0.0002	<0.001	6.8	0.488	<0.001	950	<0.001	1800
APW04	06/30/2021	<0.003	<0.001	0.032	<0.001	0.21	<0.001	220	27	<0.004	<0.002	<0.25	<0.001	0.045	<0.0002	<0.001	6.8	0.663	<0.001	910	<0.001	1700
APW04	07/15/2021	<0.003	0.0012	0.025	<0.001	0.033	<0.001	210	34	<0.004	<0.002	<0.25	<0.001	0.034	<0.0002	<0.001	6.8	1.29	<0.001	920	<0.001	1900
APW05	12/15/2015	<0.003	0.018	0.19	<0.001	0.099	<0.001	51	48	<0.004	<0.002	0.486	0.0017	0.023	<0.0002	0.023	7.5	0.311	<0.001	15	<0.001	560
APW05	01/20/2016	<0.003	0.017	0.19	<0.001	0.12	<0.001	52	50	<0.004	<0.002	0.409	0.0016	0.017	0.0002	0.023	7.5	0.235	<0.001	15	<0.001	510
APW05	04/27/2016	<0.003	0.021	0.24	<0.001	0.1	<0.001	71	58	<0.004	<0.002	0.494	0.0012	0.02	0.002	0.032	7.7	0.281	0.001	14	<0.001	520
APW05	08/01/2016	<0.003	0.014	0.21	<0.001	0.1	<0.001	49	52	<0.004	<0.002	0.54	<0.001	0.016	<0.0002	0.027	7.5	0.616	<0.001	1.8	<0.001	500
APW05	10/25/2016	<0.003	0.013	0.22	<0.001	0.12	<0.001	50	50	<0.004	<0.002	0.66	<0.001	0.015	<0.0002	0.027	7.6	0.654	<0.001	<1	<0.001	1000
APW05	01/23/2017	<0.003	0.015	0.21	<0.001	0.09	<0.001	45	50	<0.004	<0.002	0.418	<0.001	0.013	<0.0002	0.021	7.4	0.0999	<0.001	<1	<0.001	550
APW05	04/24/2017	<0.003	0.014	0.2	<0.001	0.079	<0.001	44	46	0.004	<0.002	0.437	0.0014	0.015	<0.0002	0.016	7.0	1.19	<0.001	1.2	<0.001	600
APW05	06/13/2017	<0.003	0.016	0.23	<0.001	0.082	<0.001	48	47	<0.004	<0.002	0.508	<0.001	0.014	<0.0002	0.018	7.1	1.32	<0.001	<1	<0.001	540

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW05	11/17/2017	--	--	--	--	0.099	--	51	43	--	--	0.634	--	--	--	--	6.9	--	--	<1	--	480
APW05	05/18/2018	--	--	--	--	0.1	--	48	48	--	--	0.525	--	--	--	--	7.1	--	--	2.1	--	480
APW05	08/17/2018	--	--	--	--	--	--	54	56	--	--	--	--	--	--	--	7.0	--	--	1.4	--	--
APW05	11/09/2018	--	--	--	--	0.098	--	50	51	--	--	0.427	--	--	--	--	7.0	--	--	5.1	--	500
APW05	02/22/2019	--	--	--	--	0.11	--	50	48	--	--	0.374	--	--	--	--	6.9	--	--	3.5	--	600
APW05	08/22/2019	--	--	--	--	0.12	--	49	50	--	--	<0.25	--	--	--	--	7.0	--	--	2.3	--	530
APW05	02/04/2020	--	--	--	--	0.091	--	51	54	--	--	0.48	--	--	--	--	7.5	--	--	2.3	--	600
APW05	06/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4	--	--	--	--	--
APW05	07/28/2020	--	--	--	--	0.1	--	53	52	--	--	0.544	--	--	--	--	7.7	--	--	1.8	--	530
APW05	02/09/2021	--	--	--	--	0.13	--	54	50	--	--	0.543	--	--	--	--	7.6	--	--	1.3	--	560
APW05	02/17/2021	<0.003	0.003	0.22	<0.001	0.1	<0.001	49	52	<0.004	<0.002	0.479	<0.001	<0.02	<0.0002	0.019	7.2	0.356	<0.001	3.3	<0.001	510
APW05	03/10/2021	<0.003	0.022	0.24	<0.001	0.12	<0.001	55	48	<0.004	<0.002	0.365	<0.001	<0.02	<0.0002	0.011	7.7	0.872	<0.001	1.3	<0.001	530
APW05	03/30/2021	<0.003	0.022	0.27	<0.001	0.092	<0.001	54	49	<0.004	<0.002	0.342	<0.001	<0.02	<0.0002	0.011	7.2	1.31	<0.001	1.3	<0.001	560
APW05	04/28/2021	<0.003	0.018	0.24	<0.001	0.099	<0.001	52	51	<0.004	<0.002	0.514	<0.001	<0.02	<0.0002	0.012	7.5	0.932	<0.001	1.1	<0.001	570
APW05	05/25/2021	<0.003	0.019	0.24	<0.001	0.12	<0.001	54	48	<0.004	<0.002	0.532	<0.001	<0.02	<0.0002	0.012	7.5	1.04	<0.001	1	<0.001	570
APW05	06/17/2021	<0.003	0.022	0.25	<0.001	0.091	<0.001	58	50	<0.004	<0.002	0.516	<0.001	<0.02	<0.0002	0.011	7.7	1.08	<0.001	<1	<0.001	560
APW05	06/30/2021	<0.003	0.021	0.25	<0.001	0.26	<0.001	52	51	<0.004	<0.002	0.441	<0.001	<0.02	<0.0002	0.011	7.6	0.0954	<0.001	1	<0.001	470
APW05	07/15/2021	<0.003	0.022	0.25	<0.001	0.1	<0.001	51	52	<0.004	<0.002	0.386	<0.001	<0.02	<0.0002	0.011	7.8	0.305	<0.001	1.1	<0.001	560
APW05S	02/17/2021	<0.003	<0.001	0.048	<0.001	0.04	<0.001	390	550	<0.004	0.0058	0.345	<0.001	0.043	<0.0002	0.0027	6.6	0.191	<0.001	640	<0.001	3700
APW05S	03/10/2021	<0.003	<0.001	0.051	<0.001	0.13	<0.001	420	190	<0.004	0.0025	0.379	<0.001	0.042	<0.0002	0.0016	7.0	0.195	<0.001	200	<0.001	3600
APW05S	04/29/2021	<0.003	0.0018	0.048	<0.001	0.04	<0.001	420	200	<0.004	<0.002	0.373	<0.001	0.039	<0.0002	0.0014	6.8	0.146	<0.001	2000	<0.001	3800
APW05S	05/25/2021	<0.003	0.0016	0.053	<0.001	0.056	<0.001	420	210	<0.004	<0.002	0.391	<0.001	0.042	<0.0002	0.0014	6.9	0.386	<0.001	2100	<0.001	3500

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW05S	06/17/2021	<0.003	0.0022	0.051	<0.001	0.043	<0.001	410	190	<0.004	0.0022	0.364	<0.001	0.038	<0.0002	0.0013	6.8	1.58	<0.001	2100	<0.001	3600
APW05S	06/30/2021	<0.003	0.002	0.051	<0.001	0.046	<0.001	380	180	<0.004	0.0022	0.401	<0.001	0.091	<0.0002	0.0011	6.7	0.29	<0.001	1900	<0.001	3200
APW05S	07/15/2021	<0.003	0.0026	0.05	<0.001	0.039	<0.001	370	260	<0.004	0.0027	0.379	<0.001	0.067	<0.0002	0.0011	6.8	0.644	<0.001	2000	<0.001	3800
APW06	12/15/2015	<0.003	0.017	0.16	<0.001	0.073	<0.001	53	26	<0.004	<0.002	0.509	<0.001	0.019	0.00023	0.012	7.5	0.591	0.006	9.9	<0.001	480
APW06	01/20/2016	<0.003	0.0091	0.17	<0.001	0.082	<0.001	53	24	<0.004	<0.002	0.393	<0.001	0.012	<0.0002	0.013	7.4	0.236	<0.001	9.9	<0.001	500
APW06	04/27/2016	<0.003	0.019	0.21	<0.001	0.16	<0.001	64	29	<0.004	<0.002	0.564	0.0012	0.019	<0.0002	0.028	6.5	0.984	<0.001	7.4	<0.001	450
APW06	08/01/2016	<0.003	0.0045	0.2	<0.001	0.078	<0.001	50	27	<0.004	<0.002	0.65	<0.001	0.016	<0.0002	0.0066	7.4	0.69	<0.001	1.2	<0.001	520
APW06	10/25/2016	<0.003	0.0041	0.22	<0.001	0.093	<0.001	50	26	<0.004	<0.002	0.686	<0.001	0.015	<0.0002	0.0087	7.5	0.329	<0.001	<1	<0.001	560
APW06	01/23/2017	<0.003	0.0036	0.21	<0.001	0.076	<0.001	46	26	<0.004	<0.002	0.448	<0.001	0.014	<0.0002	0.0086	6.9	0.316	<0.001	<1	<0.001	530
APW06	04/24/2017	<0.003	0.0042	0.2	<0.001	0.074	0.0012	43	50	<0.004	<0.002	0.47	0.0012	0.015	<0.0002	0.011	7.2	0.859	<0.001	<1	0.0011	540
APW06	06/13/2017	<0.003	0.0057	0.22	0.0025	0.093	0.0017	51	25	<0.004	0.002	0.567	0.0025	0.014	<0.0002	0.014	7.1	0.932	0.0014	2.3	0.0025	460
APW06	11/17/2017	--	--	--	--	0.094	--	50	23	--	--	0.617	--	--	--	--	7.2	--	--	1.9	--	470
APW06	05/18/2018	--	--	--	--	0.087	--	51	25	--	--	0.564	--	--	--	--	7.3	--	--	1.7	--	420
APW06	08/17/2018	--	--	--	--	--	--	52	25	--	--	--	--	--	--	--	7.3	--	--	1.7	--	--
APW06	11/09/2018	--	--	--	--	0.083	--	51	24	--	--	0.459	--	--	--	--	7.2	--	--	2.1	--	440
APW06	02/22/2019	--	--	--	--	0.09	--	45	24	--	--	0.386	--	--	--	--	7.3	--	--	1.7	--	480
APW06	08/23/2019	--	--	--	--	0.11	--	55	26	--	--	0.314	--	--	--	--	7.3	--	--	5.8	--	500
APW06	02/04/2020	--	--	--	--	0.08	--	53	27	--	--	0.483	--	--	--	--	7.5	--	--	<1	--	640
APW06	06/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4	--	--	--	--	--
APW06	07/28/2020	--	--	--	--	0.091	--	55	24	--	--	0.564	--	--	--	--	7.8	--	--	3.2	--	510
APW06	02/09/2021	--	--	--	--	0.087	--	55	24	--	--	0.585	--	--	--	--	7.6	--	--	1.8	--	450
APW06	02/17/2021	<0.003	0.0045	0.24	<0.001	0.086	<0.001	54	23	<0.004	<0.002	0.504	<0.001	<0.02	<0.0002	0.0073	6.4	0.231	<0.001	3.6	<0.001	500

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW06	03/10/2021	<0.003	0.0052	0.25	<0.001	0.086	<0.001	58	22	<0.004	<0.002	0.427	<0.001	<0.02	<0.0002	0.0058	7.7	0.594	<0.001	9.2	<0.001	540
APW06	03/30/2021	<0.003	0.0052	0.22	<0.001	0.078	<0.001	56	26	<0.004	<0.002	0.368	<0.001	<0.02	<0.0002	0.0062	7.1	4.9	<0.001	7.7	<0.001	500
APW06	04/29/2021	<0.003	0.0073	0.25	<0.001	0.082	<0.001	62	23	0.0068	0.0027	0.496	0.0032	<0.02	<0.0002	0.0077	7.7	1.55	<0.001	8.5	<0.001	610
APW06	05/25/2021	<0.003	0.0088	0.28	<0.001	0.1	<0.001	68	23	0.011	0.0043	0.55	0.0074	<0.02	<0.0002	0.0085	7.7	0.474	<0.001	7.8	<0.001	490
APW06	06/16/2021	<0.003	0.0081	0.25	<0.001	0.11	<0.001	67	25	0.0076	0.0033	0.545	0.0066	<0.02	<0.0002	0.0083	7.7	1.35	<0.001	6.2	<0.001	520
APW06	06/30/2021	<0.003	0.0078	0.23	<0.001	0.085	<0.001	63	32	0.0058	0.0033	0.481	0.0063	0.03	<0.0002	0.0078	7.6	0.544	<0.001	6.3	<0.001	500
APW06	07/15/2021	<0.003	0.0067	0.23	<0.001	0.083	<0.001	55	27	<0.004	<0.002	0.442	0.0013	<0.02	<0.0002	0.0076	7.5	0.285	<0.001	7.8	<0.001	490
APW07	12/15/2015	<0.003	0.0039	0.35	<0.001	0.073	<0.001	74	69	<0.004	<0.002	0.467	<0.001	<0.01	<0.0002	0.014	7.4	1.16	<0.001	13	<0.001	520
APW07	01/21/2016	<0.003	0.0065	0.4	<0.001	0.052	<0.001	74	79	<0.004	<0.002	0.38	0.0015	<0.01	<0.0002	0.0083	7.4	1.06	<0.001	8.6	<0.001	440
APW07	05/03/2016	<0.003	0.004	0.41	<0.001	0.071	<0.001	85	72	<0.004	<0.002	0.545	<0.001	<0.01	<0.0002	0.0086	7.5	1.74	<0.001	7.5	<0.001	500
APW07	08/01/2016	<0.003	0.0049	0.45	<0.001	0.07	<0.001	86	77	<0.004	<0.002	0.462	<0.001	<0.01	<0.0002	0.006	7.3	1.32	<0.001	2.8	<0.001	490
APW07	10/26/2016	<0.003	0.0058	0.5	<0.001	0.096	<0.001	76	79	<0.004	<0.002	0.425	<0.001	<0.01	<0.0002	0.0054	7.2	2.02	<0.001	<1	<0.001	590
APW07	01/26/2017	<0.003	0.0062	0.45	<0.001	0.082	<0.001	87	77	<0.004	<0.002	0.352	<0.001	<0.01	<0.0002	0.0072	7.2	1.82	<0.001	<1	<0.001	520
APW07	04/24/2017	<0.003	0.0077	0.45	<0.001	0.069	<0.001	87	77	0.0049	<0.002	0.367	0.0022	<0.01	<0.0002	0.0029	7.3	1.26	<0.001	<1	<0.001	600
APW07	06/13/2017	<0.003	0.0087	0.48	<0.001	0.084	<0.001	93	77	<0.004	<0.002	0.425	0.0046	<0.01	<0.0002	0.0039	7.2	1.69	<0.001	<1	<0.001	560
APW07	11/17/2017	--	--	--	--	0.097	--	72	73	--	--	0.508	--	--	--	--	7.2	--	--	3.8	--	530
APW07	05/18/2018	--	--	--	--	0.082	--	97	75	--	--	0.435	--	--	--	--	7.1	--	--	4.9	--	500
APW07	08/18/2018	--	--	--	--	--	--	100	77	--	--	--	--	--	--	--	7.1	--	--	3.2	--	--
APW07	11/09/2018	--	--	--	--	0.08	--	92	71	--	--	0.343	--	--	--	--	7.0	--	--	4.5	--	500
APW07	02/22/2019	--	--	--	--	0.06	--	45	43	--	--	0.734	--	--	--	--	7.2	--	--	66	--	340
APW07	08/23/2019	--	--	--	--	0.075	--	58	46	--	--	0.632	--	--	--	--	7.1	--	--	62	--	350
APW07	02/05/2020	--	--	--	--	0.092	--	100	68	--	--	0.332	--	--	--	--	7.4	--	--	5.7	--	640

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW07	06/11/2020	--	--	--	--	--	--	--	68	--	--	--	--	--	--	--	7.3	--	--	--	--	--
APW07	07/28/2020	--	--	--	--	0.086	--	94	77	--	--	0.412	--	--	--	--	7.3	--	--	6.7	--	530
APW07	02/10/2021	--	--	--	--	0.11	--	110	69	--	--	0.372	--	--	--	--	7.0	--	--	6.3	--	540
APW08	12/15/2015	<0.003	0.0083	0.24	<0.001	0.083	<0.001	85	52	<0.004	<0.002	0.441	0.0016	0.013	<0.0002	0.0075	7.4	1.95	<0.001	35	<0.001	560
APW08	01/21/2016	<0.003	0.016	0.3	<0.001	0.06	<0.001	85	59	0.0049	<0.002	0.414	0.0023	0.012	<0.0002	0.0055	7.5	2.27	<0.001	34	<0.001	510
APW08	05/03/2016	<0.003	0.012	0.32	<0.001	0.083	<0.001	100	55	0.0045	<0.002	0.566	0.0021	<0.01	<0.0002	0.0063	7.4	1.88	0.0016	30	<0.001	560
APW08	08/02/2016	<0.003	0.013	0.32	<0.001	0.076	<0.001	94	56	<0.004	<0.002	0.504	<0.001	<0.01	<0.0002	0.0054	7.2	0.857	<0.001	35	<0.001	520
APW08	10/26/2016	<0.003	0.013	0.35	<0.001	0.091	<0.001	84	59	<0.004	<0.002	0.463	<0.001	<0.01	<0.0002	0.0055	7.4	0.812	<0.001	37	<0.001	600
APW08	01/25/2017	<0.003	0.017	0.37	<0.001	0.081	<0.001	100	57	<0.004	<0.002	0.404	<0.001	<0.01	<0.0002	0.0057	7.2	0.499	<0.001	36	<0.001	600
APW08	04/25/2017	<0.003	0.02	0.36	<0.001	0.073	<0.001	100	57	0.016	0.0056	0.418	0.0097	0.017	<0.0002	0.0074	7.5	1.8	<0.001	38	<0.001	590
APW08	06/13/2017	<0.003	0.017	0.39	<0.001	0.092	<0.001	110	57	0.01	0.0043	0.449	0.0075	0.012	<0.0002	0.0081	7.3	2.08	<0.001	38	<0.001	600
APW08	11/17/2017	--	--	--	--	0.11	--	83	50	--	--	0.474	--	--	--	--	7.1	--	--	39	--	490
APW08	05/18/2018	--	--	--	--	0.088	--	92	56	--	--	0.448	--	--	--	--	7.2	--	--	37	--	520
APW08	08/18/2018	--	--	--	--	--	--	82	57	--	--	--	--	--	--	--	7.2	--	--	43	--	--
APW08	11/09/2018	--	--	--	--	0.086	--	110	56	--	--	0.373	--	--	--	--	7.1	--	--	42	--	580
APW08	02/22/2019	--	--	--	--	0.1	--	80	56	--	--	0.393	--	--	--	--	7.2	--	--	46	--	600
APW08	08/23/2019	--	--	--	--	0.1	--	82	59	--	--	0.337	--	--	--	--	7.2	--	--	48	--	570
APW08	02/05/2020	--	--	--	--	0.1	--	120	55	--	--	0.331	--	--	--	--	7.4	--	--	45	--	700
APW08	06/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3	--	--	--	--	--
APW08	07/28/2020	--	--	--	--	0.087	--	110	62	--	--	0.441	--	--	--	--	7.3	--	--	47	--	620
APW08	10/28/2020	--	--	--	--	--	--	--	55	--	--	--	--	--	--	--	7.4	--	--	--	--	--
APW08	02/10/2021	--	--	--	--	0.11	--	110	57	--	--	<0.25	--	--	--	--	7.2	--	--	42	--	550

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW09	12/15/2015	<0.003	0.007	0.24	<0.001	0.062	<0.001	54	88	<0.004	<0.002	0.574	0.0011	<0.01	<0.0002	0.021	7.5	0.612	<0.001	25	<0.001	630
APW09	01/20/2016	<0.003	0.0067	0.24	<0.001	0.074	<0.001	57	95	<0.004	<0.002	0.468	0.0044	<0.01	<0.0002	0.023	7.6	0.743	<0.001	27	<0.001	540
APW09	05/03/2016	<0.003	0.008	0.32	<0.001	0.07	<0.001	70	110	<0.004	<0.002	0.746	0.0051	<0.01	<0.0002	0.021	7.6	1.54	<0.001	18	<0.001	590
APW09	08/02/2016	<0.003	0.014	0.41	<0.001	0.073	<0.001	74	130	<0.004	<0.002	0.532	<0.001	<0.01	<0.0002	0.011	7.2	1.137	<0.001	4.2	<0.001	640
APW09	10/26/2016	<0.003	0.016	0.47	<0.001	0.09	<0.001	77	130	<0.004	<0.002	0.528	<0.001	<0.01	<0.0002	0.01	7.6	1.18	<0.001	1.5	<0.001	770
APW09	01/25/2017	<0.003	0.018	0.44	<0.001	0.081	<0.001	79	130	<0.004	<0.002	0.468	<0.001	<0.01	<0.0002	0.0075	7.5	1.78	<0.001	<1	<0.001	740
APW09	04/25/2017	<0.003	0.017	0.38	<0.001	0.078	<0.001	67	120	<0.004	<0.002	0.515	<0.001	<0.01	0.00023	0.0053	7.5	1.07	<0.001	1.1	<0.001	840
APW09	06/13/2017	<0.003	0.0039	0.11	<0.001	0.053	<0.001	42	51	<0.004	<0.002	0.755	<0.001	<0.01	<0.0002	0.016	7.5	0.984	<0.001	48	<0.001	300
APW09	11/18/2017	--	--	--	--	0.08	--	68	84	--	--	0.655	--	--	--	--	7.4	--	--	4.5	--	720
APW09	05/18/2018	--	--	--	--	0.098	--	80	120	--	--	0.467	--	--	--	--	7.4	--	--	1	--	710
APW09	08/17/2018	--	--	--	--	--	--	81	130	--	--	--	--	--	--	--	7.5	--	--	2.4	--	--
APW09	11/09/2018	--	--	--	--	0.055	--	44	44	--	--	0.73	--	--	--	--	7.4	--	--	62	--	300
APW09	02/22/2019	--	--	--	--	0.054	--	38	47	--	--	0.714	--	--	--	--	7.5	--	--	61	--	320
APW09	08/23/2019	--	--	--	--	0.055	--	41	51	--	--	0.621	--	--	--	--	7.4	--	--	51	--	360
APW09	02/19/2020	--	--	--	--	0.1	--	88	130	--	--	0.453	--	--	--	--	7.5	--	--	7.5	--	790
APW09	06/11/2020	--	--	--	--	--	--	--	130	--	--	--	--	--	--	--	7.4	--	--	--	--	870
APW09	07/28/2020	--	--	--	--	0.1	--	84	140	--	--	0.537	--	--	--	--	7.4	--	--	3.2	--	810
APW09	02/11/2021	--	--	--	--	0.11	--	85	140	--	--	0.536	--	--	--	--	7.4	--	--	<10	--	840
APW10	12/16/2015	<0.003	0.0034	0.038	<0.001	0.066	<0.001	120	46	<0.004	<0.002	0.328	<0.001	0.03	<0.0002	0.0094	7.1	0.755	<0.001	430	<0.001	1000
APW10	01/20/2016	<0.003	0.0043	0.042	<0.001	0.077	<0.001	120	48	<0.004	<0.002	<0.25	<0.001	0.021	<0.0002	0.011	7.2	1.16	<0.001	410	<0.001	950
APW10	05/03/2016	<0.003	0.0083	0.04	<0.001	0.065	<0.001	140	46	<0.004	<0.002	0.448	<0.001	0.023	<0.0002	0.01	7.1	0.799	<0.001	410	<0.001	930
APW10	08/02/2016	<0.003	0.0092	0.037	<0.001	0.063	<0.001	140	45	<0.004	<0.002	0.367	<0.001	0.026	<0.0002	0.0091	7.1	0.6	<0.001	410	<0.001	840

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW10	10/26/2016	<0.003	0.009	0.04	<0.001	0.069	<0.001	120	48	<0.004	<0.002	0.371	<0.001	0.027	<0.0002	0.0093	7.1	0.556	<0.001	470	<0.001	960
APW10	01/25/2017	<0.003	0.01	0.035	<0.001	0.065	<0.001	160	46	<0.004	<0.002	0.258	<0.001	0.023	<0.0002	0.0085	7.1	0.43	<0.001	430	<0.001	1000
APW10	04/25/2017	<0.003	0.0084	0.031	<0.001	0.056	<0.001	120	44	<0.004	<0.002	0.289	<0.001	0.026	<0.0002	0.0071	7.0	0.604	<0.001	410	<0.001	1000
APW10	06/13/2017	<0.003	0.0035	0.027	<0.001	0.077	<0.001	110	46	<0.004	<0.002	0.344	<0.001	0.026	<0.0002	0.0091	6.9	0.897	<0.001	410	<0.001	920
APW10	11/18/2017	--	--	--	--	0.072	--	120	47	--	--	0.414	--	--	--	--	6.9	--	--	390	--	910
APW10	05/18/2018	--	--	--	--	0.08	--	130	51	--	--	0.335	--	--	--	--	7.2	--	--	440	--	900
APW10	08/17/2018	--	--	--	--	--	--	130	51	--	--	--	--	--	--	--	6.9	--	--	420	--	--
APW10	11/09/2018	--	--	--	--	0.078	--	140	47	--	--	0.281	--	--	--	--	7.0	--	--	410	--	900
APW10	02/22/2019	--	--	--	--	0.079	--	110	50	--	--	0.276	--	--	--	--	6.9	--	--	420	--	990
APW10	08/23/2019	--	--	--	--	0.096	--	130	50	--	--	0.359	--	--	--	--	7.0	--	--	390	--	1000
APW10	02/05/2020	--	--	--	--	0.094	--	140	44	--	--	<0.25	--	--	--	--	7.1	--	--	400	--	1200
APW10	06/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2	--	--	--	--	1000
APW10	07/28/2020	--	--	--	--	0.076	--	140	53	--	--	0.356	--	--	--	--	7.1	--	--	410	--	1000
APW10	02/11/2021	--	--	--	--	0.082	--	150	45	--	--	0.362	--	--	--	--	7.4	--	--	410	--	1100
APW10	06/17/2021	<0.003	0.008	0.026	<0.001	0.07	<0.001	150	47	<0.004	<0.002	0.436	<0.001	0.022	<0.0002	0.0074	7.3	0.617	<0.001	540	<0.001	1100
APW10	06/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.5	--	--	--	--	1000
APW10	07/29/2021	<0.003	0.0058	0.026	<0.001	0.075	<0.001	150	45	<0.004	<0.002	0.462	<0.001	0.022	<0.0002	0.0071	7.5	0.794	<0.001	410	<0.001	1000
APW11	02/18/2021	<0.003	0.002	0.16	<0.001	0.074	<0.00089	96	47	<0.004	<0.002	0.497	<0.001	0.021	0.00042	0.013	6.1	1.87	<0.001	280	<0.001	780
APW11	03/09/2021	<0.003	0.0046	0.077	<0.001	0.075	<0.001	120	26	0.0086	0.0029	<0.25	0.0076	0.024	<0.0002	0.0078	7.2	0.763	0.001	290	<0.001	940
APW11	03/29/2021	<0.003	0.005	0.071	<0.001	0.15	<0.001	130	26	0.012	0.0048	<0.25	0.014	0.028	<0.0002	0.0059	6.6	2.13	0.0032	270	<0.001	820
APW11	04/28/2021	<0.003	0.0021	0.048	<0.001	0.066	<0.001	120	26	<0.004	<0.002	<0.25	<0.001	0.021	<0.0002	0.0046	7.1	0.477	<0.001	280	<0.001	920
APW11	05/24/2021	<0.003	0.0015	0.05	<0.001	0.083	<0.001	130	27	<0.004	<0.002	<0.25	<0.001	0.024	0.00082	0.005	7.4	0.563	<0.001	300	0.0036	850

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW11	06/16/2021	<0.003	0.002	0.047	<0.001	0.078	<0.001	130	26	<0.004	<0.002	0.375	<0.001	0.024	<0.0002	0.0048	7.2	2.05	<0.001	290	<0.001	850
APW11	06/30/2021	<0.003	0.0018	0.042	<0.001	0.065	<0.001	120	33	<0.004	<0.002	0.409	<0.001	0.038	<0.0002	0.0044	7.1	0.382	<0.001	280	<0.001	860
APW11	07/15/2021	<0.003	0.0023	0.042	<0.001	0.062	<0.001	120	31	<0.004	<0.002	<0.25	<0.001	0.03	<0.0002	0.0043	7.2	0.474	<0.001	140	<0.001	810
APW12	02/17/2021	<0.003	0.0016	0.058	<0.001	0.27	<0.00089	230	27	<0.004	0.0073	<0.25	<0.001	0.033	0.0019	0.0037	6.2	0.682	<0.001	390	<0.001	1300
APW12	03/09/2021	<0.003	0.0017	0.05	<0.001	0.26	<0.001	230	27	<0.004	0.0073	<0.25	<0.001	0.028	<0.0002	0.0025	6.5	0.367	<0.001	480	<0.001	1300
APW12	03/29/2021	<0.003	0.002	0.046	<0.001	0.29	<0.001	220	28	<0.004	0.0065	<0.25	<0.001	0.029	<0.0002	0.0019	6.0	0.166	<0.001	440	<0.001	1400
APW12	04/28/2021	<0.003	0.0016	0.038	<0.001	0.21	<0.001	210	23	<0.004	0.005	<0.25	<0.001	0.026	<0.0002	0.0012	6.4	0.234	<0.001	390	<0.001	1300
APW12	05/25/2021	<0.003	0.0023	0.038	<0.001	0.29	<0.001	220	23	<0.004	0.0043	<0.25	<0.001	0.029	<0.0002	0.0038	6.5	0.319	<0.001	390	<0.001	1300
APW12	06/16/2021	<0.003	0.0027	0.039	<0.001	0.15	<0.001	210	20	<0.004	0.0034	<0.25	<0.001	0.026	<0.0002	<0.001	6.4	1.88	<0.001	290	<0.001	1100
APW12	06/30/2021	<0.003	0.0019	0.04	<0.001	0.11	<0.001	190	20	<0.004	0.0032	<0.25	<0.001	0.046	<0.0002	<0.001	6.3	0.466	<0.001	310	<0.001	990
APW12	07/15/2021	<0.003	0.0017	0.033	<0.001	0.28	<0.001	210	26	<0.004	0.0032	<0.25	<0.001	0.045	<0.0002	<0.001	6.5	0.667	<0.001	440	<0.001	1300
APW13	02/22/2021	<0.003	0.0043	0.055	<0.001	0.12	<0.001	110	57	<0.004	<0.002	0.503	<0.001	0.042	<0.0002	0.016	7.1	0.429	<0.001	220	<0.001	760
APW13	03/10/2021	<0.003	0.0046	0.054	<0.001	0.11	<0.001	120	71	<0.004	<0.002	0.326	<0.001	0.044	<0.0002	0.017	7.2	0.17	<0.001	210	<0.001	850
APW13	03/31/2021	<0.003	0.0047	0.057	<0.001	0.12	<0.001	110	46	<0.004	<0.002	0.43	<0.001	0.041	<0.0002	0.011	6.4	1.05	<0.001	210	<0.001	880
APW13	04/29/2021	<0.003	0.0046	0.05	<0.001	0.11	<0.001	110	48	<0.004	<0.002	0.327	<0.001	0.032	<0.0002	0.011	7.2	1.44	<0.001	210	<0.001	840
APW13	05/25/2021	<0.003	0.0031	0.051	<0.001	0.12	<0.001	120	64	<0.004	<0.002	0.402	<0.001	0.03	<0.0002	0.0096	7.3	0.966	<0.001	220	<0.001	880
APW13	06/17/2021	<0.003	0.0037	0.051	<0.001	0.1	<0.001	130	53	<0.004	<0.002	0.487	<0.001	0.027	<0.0002	0.0089	7.2	0.281	<0.001	220	<0.001	830
APW13	06/30/2021	<0.003	0.0039	0.051	<0.001	0.11	<0.001	120	45	<0.004	<0.002	0.447	<0.001	0.054	<0.0002	0.0088	7.3	0.546	<0.001	230	<0.001	790
APW13	07/15/2021	<0.003	0.006	0.05	<0.001	0.15	<0.001	110	55	<0.004	<0.002	<0.25	<0.001	0.036	<0.0002	0.0082	7.3	0.328	<0.001	210	<0.001	820
APW14	02/22/2021	<0.003	0.0074	0.14	<0.001	0.11	<0.001	120	55	0.0057	0.0023	0.489	0.0032	0.051	<0.0002	0.014	7.5	0.752	<0.001	320	<0.001	830
APW14	03/10/2021	<0.003	0.0095	0.099	<0.001	0.097	<0.001	130	65	<0.004	<0.002	0.313	0.002	0.044	<0.0002	0.0083	7.4	0.356	<0.001	340	<0.001	970
APW14	03/31/2021	<0.003	0.0098	0.092	<0.001	0.11	<0.001	130	46	<0.004	<0.002	0.363	<0.001	0.034	<0.0002	0.0068	6.5	0.594	<0.001	330	<0.001	1000

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW14	04/28/2021	<0.003	0.0053	0.1	<0.001	0.093	<0.001	130	44	<0.004	<0.002	<0.25	<0.001	0.03	<0.0002	0.0081	7.4	0.342	<0.001	320	<0.001	1000
APW14	05/25/2021	<0.003	0.0047	0.098	<0.001	0.11	<0.001	130	43	<0.004	<0.002	0.358	<0.001	0.029	<0.0002	0.0063	7.5	0.658	<0.001	320	<0.001	920
APW14	06/17/2021	<0.003	0.0054	0.086	<0.001	0.089	<0.001	140	45	<0.004	<0.002	0.436	<0.001	0.024	<0.0002	0.0053	7.4	1.26	<0.001	310	<0.001	940
APW14	06/30/2021	<0.003	0.0061	0.082	<0.001	0.097	<0.001	150	49	<0.004	<0.002	0.371	<0.001	0.047	<0.0002	0.0053	7.5	1.05	<0.001	330	<0.001	860
APW14	07/15/2021	<0.003	0.0055	0.07	<0.001	0.12	<0.001	130	53	<0.004	<0.002	<0.25	<0.001	0.032	<0.0002	0.0046	7.4	0.695	<0.001	330	<0.001	970
APW15	02/23/2021	<0.003	0.02	0.56	<0.001	0.14	<0.001	93	260	<0.004	<0.002	0.544	0.0011	<0.02	<0.0002	0.0089	7.0	1.43	<0.001	<1	<0.001	1100
APW15	03/10/2021	<0.003	0.022	0.61	<0.001	0.13	<0.001	100	250	<0.004	<0.002	1.65	0.0012	<0.02	<0.0002	0.016	7.2	2.88	<0.001	<1	<0.001	1100
APW15	03/31/2021	<0.003	0.016	0.63	<0.001	0.16	<0.001	100	240	0.005	0.0021	1.44	0.003	<0.02	<0.0002	0.013	6.5	1.76	<0.001	<1	<0.001	1100
APW15	04/28/2021	<0.003	0.021	0.6	<0.001	0.13	<0.001	96	230	<0.004	<0.002	1.81	<0.001	<0.02	<0.0002	0.015	7.2	1.17	<0.001	<1	<0.001	1200
APW15	05/24/2021	<0.003	0.017	0.57	<0.001	0.15	<0.001	98	230	<0.004	<0.002	1.68	<0.001	<0.02	<0.0002	0.012	7.3	1.87	<0.001	<1	<0.001	1000
APW15	06/17/2021	<0.003	0.017	0.6	<0.001	0.13	<0.001	95	240	<0.004	<0.002	3.18	<0.001	0.022	<0.0002	0.012	7.3	2.54	<0.001	<1	<0.001	1000
APW15	06/30/2021	<0.003	0.017	0.6	<0.001	0.13	<0.001	98	230	<0.004	<0.002	2.89	<0.001	0.022	<0.0002	0.0098	7.1	2.46	<0.001	<1	<0.001	1000
APW15	07/14/2021	<0.003	0.016	0.6	<0.001	0.16	<0.001	96	130	<0.004	<0.002	8.16	<0.001	<0.02	<0.0002	0.0094	7.2	2.23	<0.001	<1	<0.001	1200
APW16	02/23/2021	<0.003	0.014	0.62	<0.001	0.14	<0.001	92	71	<0.004	<0.002	0.629	<0.001	<0.02	<0.0002	0.0036	7.4	2.08	<0.001	1.9	<0.001	780
APW16	03/10/2021	<0.003	0.015	0.66	<0.001	0.15	<0.001	99	71	<0.004	<0.002	0.755	<0.001	<0.02	<0.0002	0.0044	7.5	2.17	<0.001	<1	<0.001	750
APW16	03/30/2021	<0.003	0.013	0.66	<0.001	0.17	<0.001	97	71	<0.004	<0.002	0.886	<0.001	<0.02	<0.0002	0.0033	7.0	0.946	<0.001	<1	<0.001	740
APW16	04/28/2021	<0.003	0.0083	0.62	<0.001	0.12	<0.001	96	75	<0.004	<0.002	0.742	<0.001	<0.02	<0.0002	0.0015	7.4	1.55	<0.001	<1	<0.001	750
APW16	05/24/2021	<0.003	0.0074	0.61	<0.001	0.15	<0.001	100	74	<0.004	<0.002	0.639	<0.001	<0.02	<0.0002	0.0012	7.6	1.19	<0.001	<1	<0.001	810
APW16	06/16/2021	<0.003	0.0077	0.57	<0.001	0.14	<0.001	100	73	<0.004	<0.002	0.735	<0.001	<0.02	<0.0002	<0.001	7.4	2.05	<0.001	<1	<0.001	720
APW16	06/30/2021	<0.003	0.0083	0.55	<0.001	0.13	<0.001	96	59	<0.004	<0.002	0.766	<0.001	<0.02	<0.0002	<0.001	7.0	5.85	<0.001	<1	<0.001	610
APW16	07/15/2021	<0.003	0.0088	0.56	<0.001	0.13	<0.001	95	77	<0.004	<0.002	0.55	<0.001	<0.02	<0.0002	<0.001	7.4	2.91	<0.001	<1	<0.001	690
APW17	02/23/2021	<0.003	0.0033	0.54	<0.001	0.091	<0.001	100	64	<0.004	<0.002	0.944	<0.001	<0.02	<0.0002	0.0085	7.4	0.821	<0.001	34	<0.001	680

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Location	Sample Date	Antimony, total (mg/L)	Arsenic, total (mg/L)	Barium, total (mg/L)	Beryllium, total (mg/L)	Boron, total (mg/L)	Cadmium, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Chromium, total (mg/L)	Cobalt, total (mg/L)	Fluoride, total (mg/L)	Lead, total (mg/L)	Lithium, total (mg/L)	Mercury, total (mg/L)	Molybdenum, total (mg/L)	pH (field) (SU)	Radium 226 and 228 combined (pCi/L)	Selenium, total (mg/L)	Sulfate, total (mg/L)	Thallium, total (mg/L)	Total Dissolved Solids (mg/L)
35 I.A.C. 845.600	Lower	0	0	0	0	0	0	--	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0
	Upper	0.006	0.010	2.0	0.004	2	0.005	--	200	0.1	0.006	4.0	0.0075	0.04	0.002	0.1	9.0	5	0.05	400	0.002	1200
APW17	03/10/2021	<0.003	0.0026	0.57	<0.001	0.083	<0.001	110	60	<0.004	<0.002	0.677	<0.001	<0.02	<0.0002	0.0066	7.7	0.849	<0.001	30	<0.001	650
APW17	03/30/2021	<0.003	0.0014	0.63	<0.001	0.086	<0.001	110	57	<0.004	<0.002	0.374	<0.001	<0.02	<0.0002	0.0052	7.1	0.259	<0.001	31	<0.001	620
APW17	04/29/2021	<0.003	0.003	0.6	<0.001	0.088	<0.001	120	55	<0.004	<0.002	0.468	<0.001	<0.02	<0.0002	0.0055	7.4	1.51	<0.001	36	<0.001	630
APW17	05/24/2021	<0.003	0.0035	0.59	<0.001	0.087	<0.001	110	88	<0.004	<0.002	0.474	<0.001	<0.02	<0.0002	0.005	7.4	1.36	<0.001	40	<0.001	670
APW17	06/16/2021	<0.003	0.0058	0.62	<0.001	0.088	<0.001	120	54	<0.004	<0.002	0.593	<0.001	<0.02	<0.0002	0.0048	7.4	3.11	<0.001	40	<0.001	640
APW17	06/30/2021	<0.003	0.0074	0.61	<0.001	0.084	<0.001	110	49	<0.004	<0.002	0.548	<0.001	<0.02	<0.0002	0.0048	7.4	2.6	<0.001	41	<0.001	630
APW17	07/15/2021	<0.003	0.0083	0.61	<0.001	0.091	<0.001	110	31	<0.004	<0.002	0.412	<0.001	<0.02	<0.0002	0.0049	7.4	1.55	<0.001	<25	<0.001	650
APW18	02/23/2021	<0.003	0.0043	0.18	<0.001	0.12	<0.001	49	79	0.0085	0.0034	1.43	0.0079	<0.02	<0.0002	0.033	7.9	2.72	<0.001	26	<0.001	560
APW18	03/10/2021	<0.003	0.0032	0.36	<0.001	0.11	<0.001	62	42	0.0066	0.0024	6.38	0.0048	<0.02	<0.0002	0.015	7.8	1.88	<0.001	12	<0.001	610
APW18	03/30/2021	<0.003	0.0025	0.34	<0.001	0.15	<0.001	60	35	<0.004	<0.002	7.02	0.0023	<0.02	<0.0002	0.012	7.3	0.912	<0.001	9.4	0.0016	580
APW18	04/29/2021	<0.003	0.0019	0.34	<0.001	0.14	<0.001	60	40	<0.004	<0.002	0.617	0.0018	<0.02	<0.0002	0.016	7.6	2.4	<0.001	<1	<0.001	490
APW18	05/24/2021	<0.003	0.0014	0.35	<0.001	0.11	<0.001	59	35	<0.004	<0.002	0.597	<0.001	<0.02	<0.0002	0.0095	7.6	1.91	<0.001	<1	<0.001	650
APW18	06/16/2021	0.0035	0.0043	0.36	0.0033	0.19	0.0034	64	29	0.0042	0.0036	6.67	0.0035	<0.02	0.00047	0.0096	7.6	2.12	0.0038	4.8	0.0022	550
APW18	06/30/2021	<0.003	<0.001	0.36	<0.001	0.11	<0.001	60	28	<0.004	<0.002	3.23	<0.001	<0.02	<0.0002	0.0048	7.6	1.73	<0.001	2.2	<0.001	450
APW18	07/15/2021	<0.003	0.0015	0.33	<0.001	0.12	<0.001	64	31	<0.004	<0.002	4.67	<0.001	<0.02	<0.0002	0.0051	7.6	2.2	<0.001	1.9	<0.001	520

Notes:
Detected at concentration greater than the GWPS
-- = data not available
GWPS = Groundwater Protection Standard
mg/L = milligrams per liter
pCi/L = picocuries per liter
SU = standard units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method. Estimated concentrations below the reporting limit and associated qualifiers are not provided since they are not utilized in statistics to determine exceedances above Part 845 standards.
35 I.A.C. 845.600 = Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW02	01/13/2015	--	--	6.9	6190	--	--
APW02	04/21/2015	--	--	6.9	5320	--	--
APW02	07/15/2015	--	--	7.0	1653	--	--
APW02	10/07/2015	--	--	6.7	4290	--	--
APW02	02/17/2021	6.88	90.3	6.6	5409	5.9	22.1
APW02	03/10/2021	2.11	62.6	7.0	4714	12.4	57.5
APW02	03/30/2021	1.91	82	6.6	3158	13.6	20800
APW02	04/29/2021	1.10	164	6.7	5417	17.8	13.9
APW02	05/25/2021	1.10	116	6.7	5536	29.6	57
APW02	06/16/2021	0.57	52.9	6.6	5574	30.0	62.9
APW02	06/30/2021	0.86	82.3	6.6	5523	22.8	19
APW02	07/15/2021	0.51	57.6	6.5	5543	29.6	8.04
APW03	01/13/2015	--	--	7.4	1132	--	--
APW03	04/20/2015	--	--	7.0	988	--	--
APW03	07/15/2015	--	--	6.9	1212	--	--
APW03	10/07/2015	--	--	7.3	1047	--	--
APW03	02/18/2021	6.74	225	6.7	1132	7.9	140
APW03	03/10/2021	2.67	30.7	7.2	1041	12.6	55.8
APW03	03/31/2021	1.17	28.9	6.3	949.5	10.1	51.8
APW03	04/29/2021	0.92	114	7.0	1104	19.6	8.47
APW03	05/25/2021	1.10	132	7.0	1132	29.6	15.8
APW03	06/17/2021	0.81	166	7.0	1114	22.8	26.5
APW03	06/30/2021	0.85	37.8	7.0	1115	25.4	7.56
APW03	07/15/2021	0.78	-28.6	6.9	1121	35.0	124
APW04	01/13/2015	--	--	7.2	2980	--	--
APW04	04/20/2015	--	--	7.0	2880	--	--
APW04	07/15/2015	--	--	7.0	1431	--	--
APW04	10/07/2015	--	--	7.0	2510	--	--
APW04	02/18/2021	1.81	217	6.5	2396	6.9	293
APW04	03/11/2021	0.44	224	6.9	2387	10.6	62.9
APW04	03/31/2021	0.35	55	6.1	2005	10.8	63.4
APW04	04/29/2021	0.43	140	6.9	2297	19.0	8.29
APW04	05/25/2021	0.42	166	6.9	2313	22.7	56.7
APW04	06/17/2021	0.53	169	6.8	2330	27.0	31.4
APW04	06/30/2021	1.10	141	6.8	2339	26.4	25.9
APW04	07/15/2021	0.74	78.1	6.8	2333	33.9	227
APW05	12/15/2015	0	-57	7.5	1040	13.4	14.4
APW05	01/20/2016	0	-51	7.5	1030	12.6	44.6
APW05	04/27/2016	0	27	7.7	1120	14.3	15
APW05	08/01/2016	0	-64	7.5	1100	18.0	2.5
APW05	10/25/2016	0	-83	7.6	1070	16.8	0
APW05	01/23/2017	0	-143	7.4	1050	13.6	0
APW05	04/24/2017	0	-101	7.0	1060	17.3	0
APW05	06/13/2017	0	-88	7.1	1050	17.5	35.5

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW05	11/17/2017	0	-60	6.9	1080	12.7	24.2
APW05	05/18/2018	0	-61	7.1	1140	15.6	22.6
APW05	08/17/2018	0	-69	7.0	1025	15.2	22
APW05	11/09/2018	0	-56	7.0	1100	14.7	27.1
APW05	02/22/2019	0	-60	6.9	1071	11.4	34.6
APW05	08/22/2019	0	-60	7.0	1021	17.3	67.3
APW05	02/04/2020	0.83	-119	7.5	971.9	11.3	2.97
APW05	06/11/2020	1.20	-124	7.4	856	15.0	4.5
APW05	07/28/2020	1.20	-146	7.7	924.7	19.0	3.57
APW05	02/09/2021	0.19	-129	7.6	996	11.2	39.9
APW05	02/17/2021	1.33	192	7.2	1086	7.6	0
APW05	03/10/2021	0.15	-129	7.7	975.9	13.6	16.5
APW05	03/30/2021	0.69	-71.9	7.2	980.3	13.6	1.08
APW05	04/28/2021	0.60	-65	7.5	867	15.9	6.7
APW05	05/25/2021	0.95	61.8	7.5	976	17.9	1.89
APW05	06/17/2021	0.34	-150	7.7	946	18.8	0.81
APW05	06/30/2021	0.29	-160	7.5	977	19.0	1.02
APW05	07/15/2021	0.25	-140	7.8	995	16.7	3.96
APW05S	02/17/2021	0.69	202	6.6	4672	6.5	0
APW05S	03/10/2021	0.24	16.3	7.0	4186	12.5	0
APW05S	04/29/2021	0.45	4.7	6.8	4339	18.0	14.2
APW05S	05/25/2021	0.93	-37	6.9	4306	30.3	40.2
APW05S	06/17/2021	0.73	-8.8	6.8	3977	28.6	20.5
APW05S	06/30/2021	0.81	2.8	6.7	3967	27.6	32.6
APW05S	07/15/2021	0.73	-35.6	6.8	3933	32.6	9.27
APW06	12/15/2015	0	-5	7.5	915	13.2	1000
APW06	01/20/2016	0	58	7.4	990	11.9	77.4
APW06	04/27/2016	0	-61	6.5	896	14.4	0.3
APW06	08/01/2016	0	-80	7.4	1010	17.1	0
APW06	10/25/2016	0	-73	7.5	971	15.3	0
APW06	01/23/2017	0	-109	6.9	938	13.2	0
APW06	04/24/2017	0	-94	7.2	961	17.6	0
APW06	06/13/2017	0	-83	7.1	914	16.5	19.8
APW06	11/17/2017	0	-79	7.2	860	12.1	17.2
APW06	05/18/2018	0	-67	7.3	902	14.4	12.3
APW06	08/17/2018	0	-73	7.3	910	15.0	22.7
APW06	11/09/2018	0	-82	7.2	938	15.7	28.3
APW06	02/22/2019	0	-71	7.3	942	11.9	34.7
APW06	08/23/2019	0	-58	7.3	873	17.5	14.9
APW06	02/04/2020	2.20	-125	7.5	889.5	11.2	3.04
APW06	06/11/2020	1.30	-125	7.4	807	15.2	24.6
APW06	07/28/2020	0.66	-164	7.8	880.8	18.3	5.59
APW06	02/09/2021	1.40	-110	7.6	859.8	9.0	0.91
APW06	02/17/2021	0.19	-41	6.4	937.9	4.6	0

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW06	03/10/2021	0.23	-131	7.7	779.1	14.4	25.7
APW06	03/30/2021	0.31	-69.7	7.1	893.1	15.5	0
APW06	04/29/2021	0.36	-130	7.7	925	15.8	111
APW06	05/25/2021	0.29	-138	7.7	939	24.4	225
APW06	06/16/2021	0.47	-127	7.7	928	22.8	315
APW06	06/30/2021	0.78	-120	7.6	925	23.8	276
APW06	07/15/2021	0.75	-148	7.5	926	27.7	41.9
APW07	12/15/2015	1.71	-40	7.4	1060	12.0	55.1
APW07	01/21/2016	0	-110	7.4	1130	10.5	185
APW07	05/03/2016	0	-94	7.5	1210	13.5	179
APW07	08/01/2016	0	-114	7.3	1130	19.4	26
APW07	10/26/2016	0	-69	7.2	1110	17.9	5.7
APW07	01/26/2017	0	-136	7.2	1110	11.0	0
APW07	04/24/2017	0	-112	7.3	1130	17.2	0
APW07	06/13/2017	0	-94	7.2	1060	17.1	39.5
APW07	11/17/2017	0	-71	7.2	1120	12.5	47
APW07	05/18/2018	0	-88	7.1	1090	15.4	47.9
APW07	08/18/2018	0	-88	7.1	1000	15.0	41.1
APW07	11/09/2018	0	-92	7.0	993	13.9	33
APW07	02/22/2019	0	-92	7.2	1012	11.6	34
APW07	08/23/2019	0	-74	7.1	879	17.0	27.4
APW07	02/05/2020	0.39	-137	7.4	247.7	10.3	77.6
APW07	06/11/2020	0.16	-164	7.3	1112	15.1	51
APW07	07/28/2020	1.40	-104	7.3	1083	18.8	3.3
APW07	02/10/2021	2.30	-10.5	7.0	806.2	9.4	72.6
APW08	12/15/2015	0	38	7.4	1140	12.7	105
APW08	01/21/2016	0	-93	7.5	1150	11.0	83.3
APW08	05/03/2016	0	-93	7.4	1055	13.3	168
APW08	08/02/2016	0	-87	7.2	1160	17.9	5
APW08	10/26/2016	0	-76	7.4	1180	17.2	2.1
APW08	01/25/2017	0	-121	7.2	1140	14.2	0
APW08	04/25/2017	0	-103	7.5	1160	17.0	1000
APW08	06/13/2017	0	-108	7.3	1090	17.4	1000
APW08	11/17/2017	0	-102	7.1	1020	12.5	1000
APW08	05/18/2018	0	-96	7.2	940	16.2	890
APW08	08/18/2018	0	-101	7.2	993	15.0	100
APW08	11/09/2018	0	-109	7.1	857	13.8	1000
APW08	02/22/2019	0	-99	7.2	955	11.8	1000
APW08	08/23/2019	0	-98	7.2	1004	17.1	1000
APW08	02/05/2020	1.10	-130	7.4	1150	11.5	114
APW08	06/11/2020	0.54	-127	7.3	1163	15.1	30
APW08	07/28/2020	1.30	-101	7.3	1138	16.8	9.2
APW08	10/28/2020	1.00	-94.2	7.4	1148	14.2	17.9
APW08	02/10/2021	1.70	-103	7.2	1045	10.3	104

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW09	12/15/2015	0	11	7.5	1150	13.0	11.7
APW09	01/20/2016	0	72	7.6	1040	11.3	49.6
APW09	05/03/2016	0	56	7.6	988	13.9	67.7
APW09	08/02/2016	0	-106	7.2	1460	17.2	0
APW09	10/26/2016	0	-77	7.6	1450	15.9	0
APW09	01/25/2017	0	-140	7.5	1470	14.8	0
APW09	04/25/2017	0	-74	7.5	1420	18.4	0
APW09	06/13/2017	0	-67	7.5	1390	17.1	27.4
APW09	11/18/2017	0	-78	7.4	1420	13.0	34.1
APW09	05/18/2018	0	-71	7.4	1490	15.2	35.1
APW09	08/17/2018	0	-69	7.5	1265	15.0	40
APW09	11/09/2018	0	-72	7.4	1240	16.7	48.5
APW09	02/22/2019	0	-65	7.5	1285	11.7	50.3
APW09	08/23/2019	0	-60	7.4	1180	16.6	29
APW09	02/19/2020	0.86	-151	7.5	1456	13.5	10.1
APW09	06/11/2020	0.60	-152	7.4	1516	15.7	389
APW09	07/28/2020	0.47	-136	7.4	1467	18.9	19.9
APW09	02/11/2021	2.00	-28.1	7.4	1208	9.4	31.8
APW10	12/16/2015	1.93	-29	7.1	1610	13.3	1000
APW10	01/20/2016	0	-21	7.2	1430	12.5	1000
APW10	05/03/2016	0	-19	7.1	1326	13.4	33.3
APW10	08/02/2016	0	-18	7.1	1640	17.4	0
APW10	10/26/2016	0	38	7.1	1600	14.5	0
APW10	01/25/2017	0	-73	7.1	1570	13.6	0
APW10	04/25/2017	0	0	7.0	1610	15.6	0
APW10	06/13/2017	0	12	6.9	1620	15.8	36.5
APW10	11/18/2017	0	34	6.9	1480	12.4	43
APW10	05/18/2018	0	29	7.2	1600	14.7	48.5
APW10	08/17/2018	0	57	6.9	1468	15.1	41.2
APW10	11/09/2018	0	78	7.0	1340	14.9	46.8
APW10	02/22/2019	0	61	6.9	1510	11.9	41.1
APW10	08/23/2019	0	69	7.0	1520	17.2	30.7
APW10	02/05/2020	0.50	14.7	7.1	356	10.6	4.57
APW10	06/11/2020	1.10	-207	7.2	1563	16.1	1.4
APW10	07/28/2020	0.21	-153	7.1	1546	20.8	1.6
APW10	02/11/2021	3.00	46.7	7.4	1594	5.9	168
APW10	06/17/2021	1.70	79.6	7.3	1501	20.4	2.24
APW10	06/30/2021	1.50	140	7.5	1531	16.2	5.8
APW10	07/29/2021	2.80	132	7.5	4100	19.1	0
APW11	02/18/2021	0.14	125	6.1	1285	9.8	0
APW11	03/09/2021	0.37	-56.2	7.2	1460	15.0	174
APW11	03/29/2021	0.23	2.6	6.6	1130	14.4	1760
APW11	04/28/2021	2.00	-51.6	7.1	1297	16.7	96.4
APW11	05/24/2021	3.10	-82.4	7.4	1337	16.5	11.3

RAMBOLL

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW11	06/16/2021	2.60	-41.2	7.2	1320	19.9	14.8
APW11	06/30/2021	3.10	-37.2	7.1	381.5	17.4	3.65
APW11	07/15/2021	4.10	-24.4	7.2	1318	16.9	5.12
APW12	02/17/2021	0.16	27.2	6.2	1917	10.2	0
APW12	03/09/2021	0.15	45.5	6.5	2115	13.6	6.38
APW12	03/29/2021	0.20	117	6.0	1752	13.4	12.2
APW12	04/28/2021	0.92	11.2	6.4	1537	15.5	22.6
APW12	05/25/2021	0.84	49.5	6.5	1571	17.6	44.5
APW12	06/16/2021	2.40	9.9	6.4	268.4	22.4	10.7
APW12	06/30/2021	1.10	115	6.3	1546	17.6	3.59
APW12	07/15/2021	0.40	22.8	6.5	1870	17.1	3.16
APW13	02/22/2021	0.25	-102	7.1	1544	13.4	25.7
APW13	03/10/2021	0.31	-80.2	7.2	1336	13.8	28.7
APW13	03/31/2021	1.13	-9.4	6.4	1392	12.7	28.8
APW13	04/29/2021	1.40	-96.2	7.2	1399	15.9	8.6
APW13	05/25/2021	3.50	-95.6	7.3	1390	19.1	12.4
APW13	06/17/2021	1.90	-75.3	7.2	1399	18.9	1.69
APW13	06/30/2021	2.10	-78.8	7.3	1393	18.2	0
APW13	07/15/2021	1.50	-90	7.3	1237	16.9	3.97
APW14	02/22/2021	0.95	-113	7.5	1646	12.8	173
APW14	03/10/2021	0.29	-104	7.4	1251	13.7	57.1
APW14	03/31/2021	0.16	-46.7	6.5	1236	13.5	40.4
APW14	04/28/2021	0.99	-120	7.4	1504	17.0	51.6
APW14	05/25/2021	2.00	-145	7.5	1300	20.1	24.9
APW14	06/17/2021	2.60	-97.8	7.4	1313	17.3	19.3
APW14	06/30/2021	1.80	-123	7.5	1290	17.4	11.3
APW14	07/15/2021	0.73	-144	7.4	1533	19.5	4.81
APW15	02/23/2021	0.44	-98.5	7.0	2095	12.9	80.4
APW15	03/10/2021	1.03	-108	7.2	1648	14.9	134
APW15	03/31/2021	0.13	-61.8	6.5	184.7	13.3	126
APW15	04/28/2021	0.16	-122	7.2	2041	16.2	506
APW15	05/24/2021	1.70	-128	7.3	1955	18.8	23.5
APW15	06/17/2021	0.22	-136	7.3	2030	19.9	6.01
APW15	06/30/2021	0.90	-133	7.1	1926	18.2	7.5
APW15	07/14/2021	1.20	-142	7.2	1662	19.4	5.18
APW16	02/23/2021	3.16	-71.4	7.4	1162	12.1	9.52
APW16	03/10/2021	0.18	-132	7.5	1316	13.6	0
APW16	03/30/2021	0.22	-99.5	7.0	1318	13.5	0
APW16	04/28/2021	1.30	-129	7.4	1350	15.1	10.6
APW16	05/24/2021	2.40	-132	7.5	1375	16.2	38.9
APW16	06/16/2021	0.88	-123	7.4	1338	16.6	23.9
APW16	06/30/2021	0.88	-119	7.0	1331	16.8	7.06
APW16	07/15/2021	0.80	-143	7.4	1421	19.4	9.03
APW17	02/23/2021	2.55	-22.5	7.4	901.8	12.6	22.6

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (field) (SU)	Specific Conductance (micromhos/cm)	Temperature (deg. C)	Turbidity (NTU)
APW17	03/10/2021	1.60	-132	7.7	951.8	13.8	0
APW17	03/30/2021	0.29	-87.2	7.1	1202	14.1	0
APW17	04/29/2021	3.40	-126	7.4	1042	16.3	9.5
APW17	05/24/2021	2.30	197	7.4	1206	20.8	29.5
APW17	06/16/2021	1.80	-130	7.4	1122	21.3	1.13
APW17	06/30/2021	1.30	-138	7.4	1206	19.7	3.13
APW17	07/15/2021	1.50	-110	7.4	1210	18.5	1.81
APW18	02/23/2021	1.94	-141	7.9	941.7	13.6	430
APW18	03/10/2021	0.80	-150	7.8	930.2	13.8	241
APW18	03/30/2021	0.49	-110	7.3	626.2	13.8	247
APW18	04/29/2021	1.50	-154	7.6	920	16.0	61.3
APW18	05/24/2021	2.30	120	7.6	1029	19.3	208
APW18	06/16/2021	0.75	-171	7.5	995	22.2	4.58
APW18	06/30/2021	0.41	-182	7.6	1011	21.6	8.28
APW18	07/15/2021	0.42	-154	7.6	1010	19.6	27.7

Notes:
Field readings are reported with as many significant figures as provided by analytical laboratory.
-- = data not available
cm = centimeter
deg. C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
NTU = nephelometric turbidity units
SU = standard units

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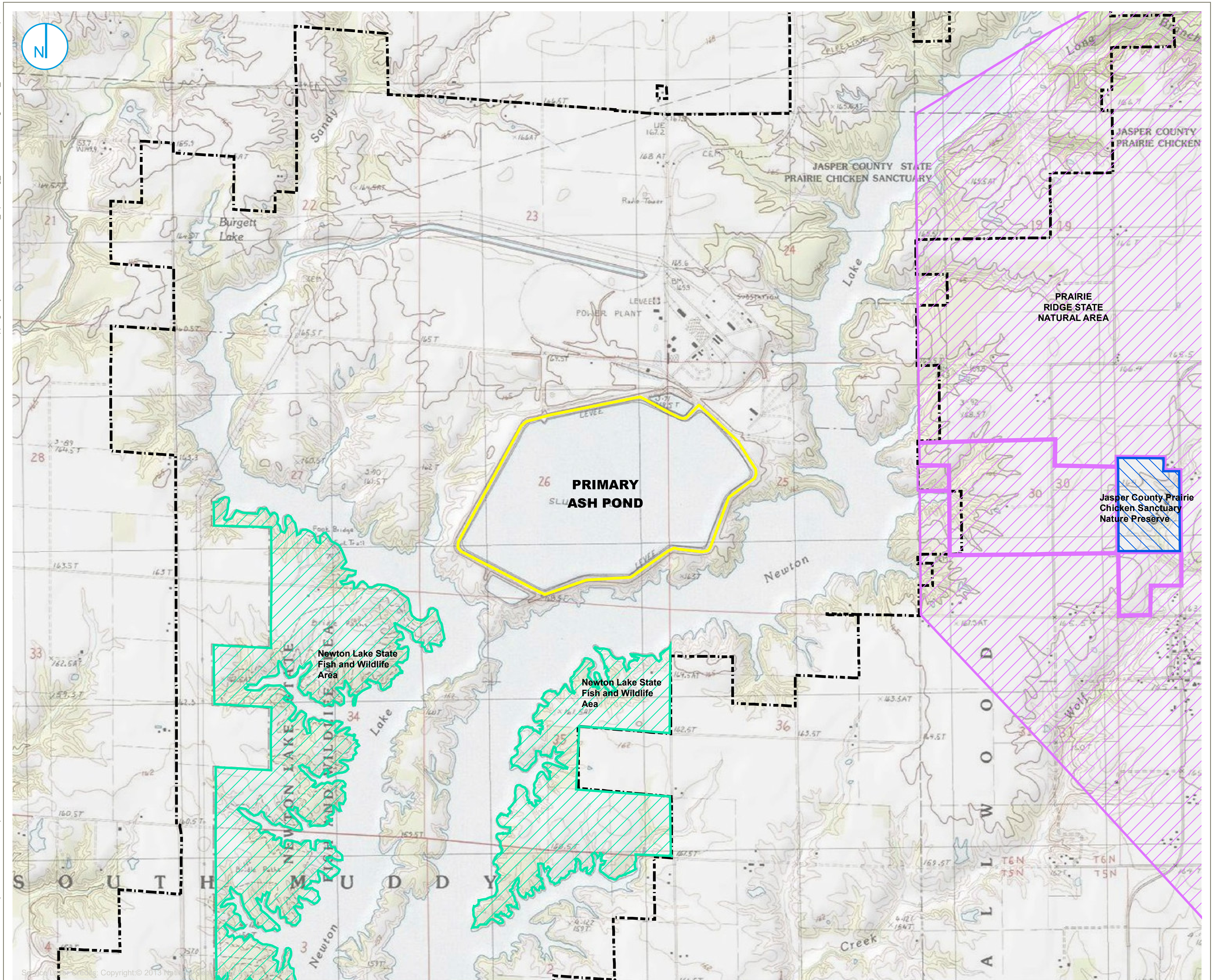
FIGURES



PART 845 REGULATED UNIT FACILITY BOUNDARY
JASPER COUNTY PRAIRIE CHICKEN SANCTUARY NATURE PRESERVE
NEWTON LAKE STATE FISH AND WILDLIFE AREA
PRAIRIE RIDGE STATE NATURAL AREA
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 1-1_Site Location Map.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 1-2_Site Map.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

PART 845 REGULATED UNIT FACILITY BOUNDARY

SITE FEATURE

PROPERTY BOUNDARY

0 500 1,000 Feet

SITE MAP

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 2-1_Topo Map.mxd

10-FOOT ELEVATION CONTOUR
2-FOOT ELEVATION CONTOUR
PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE
PROPERTY BOUNDARY

NOTE

ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988

SOURCE

INGENAE SURVEY, 2021

0 400 800 Feet

TOPOGRAPHIC MAP

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT PRIMARY ASH POND

NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

PART 845 REGULATED UNIT FACILITY BOUNDARY

SITE FEATURE

NRCS SOIL SURVEY MAP UNIT BOUNDARY

MAP UNIT SYMBOL	MAP UNIT NAME
533	Urban land
866	Dumps, slurry
109A	Racoon silt loam, 0 to 2 percent
12A	Wynoose silt loam, 0 to 2 percent
13A	Bluford silt loam, 0 to 2 percent
13B2	Bluford silt loam, 2 to 5 percent slopes, eroded
14B	Ava silt loam, 2 to 5 percent slopes
14C2	Ava silt loam, 5 to 10 percent slopes, eroded
2A	Cisne silt loam, 0 to 2 percent
3333A	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded
48A	Ebbert silt loam, 0 to 2 percent
581B2	Tamalco silt loam, 2 to 5 percent slopes, eroded
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded
7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded
805C	Orthents, clayey, sloping
8F	Hickory silt loam, 18 to 35 percent
912A	Hoyleton-Darmstadt silt loams, 0 to 2 percent slopes
M-W	Miscellaneous water
W	Water

SOURCE:
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

0 400 800
Feet

SOIL SURVEY MAP

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

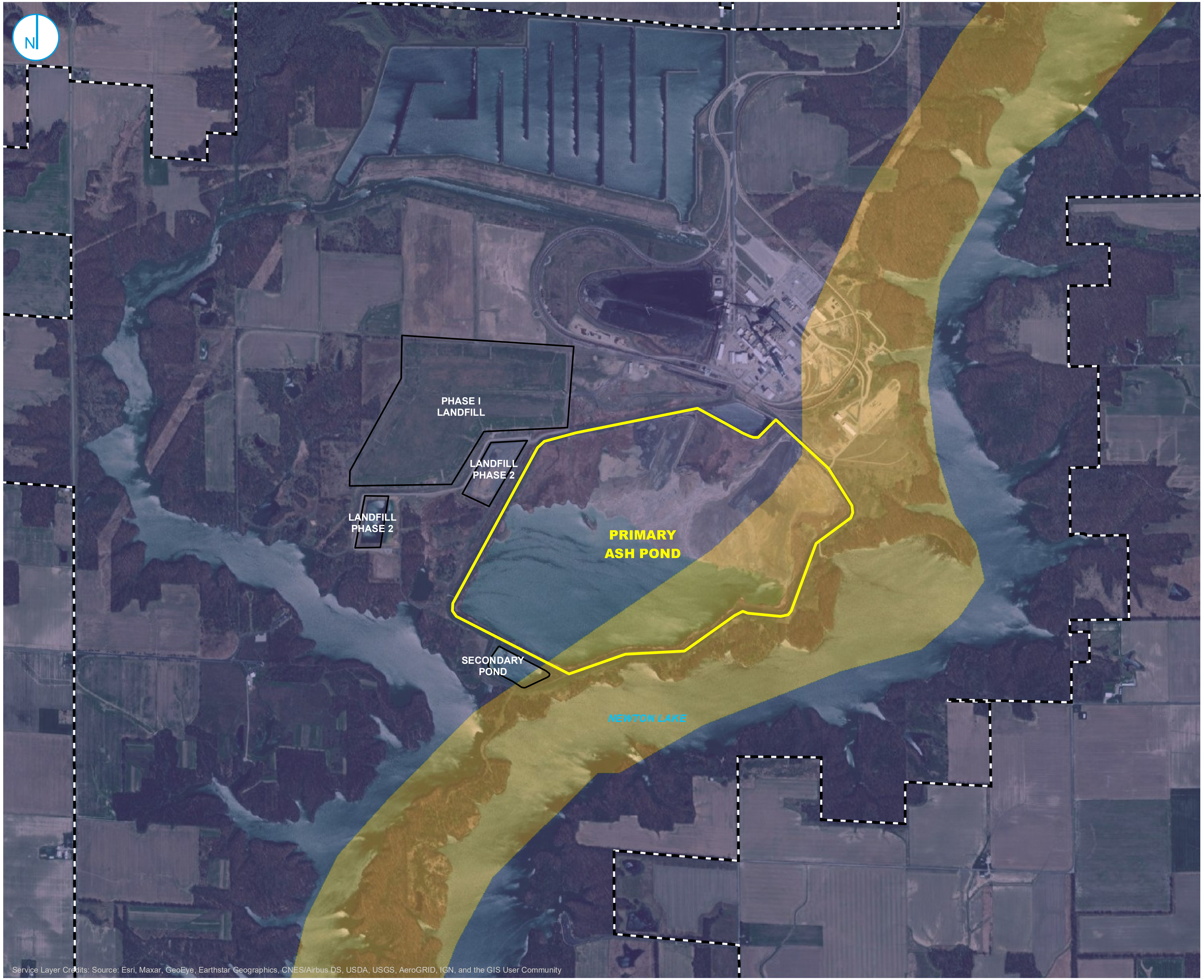
FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 2-2_Soil Survey.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD



Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 2-3_Surficial Geologic Deposits.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE
CAHOKIA ALLUVIUM (INCLUDES ALLUVIAL FAN FACIES)
VANDALIA TILL MEMBER
PROPERTY BOUNDARY

SOURCE
ILLINOIS STATE GEOLOGICAL SURVEY (ISGS)

0 750 1,500 Feet

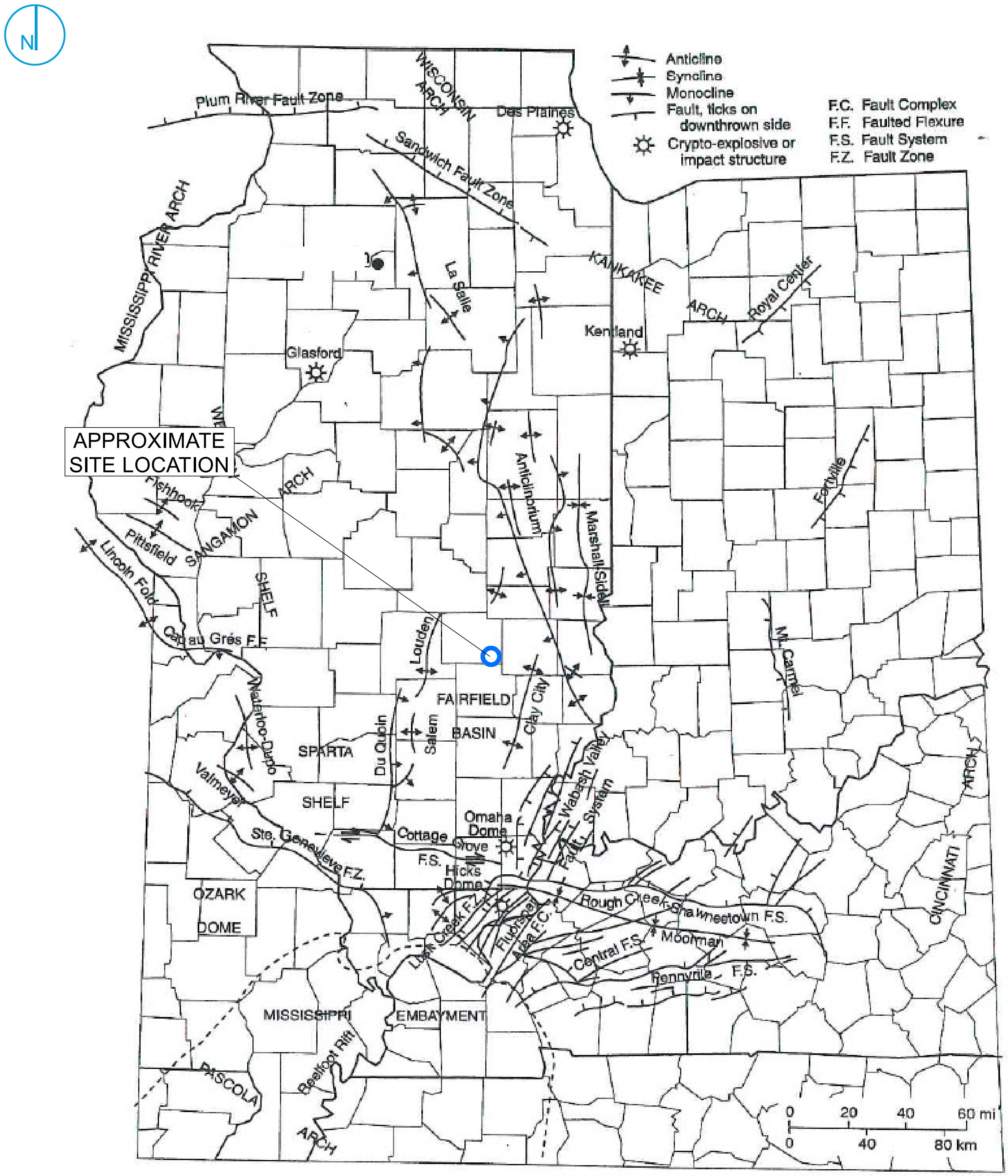
SURFICIAL GEOLOGIC DEPOSITS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



SOURCE NOTE: MODIFIED FROM "NELSON, W.J. 1995, STRUCTURAL FEATURES IN ILLINOIS, ILLINOIS STATE GEOLOGICAL SURVEY, BULLETIN 100, CHAMPAIGN, ILLINOIS."

Service Layer Credits:

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 2-4_Major Structural Features of Illinois.mxd

PROJECT: 169000XXXX | DATED: 9/1/2021 | DESIGNER: STOLZSD

MAJOR STRUCTURAL FEATURES OF ILLINOIS

DRAFT

FIGURE 2-4

PRIVILEGED AND CONFIDENTIAL
PREPARED AT THE REQUEST OF COUNSEL

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
SOIL BORING
PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE

0 400 800 Feet

FIELD INVESTIGATION LOCATIONS

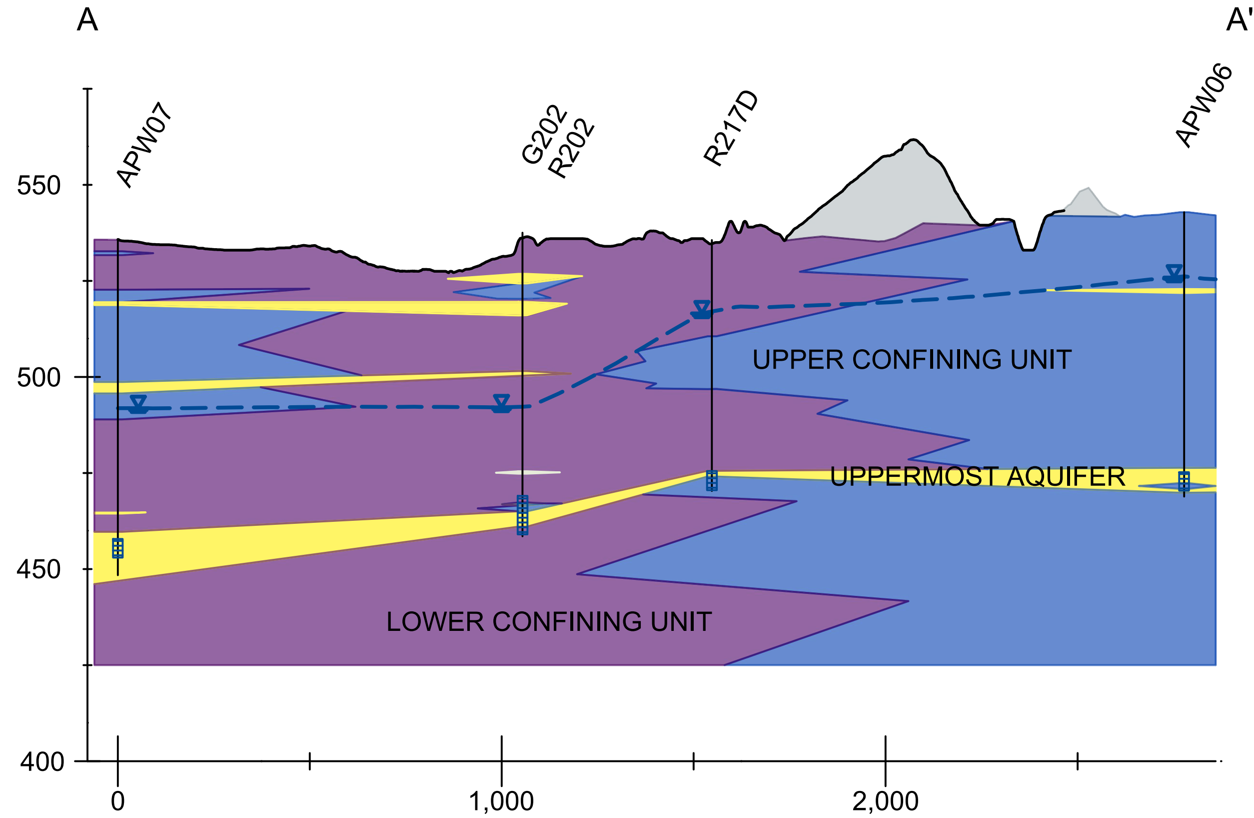
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

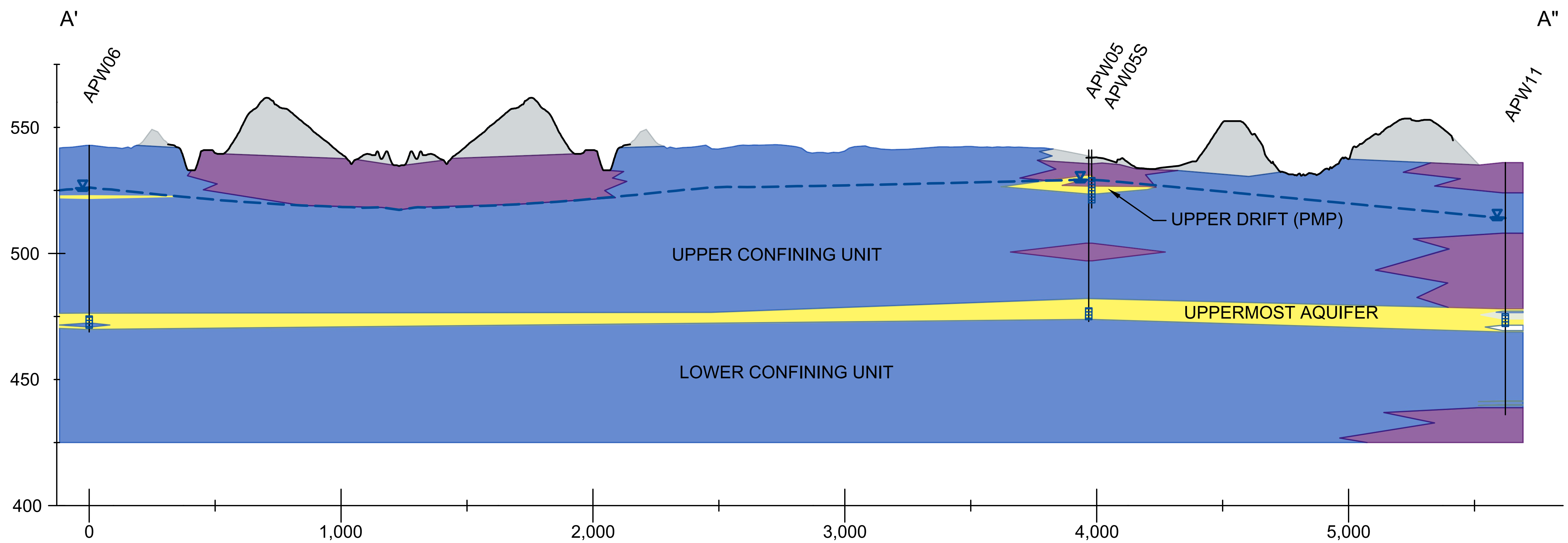
FIGURE 2-5

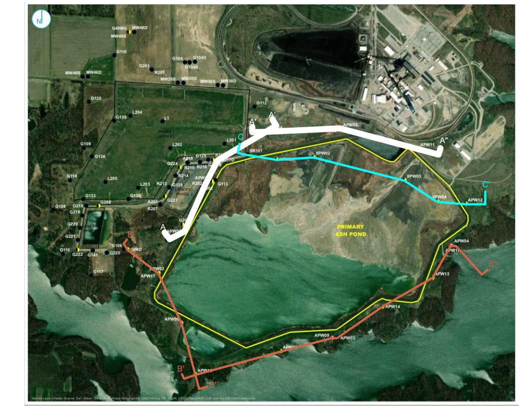
RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD







NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Groundwater elevations measured on June 24, 2021.
5. PMP = potential migration pathway

LEGEND

- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- GRAVEL (GP/GW)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPERMOST AQUIFER GROUNDWATER ELEVATION

50'
0
500'

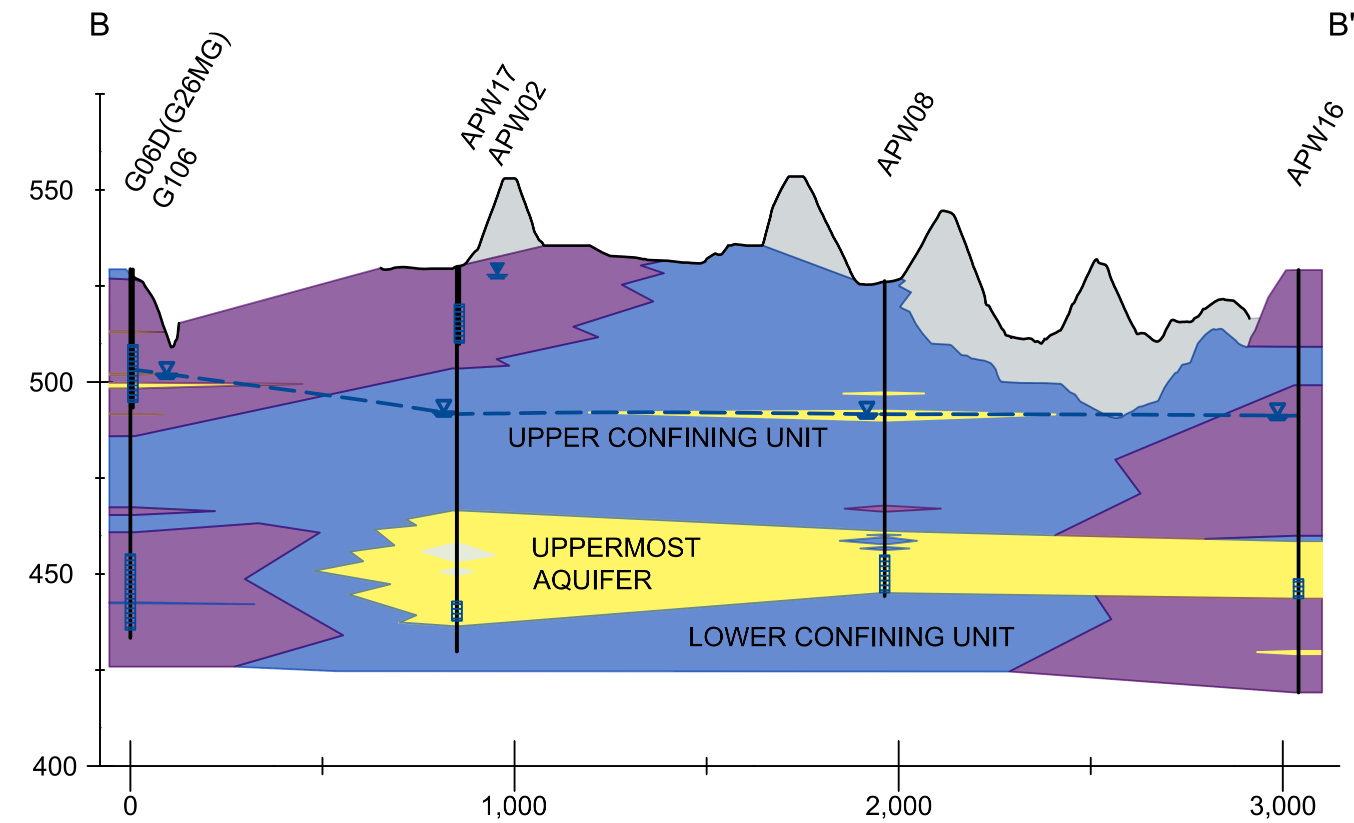
GEOLOGIC CROSS SECTION
A-A' & A'-A"

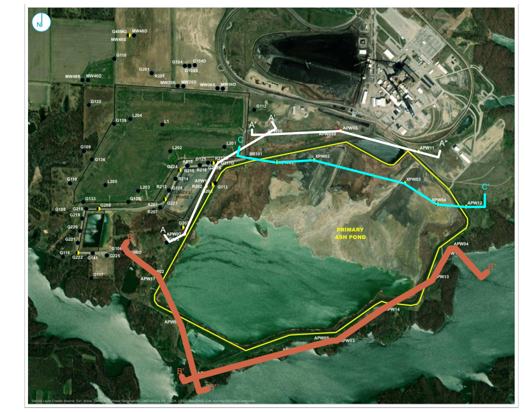
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-6

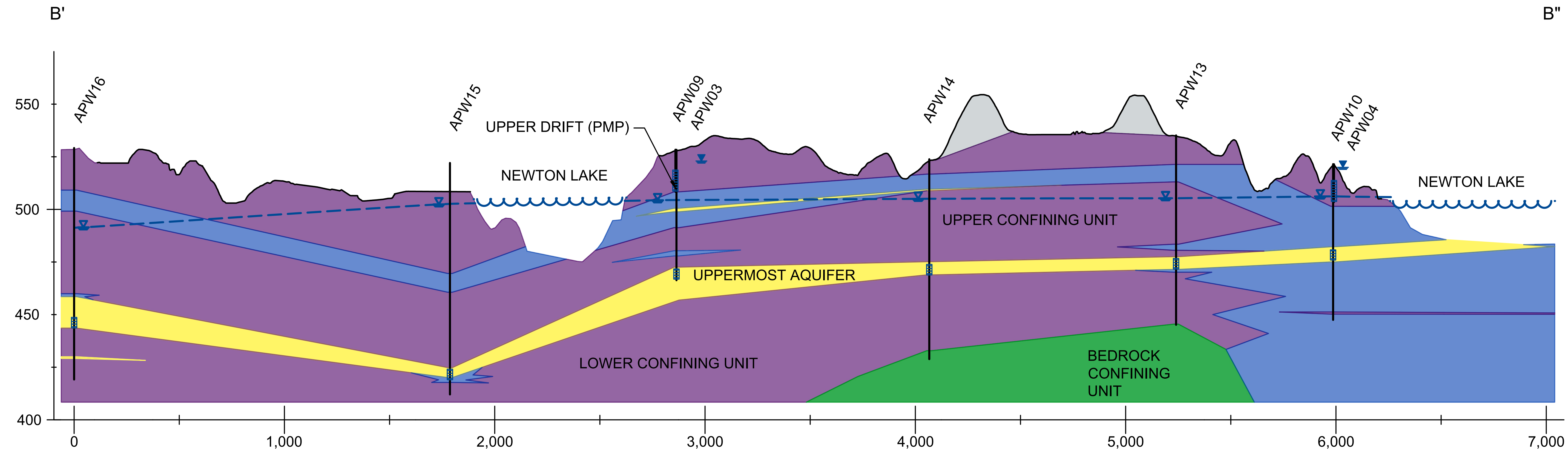
RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

PROJECT: ####





NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Groundwater elevations measured on June 24, 2021.
5. PMP = potential migration pathway



LEGEND

- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- GRAVEL (GP/GW)
- BEDROCK / WEATHERED BEDROCK (SHALE)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPERMOST AQUIFER GROUNDWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

50'
0
500'

GEOLOGIC CROSS SECTION
B-B' & B'-B"

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

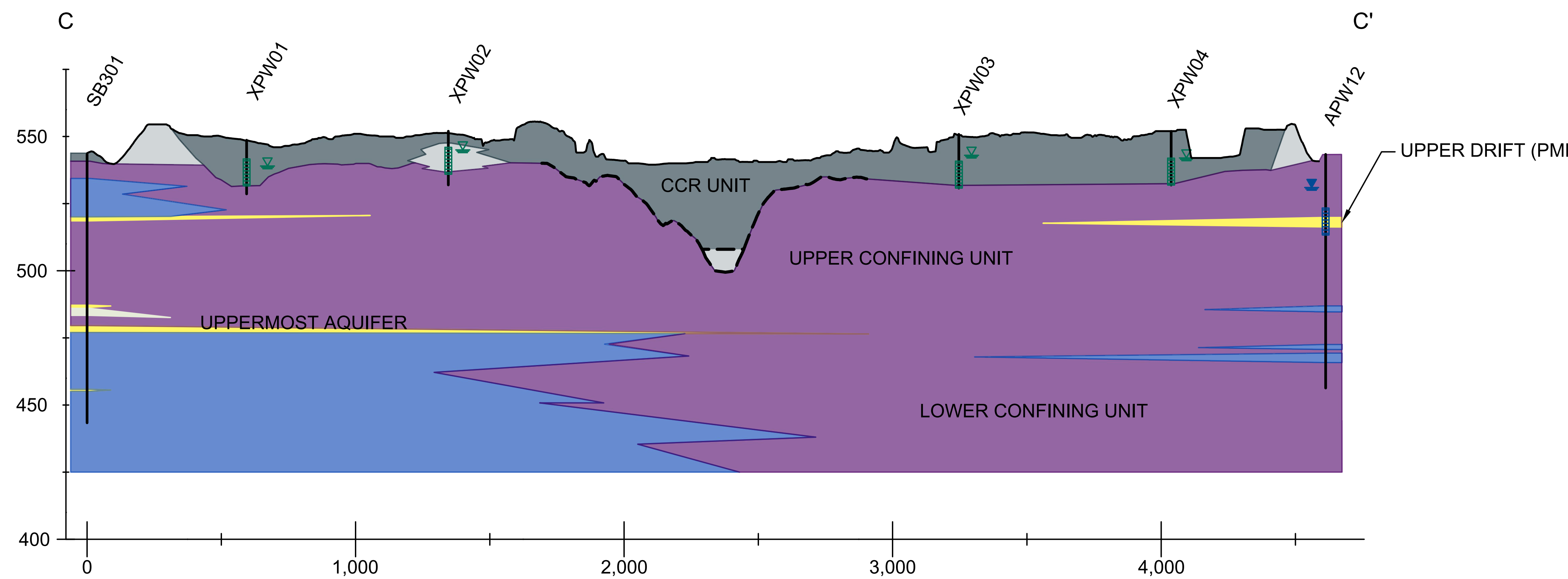
FIGURE 2-7

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: ####

NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Base of CCR Unit is based on historic land surface contours. This surface is being further evaluated as the construction permit is being developed.
5. Groundwater elevations measured on June 24, 2021.
6. PMP = potential migration pathway



LEGEND

- COAL COMBUSTION RESIDUALS (CCR)
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- GRAVEL (GP/GW)
- WELL SCREEN INTERVAL
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

50' 0 500'

GEOLOGIC CROSS SECTION
C-C'

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-8

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: #### DATED: 10/8/2021 DESIGNER: ENGELHISA

SOIL BORING AND BOTTOM OF ASH ELEVATION

10 FOOT HISTORIC ELEVATION CONTOUR

2 FOOT HISTORIC ELEVATION CONTOUR

CONSTRUCTION DRAWING S-69 INDICATES DRAINAGE FEATURE WAS TO BE FILLED TO MAX ELEVATION 508 PRIOR TO OPERATION OF THE UNIT.

PART 845 REGULATED UNIT FACILITY BOUNDARY

SITE FEATURE

PROPERTY BOUNDARY

NOTES

1. CONTOUR LINES ARE A HISTORIC LAND SURFACE. THIS SURFACE IS BEING FURTHER EVALUATED AS THE CONSTRUCTION PERMIT IS BEING DEVELOPED.

0 400 800 Feet

BOTTOM OF ASH MAP

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-9

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 2-9_Bottom of Ash Map.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE

0 400 800 Feet

MONITORING WELL LOCATIONS

HYDROGEOLOGIC SITE
CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 3-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 3-1_Monitoring Well Location Map.mxd

MONITORING WELL

UPPERMOST AQUIFER ELEVATION (2-FOOT INTERVAL)

PART 845 REGULATED UNIT FACILITY BOUNDARY

SITE FEATURE

PROPERTY BOUNDARY

NOTES:
* = NOT USED FOR CONTOURING
ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

TOP OF AQUIFER CONTOURS GENERATED IN 2018 (HALEY & ALDRICH, INC., 2018) FOR 40 C.F.R. § 257; CONTOURS HAVE NOT BEEN MODIFIED USING BORING DATA COLLECTED IN 2021, ALTHOUGH THE SEPARATION DISTANCE BETWEEN THE TOP OF UPPERMOST AQUIFER AND BOTTOM OF ASH IS CONSISTENT.

0 400 800
Feet

TOP OF UPPERMOST AQUIFER

HYDROGEOLOGIC SITE
CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 3-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 3-2_Top of Uppermost Aquifer.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988

0 400 800
Feet

UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS APRIL 27, 2021

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

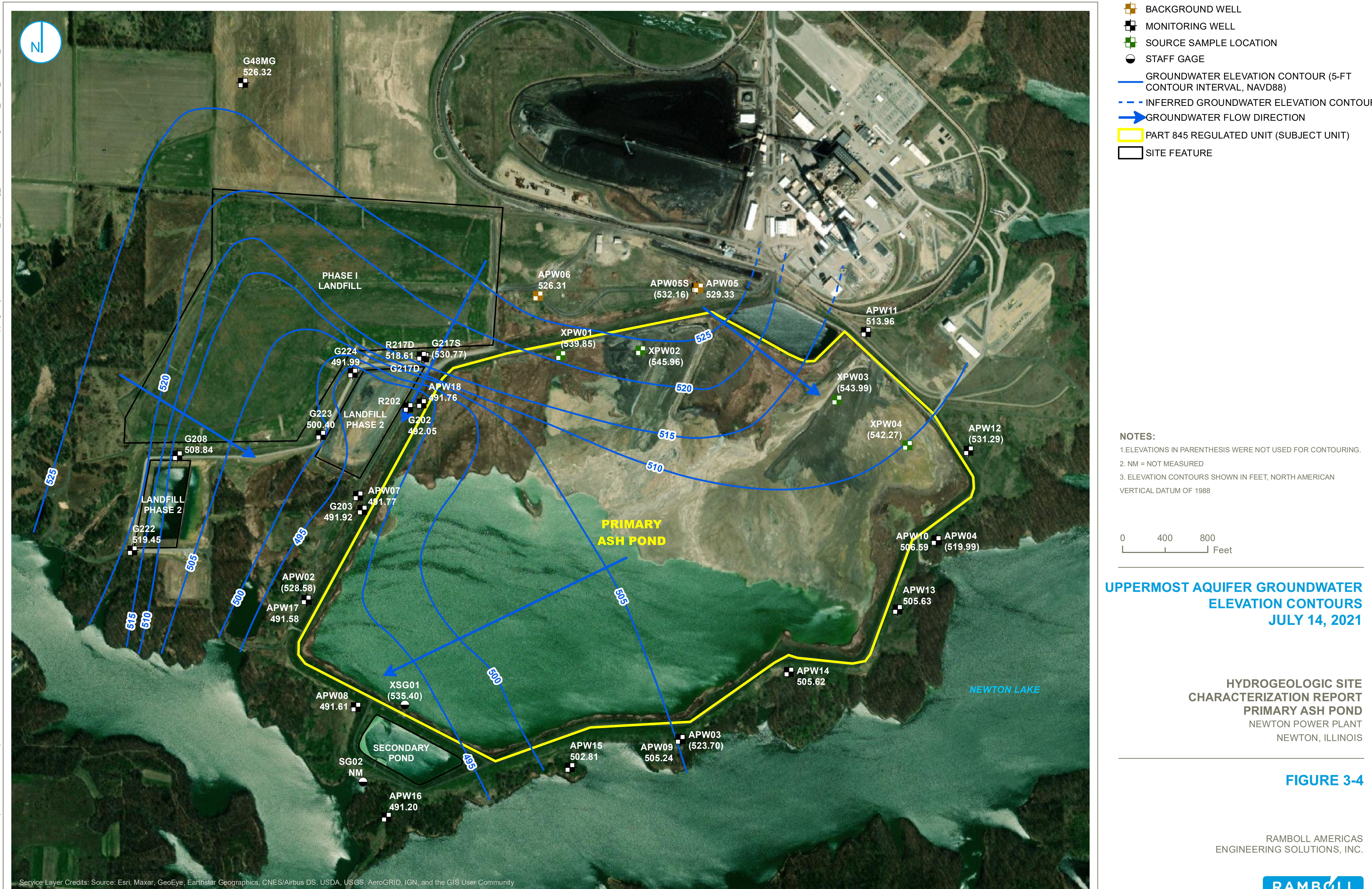
FIGURE 3-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\23\2285\MXD\845_Operating_Permit\Newton\Figure 3-3_GWE_Contours_20210427.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD



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

NOTES:

1.ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.

2. NM = NOT MEASURED

3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988

UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS JULY 14, 2021

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 3-4

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

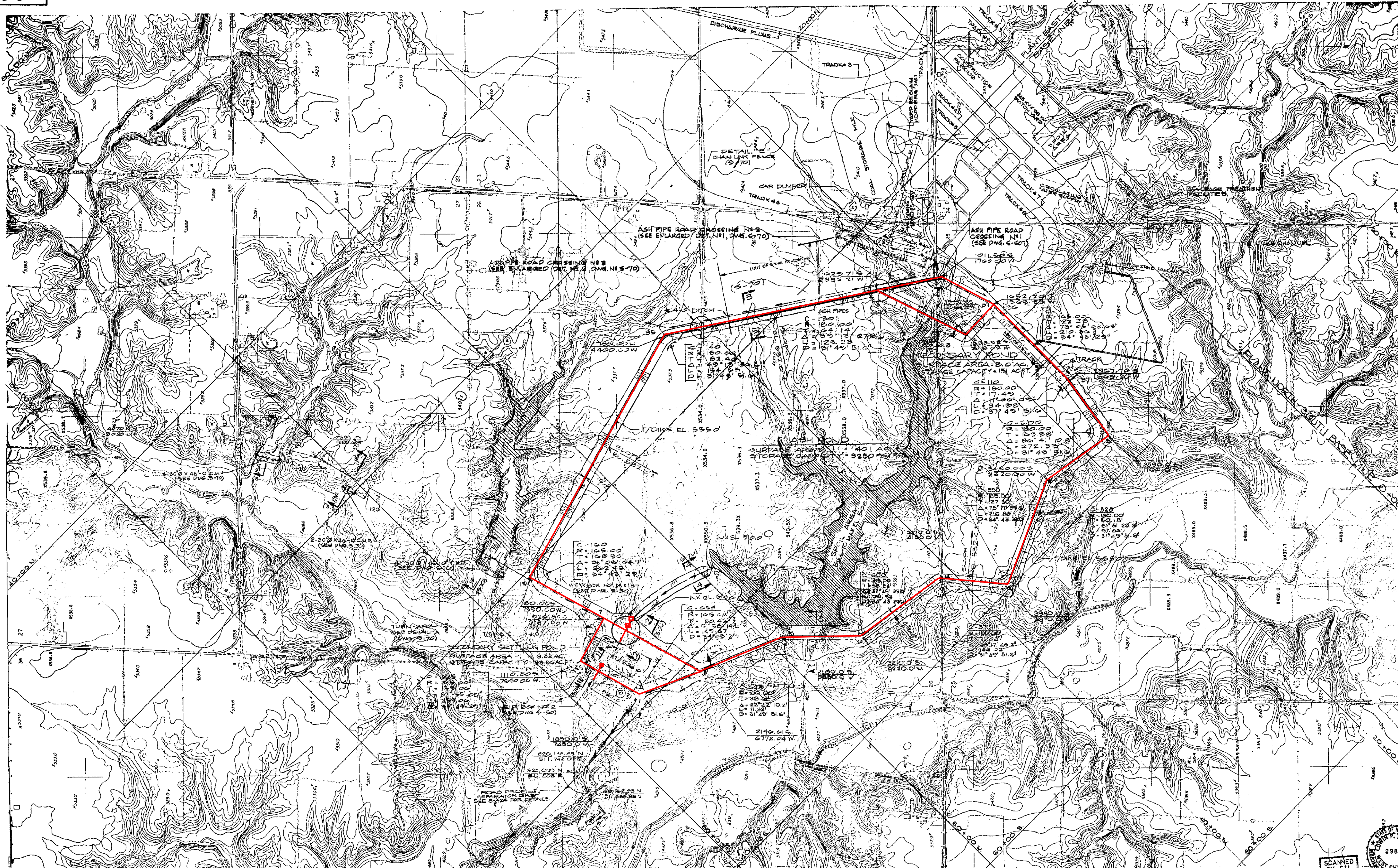
Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure 3-4_GWE_Contours_20210714.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

APPENDICES

APPENDIX A
HISTORIC TOPOGRAPHIC MAP S-69

69-S



POINT NO.	SIDE	CURVE NO.	R	T	Δ	L	D
8	ASH POND		100	52.87'	49°43 13.6	86.78	57°17 45.60"
8	SECONDARY ASH POND		65'	140.79'	130°16' 46.4"	147.80	88°08' 51.69"
21	LAKESIDE (A)		165'	49.55	33°25' 06.4"	96.27	34°43' 29.00"
21	LAKESIDE (B)		65'	70.49'	94°36' 00.0"	107.32	88°08' 51.69"
36	ASH POND (A)		57.5'	57.50	90°00' 00.0"	90.27	99°38' 41.53"
36	SECONDARY POND (B)		57.5	77.59	106°54' 52.35"	107.24	99°38' 41.53"
37	SECONDARY POND		57.5	161.37	140°46' 29.17"	141.21	99°58' 41.53"

PLANT 45° NORTH

NORTH

NOTES

7. THE WATER LEVEL IN ASH POND SHALL BE MAINTAINED AT AN ELEVATION 10.0' ABOVE THE SEDIMENT LEVEL FOR ENVIRONMENTAL PURPOSES.

NOTES

1. FOR GENERAL NOTES SEE DWG. S-14.
2. ALL WORK SHOWN IN THIS DRAWING SHALL BE DONE BY SUPERSTRUCTURE CONTRACTOR IN ACCORDANCE WITH JOB SPEC. A-3022.
3. ALL EXTERIOR SIDE SLOPES OF DIKE BELOW ELEV. 510.0' THAT IS TO BE CONSTRUCTED BEFORE LAKE FILLING. SHALL BE PROVIDED WITH 24" STONE RIPRAP ON 24" SAND AND GRAVEL FILTER BEDDING AS SHOWN ON DWG. S-70. AND ALL DIKE CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH JOB SPEC. A-3017 AND A-3022.
4. ALL DIKE TOPS AND SIDE SLOPES AND ALL EXTERNAL DITCHES SHALL BE PROVIDED WITH 4" TOPSOIL AND SEEDED IN ACCORDANCE WITH JOB SPEC. A-3017 AND A-3022.
5. EXISTING LOW AREAS SHALL BE FILLED WITH SPOILMATERIAL AS REQUIRED FOR SPOIL DISPOSAL SPOILS SHALL BE PLACED IN LAYERS AND GRADED PROPERLY FOR DRAINAGE.
6. REMOVED "HOLD" FROM SO_2 POND AREAS FOR CLEARING. SLOPE STAKING & CROSS- SECTIONING ONLY.

REFERENCE DRAWINGS

S-19	SITE CONTOURS AND DEVELOPMENT PLAN SHEET 4.
S-39	GRADING AND DRAINAGE PLAN. PLANT AREA SHEET 2.
S-40	GRADING AND DRAINAGE PLAN. PLANT AREA SHEET 3.
S-50	WEIR BOX STRUCTURES AT PRIMARY AND SECONDARY SETTLING PONDS.
S-70	ASH POND DIKE PROFILE DETAILS & SECTION
S-507	GRADING & DRAINAGE PLAN- PLANT AREA- SHT7.

Drawing Release Record

Rev	Date	Init	Description
N	07-29-94	TM	SCANNED BY S&L
A	11-29-74	CRB	[illegible]
B	2-10-75		REMOVED SO_2 [illegible]
C			HOLD [illegible]
D	7-15-75	[illegible]	[illegible]
E	12-21-75	CRB	REMOVED HOLD [illegible]
F	7-12-76	CRB	[illegible]
G	9-13-76	CRB	[illegible]
H	1-24-77	CRB	[illegible]
J	10-21-77	SPL	SHOWN LIMIT OF [illegible]
K	11-8-79	[illegible]	REV. STORAGE CAPACITIES [illegible]
L	7-8-80	[illegible]	[illegible] REVISION
[illegible]	2-20-[illegible]	[illegible]	SENT TO CLIENT

ASH POND & SO_2 DISPCSAL POND
NEWTON POWER STATION UNIT 1
CENTRAL ILL PUBLIC SERVICE CO.
NEWTON, ILLINOIS

SCALE 1" = 400'-0" & U.O.
DRAWN B. SANCHEZ 8-6-74
CHECKED C. R. Bhattacharya 8-6-74
ENGINEER A. J. Shale 8-6-74
APPROVED [illegible]

JOB NO. 4136 55 | 4136 15

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO.
S-69

APPENDIX B
INFORMATION PERTINENT TO 35 I.A.C. § 845.220(A)(3)

SUMMARY OF POTENTIAL RECEPTORS WITHIN 1,000 METERS

DESKTOP STUDY

NEWTON POWER PLANT

PRIMARY ASH POND

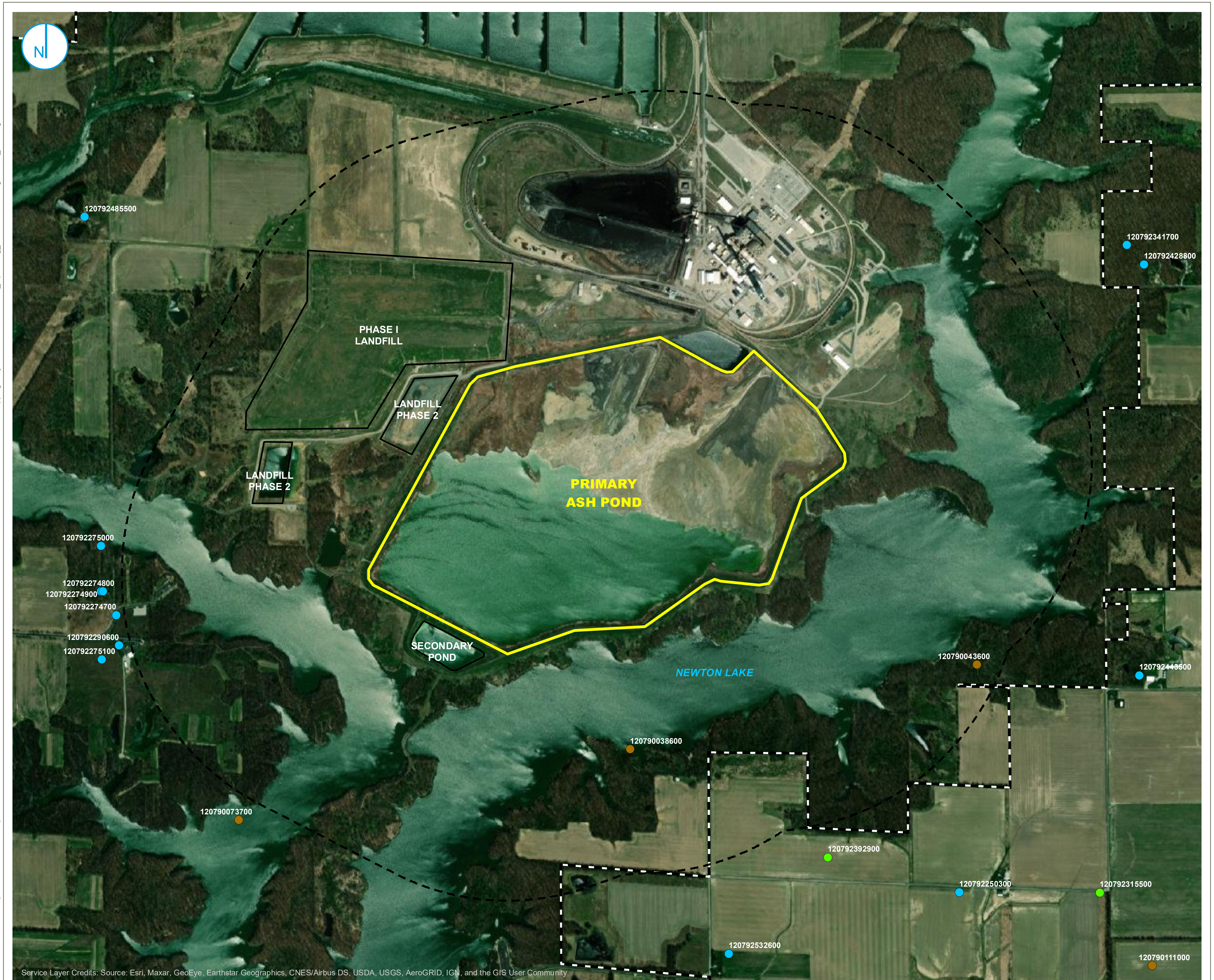
NEWTON, IL

Category	Number of Receptors Identified Within 1,000 Meters	Number of Receptors Identified Downgradient of Unit	Notes
Wells	2	0	Sidegradient; Wells are listed as dry/abandoned.
Surface Water Features	12	2	
Historic Sites	0	0	
Natural Sites	0	0	
Threatened or Endangered Species	25	10	Data provided only at a county level.
Mines	0	0	Nearest mine is 6.7 miles northeast.
Oil Sites	0	0	

[O: CJC 06/02/21; C: LDC 09/15/21]

RAMBOLL

WATER WELL SURVEY



DRY
WATER
N/A
PART 845 REGULATED UNIT FACILITY BOUNDARY
1000 METER UNIT BUFFER
SITE FEATURE
PROPERTY BOUNDARY

SOURCE: IL WELLS

0 625 1,250 Feet

DRINKING WATER INTAKES, PUMPING WELLS, AND USES OF WATER

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE B-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure B-2_Drinking Water Intakes Uses of Water.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

WELLS WITHIN 1,000 METERS
DESKTOP STUDY
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

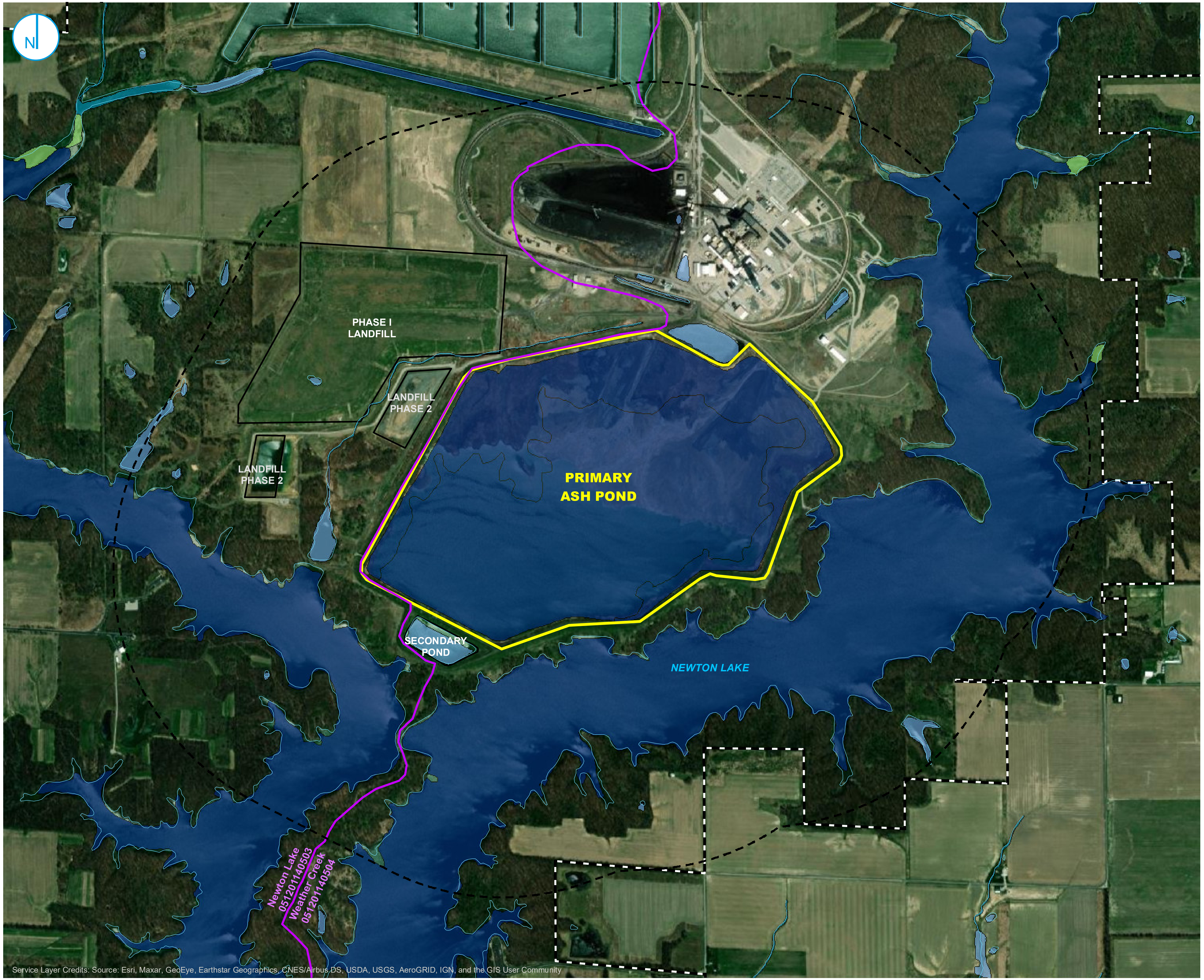
Well Number	Date Constructed	Ground Elevation (ft NAVD88)	Screen Top Depth (FT BGS)	Screen Bottom Depth (ft BGS)	Screen Length (ft)	Screen Diameter (inches)	Well Depth (ft BGS)	Total Boring Depth (ft BGS)	Latitude (DD)	Longitude (DD)	Hydraulic Position Designation (B/Sd/U/D)	Notes
120790038600	5/27/1948	---	---	---	---	---	---	---	38.918277	-88.281956	Sd	
120790043600	7/13/1950	---	---	---	---	---	---	---	38.921356	-88.265738	Sd	

[O: CJC 06/02/21; C: LDC 09/15/21]

Notes:
--- = no data
B = background
BGS = below ground surface
D = downgradient
DD = decimal degrees
ft = foot/feet
LCU = lower confining unit
Sd= Sidegradient
U = upgradient
NAVD88 = North American Vertical Datum of 1988, GEOID 12A

RAMBOLL

SURFACE WATERS



Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure B-3_Surface Waterbodies.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

SURFACE WATERBODY
WATERSHED BOUNDARY (HUC 12)
NATIONAL WETLANDS INVENTORY
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND
LAKE
OTHER
RIVERINE
PART 845 REGULATED UNIT FACILITY BOUNDARY
1000 METER UNIT BUFFER
SITE FEATURE
PROPERTY BOUNDARY

SOURCES: USGS, USFWS

0 625 1,250 Feet

SURFACE WATERBODIES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE B-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

SURFACE WATER FEATURES WITHIN 1,000 METERS
DESKTOP STUDY
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

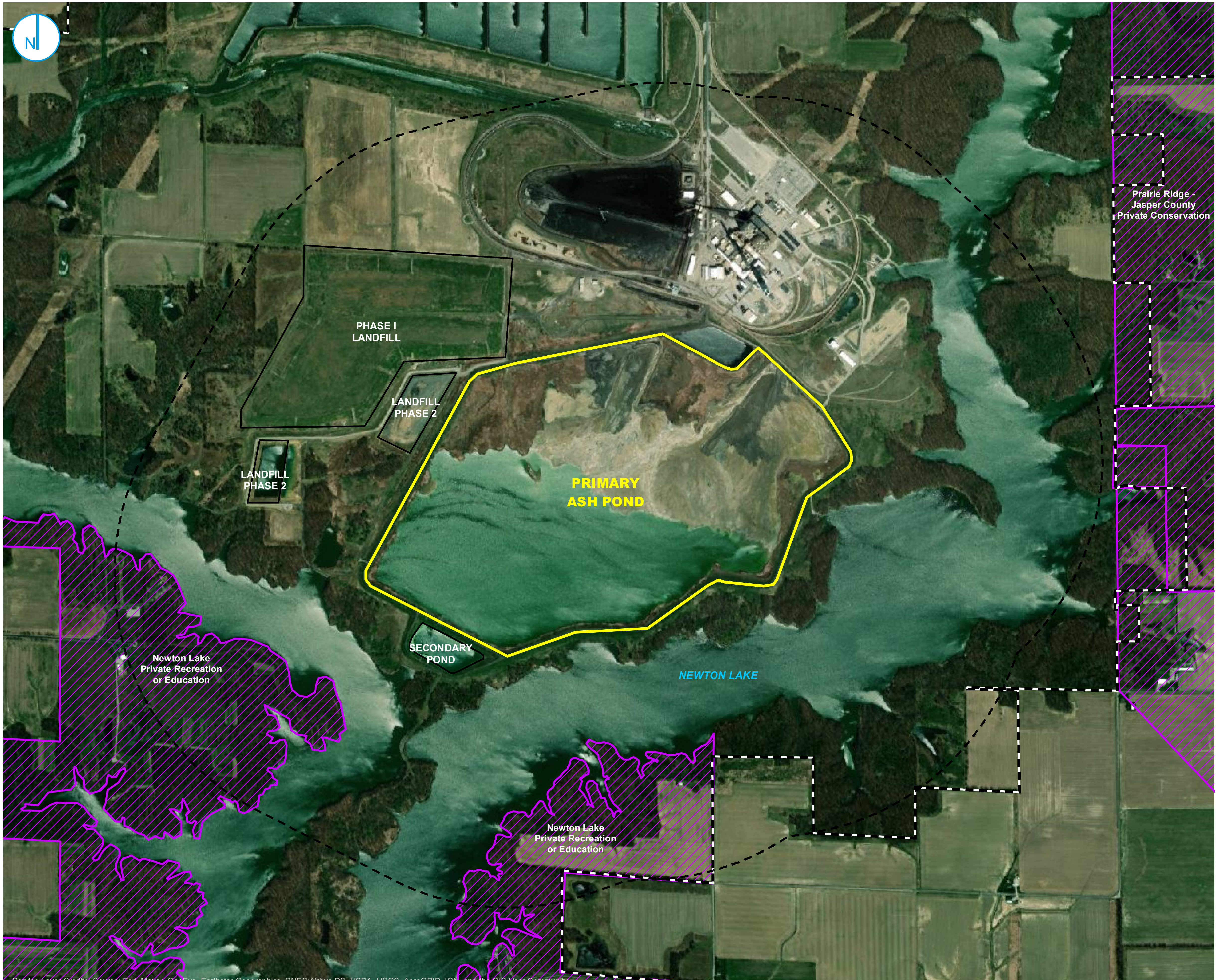
HUC	Surface Water ID	Distance from Unit (ft)	Distance from Unit (meters)	Physical Orientation to Unit	Hydraulic Orientation to Unit	Classification Code	Size (acres)
--	Freshwater Pond	45	14	NE	Upgradient	PUBGh	6.16
--	Freshwater Pond	2610	795	SE	Sidegradient	PUBGh	2.28
--	Freshwater Pond	3250	991	NW	Upgradient	PUBGh	4.07
--	Freshwater Pond 2	153	47	SW	Downgradient	PUBGh	5.79
--	Freshwater Pond 3	958	292	NE	Upgradient	PUBGh	0.92
--	Freshwater Pond 4	720	219	N	Upgradient	PUBGx	0.99
--	Freshwater Pond 5	440	134	W	Upgradient	PUBGh	3.7
--	Freshwater Pond 6	1600	488	NW	Upgradient	PUBGh	0.27
--	Lake	2780	847	N	Upgradient	L1UBHx	13.72
--	Lake Newton	240	73	S	Downgradient	L1UBHh	1647.98
--	Riverine Wetland	123	37	N	Upgradient	R4SBC	2.26
--	Riverine Wetland 2	142	43	N/NW	Upgradient	R4SBC	2.26

[O: CJC 06/02/21; C: LDC 09/15/21]

Notes:
-- = not applicable
ft = foot/feet
bgs = below ground surface
HUC = Hydrologic Unit Code
N = north
W = west
SE = southeast

RAMBOLL

NATURE PRESERVES, HISTORIC SITES, ENDANGERED / THREATENED SPECIES



Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Figure B-4_Nature Preserves.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

PROTECTED
PART 845 REGULATED UNIT FACILITY BOUNDARY
1000 METER UNIT BUFFER
SITE FEATURE
PROPERTY BOUNDARY

SOURCES: USGS - PAD-US, USFWS

0 625 1,250 Feet

NATURE PRESERVES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE B-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

JASPER COUNTY THREATENED AND ENDANGERED SPECIES

DESKTOP STUDY

NEWTON POWER PLANT

PRIMARY ASH POND

NEWTON, IL

Scientific Name	Common Name	Status	Number of Occurances	Last Observed
Ammocrypta pellucida	Eastern Sand Darter	LT	9	8/5/2019
Apalone mutica	Smooth Softshell	LT	2	8/31/2017
Asio flammeus	Short-eared Owl	LE	2	12/23/2014
Bartramia longicauda	Upland Sandpiper	LE	1	5/22/2013
Botaurus lentiginosus	American Bittern	LE	1	6/3/2013
Circus hudsonius	Northern Harrier	LE	3	2/6/2016
Coccyzus erythropthalmus	Black-billed Cuckoo	LT	1	6/25/1998
Emydoidea blandingii	Blanding's Turtle	LE	1	5/18/1998
Etheostoma histrio	Harlequin Darter	LE	1	9/18/1967
Festuca paradoxa	Cluster Fescue	LT	1	6/30/1999
Ixobrychus exilis	Least Bittern	LT	2	5/26/2017
Lanius ludovicianus	Loggerhead Shrike	LE	3	6/7/2017
Laterallus jamaicensis	Black Rail	LE	1	6/20/2012
Nyctanassa violacea	Yellow-crowned Night-Heron	LE	1	5/24/1995
Papaipema eryngii	Eryngium Stem Borer	LT	1	7/8/2020
Penstemon tubaeflorus	Tube Beard Tongue	LE	3	5/27/2019
Rallus elegans	King Rail	LE	1	6/7/2016
Sabatia campestris	Prairie Rose Gentian	LE	1	7/30/2019
Schoenoplectus purshianus	Pursh's Bulrush	LE	1	2012
Silene regia	Royal Catchfly	LE	1	5/12/2015
Spiranthes vernalis	Spring Ladies' Tresses	LE	3	8/5/2019
Sternula antillarum	Least Tern	LE	1	6/13/2004
Terrapene ornata	Ornate Box Turtle	LT	2	4/6/2020
Tracaulon arifolium	Halberd-leaved Tearthumb	LE	1	8/14/1985
Tympanuchus cupido	Greater Prairie-Chicken	LE	2	7/10/1905

[O: CJC 06/02/21; C: LDC 09/15/21]

Notes:

-- = not provided/cannot be determined

LE = listed endangered

LT = listed threatened

APPENDIX C
BORING LOGS AND WELL CONSTRUCTION LOGS

BORING AND WELL LOCATION MAP

BORING LOGS

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW11

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	1/23/2021	1/23/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW11	Feet (NAVD88)	536.05 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 825,195.28 N, 1,000,717.50 E (E)/ W
1/4 of 1/4 of Section 25, T 6 N, R 8 E

Lat 38° 55' 58.09"
Long -88° 16' 31.6"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 113		0–10	0 - 0.4' **CLAYEY SILT** ML/CL, grayish brown (10YR 5/2) to brownish yellow (10YR 6/6), roots (5-15%), gravel (0-5%), no dilatancy, medium toughness, low plasticity, wet.	ML/CL									CS= Core Sample
				0.4 - 10' **LEAN CLAY:** CL, gray (10YR 6/1), strong brown (7.5YR 5/8) mottling (15-30%), brown (10YR 3/3), silt (15-30%), sand (0-5%), organic material (0-5%), no dilatancy, low toughness, medium plasticity, wet to moist.	CL									
2 SH	24 24		10–12	10 - 12' **LEAN CLAY:** CL.	CL					17.8	28	16	53.8	SH= Shelby Tube

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

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
3 CS	96 96			12 - 22.3' **SILT WITH SAND:** (ML)s, brown (10YR 5/3), clay (5-15%), gravel (0-5%), cohesive, low toughness, non-plastic to low plasticity, moist.										
			13											
			14											
			15	15' brown (10YR 4/3), clay (5-15%), gravel (5-15%), low to medium toughness.										
			16											
			17		(ML)s									
			18	18' sand seams (0-5%) 1/16" diameter.										
			19											
4 CS	120 120		20											
			21											
			22											
			23	22.3 - 28' **SILT:** ML, yellowish brown (10YR 5/4), grayish brown (10YR 5/2) mottling (0-5%), strong brown (7.5YR 5/6) mottling (0-5%), clay (15-30%), sand (0-5%), gravel (0-5%), no dilatancy, medium toughness, low plasticity.										
			24											
			25		ML									
			26											
			27											
			28	28 - 58' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), grayish brown (10YR 5/2) mottling (0-5%), strong brown (7.5YR 5/6) mottling (0-5%), silt (15-30%), sand (0-5%), gravel (0-5%), no dilatancy, low toughness, medium to high plasticity.										
			29											
5 CS	120 120		30		CL									
			31											
			32											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	28 - 58' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), grayish brown (10YR 5/2) mottling (0-5%), strong brown (7.5YR 5/6) mottling (0-5%), silt (15-30%), sand (0-5%), gravel (0-5%), no dilatancy, low toughness, medium to high plasticity. *(continued)*										
			34	33.2' - 34.4' gray (10YR 5/1) mottling (5-15%), sand (5-15%).										
			35	34.4' - 40' sand (5-15%).										
			36											
			37											
			38											
			39											
6 CS	120 120		40											
			41											
			42		CL									
			43											
			44											
			45											
			46											
			47											
			48											
			49	48.6' dark grayish brown (10YR 4/2), olive gray (5Y 4/2) mottling (5-15%), dark grayish brown (2.5Y 4/2) mottling (5-15%), dark reddish brown (5YR 3/4) mottling (0-5%),.										
7 CS	120 120		50											
			51											
			52											

Boring Number APW11

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	28 - 58' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), grayish brown (10YR 5/2) mottling (0-5%), strong brown (7.5YR 5/6) mottling (0-5%), silt (15-30%), sand (0-5%), gravel (0-5%), no dilatancy, low toughness, medium to high plasticity. *(continued)*	CL									
			56	55.7' - 56.9' dark gray (10YR 4/1) to (7.5YR 4/1).										
			58	58 - 58.9' **SILTY SAND:** SM, grayish brown (10YR 5/2), gravel (5-15%), dense, moist.	SM									
			59	58.9 - 59.5' **SILT WITH SAND:** (ML)s, grayish brown (10YR 5/2), dark yellowish brown (10YR 4/6) mottling (0-5%), clay (15-30%), gravel (0-5%), low toughness, low plasticity.	(ML)s									
8 MC	24 20		60	59.5 - 60' **POORLY-GRADED GRAVEL:** GP, grayish brown (10YR 5/2), subrounded to subangular, fine gravel, sand (30-45%), silt (15-30%), moist.	GP					17.8	27	9	78.6	MC= Modified California Sample
			61	60 - 62' **LEAN CLAY:** CL.	CL									
9 CS	96 96		62	62 - 64.5' **POORLY-GRADED SAND WITH CLAY:** SP-SC, dark gray (10YR 4/1), subrounded, fine sand, dense, wet.	SP-SC									
			64.5	64.5 - 66.6' **CLAYEY SILT** ML/CL, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), no dilatancy, medium toughness, low to medium plasticity, moist.	ML/CL									
			66.6	66.6 - 67.2' **POORLY-GRADED SAND WITH CLAY:** SP-SC, dark gray (10YR 4/1), subrounded, fine sand, gravel (5-15%), dense, wet.	SP-SC									
			67.2	67.2 - 80' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, moist.	ML/CL									
10 CS	120 120		70											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			73–79	67.2 - 80' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, moist. *(continued)*	ML/CL									
11 SH	24 24		80–81	80 - 82' **LEAN CLAY:** CL.	CL					16.5	32	18	79	
12 CS	96 96		82–85	82 - 93.5' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, moist.	ML/CL									
			86	86' olive (5Y 4/4), dark yellowish brown (10YR 4/6) mottling (5-15%), dark gray (10YR 4/1) mottling (0-5%), black (10YR 2/1) mottling (0-5%).										
			87	87.4' olive gray (5Y 4/2), dark gray (10YR 4/1) mottling (15-30%), organic material (0-5%).										
			88	88.5' dark gray (10YR 4/1), olive gray (5Y 4/2) mottling (5-15%), olive brown (2.5Y 4/4) mottling (0-5%).										
			89	89.7' olive (5Y 4/4).										
13 CS	120 120		90–92	90.2' olive gray (5Y 4/2), organic material (0-5%).										

Boring Number APW11

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93	82 - 93.5' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, moist. *(continued)* 92' - 92.2' layer of organic material.	ML/CL									
			94	93.5 - 94' **SANDY SILT:** s(ML), dark gray (10YR 4/1), reddish brown (5YR 4/4) mottling (5-15%), clay (5-15%), gravel (0-5%), cohesive, non-plastic, moist.	s(ML)									
				94 - 94.5' **SILT:** ML, olive gray (5Y 4/2).	ML									
			95	94.5 - 94.7' **CLAYEY SAND:** SC, dark gray (10YR 4/1), wet.	SC									
			96	94.7 - 96' **SANDY SILT:** s(ML), dark gray (10YR 4/1), reddish brown (5YR 4/4) mottling (5-15%), clay (5-15%), gravel (0-5%), cohesive, non-plastic, moist.	s(ML)									
				96 - 96.2' **POORLY-GRADED SAND WITH CLAY:** SP-SC, dark gray (10YR 4/1), loose, moist.	SP-SC									
			97	96.2 - 97' **SILT:** ML, dark gray (10YR 4/1), clay (5-15%), sand (5-15%), no dilatancy to slow dilatancy, low toughness, medium plasticity.	ML									
			98	97 - 97.2' **SILT:** ML, very dark grayish brown (10YR 3/2), dry.	ML									
			99	97.2 - 100' **LEAN CLAY:** CL, dark gray (10R 4/1), silt (5-15%), organic material (0-5%), no dilatancy, high toughness, medium to high plasticity, moist.	CL									
			100	100' End of Boring.										

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SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW12

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/21/2021	2/21/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW12	Feet (NAVD88)	543.33 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 824,081.13 N, 1,001,683.34 E Ⓔ/ W
1/4 of 1/4 of Section 25, T 6 N, R 8 E
Lat 38° 55' 47.07"
Long -88° 16' 19.39"
Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 37		0	0 - 0.4' **LEAN CLAY:** CL, dark brown (10YR 3/3), sand (0-5%), roots (0-5%), moist.	CL									CS= Core Sample
			1	0.4 - 6.4' **SANDY LEAN CLAY:** s(CL), yellowish brown (10YR 5/6), gravel (0-5%), stiff, low plasticity, moist.	s(CL)				2					
			3						1.5					
2 CS	60 43		5											
			6						1.5					
			6.4	6.4 - 11.8' **LEAN CLAY:** CL, yellowish brown (10YR 5/6), gray and yellowish brown mottling (0-5%), sand (0-5%), stiff medium plasticity.	CL									
			7						1.5					
			8						1.5					
3 CS	60 60		10											
			11						1					
			11.8	11.8 - 20' **LEAN CLAY:** to **SILTY CLAY:** CL, yellowish brown (10YR 5/6), gray and yellowish brown mottling (0-5%), gravel (0-5%), sand (0-5%), very stiff, medium plasticity, moist.	CL									
			12						2					
			13						2.5					
			14						2					
4 CS	60 60		15	15' hard, gray and yellowish brown mottling (15-25%).					2.5					
			16											

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

Signature	Firm	
S W (signature)	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			17	11.8 - 20' **LEAN CLAY:** to **SILTY CLAY:** CL, yellowish brown (10YR 5/6), gray and yellowish brown mottling (0-5%), gravel (0-5%), sand (0-5%), very stiff, medium plasticity, moist. *(continued)*					4.5 4.5					
			18		CL				4.5					
			19						4.5					
5 SH	24 24		20	20 - 22' **CLAYEY SAND:** SC.	SC					15.1	27	15	45.8	SH= Shelby Tube
6 CS	36 36		22	22 - 23.5' **SANDY LEAN CLAY:** s(CL), yellowish brown (10YR 5/6), silt (15-25%), gravel (0-5%), hard, low plasticity, wet.	s(CL)				4.5					
			24	23.5 - 25' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/6), fine to medium sand, gravel (0-5%), silt (0-5%), wet.	SP									
7 MC	24 24		25	25 - 27' **POORLY-GRADED SAND WITH SILT:** SP-SM.	SP-SM					8.4	10		6.2	MC= Modified California Sample
8 CS	36 36		27	27 - 29.2' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), sand (15-25%), gravel (15-25%), hard, low plasticity, dry.	CL/ML				4.5					
9 CS	60 60		29–30	29.2 - 35' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), gravel (15-25%), sand (0-5%), hard, low plasticity, dry.					4.5					
			32		CL/ML									
			33	32.6' - 34' sand (15-25%).										
10 CS	60 60		35	35 - 55' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), yellowish brown and gray mottling (0-5%), gravel (15-25%), sand (0-25%), hard, low plasticity, dry.					4.5					
			37						4.5					
			39		CL/ML				4.5					
11 CS	60 60		40–41						4.5					
			42	41.7' - 43.2' gravel (15-45%).										

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Boring Number APW12

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			43	35 - 55' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), yellowish brown and gray mottling (0-5%), gravel (15-25%), sand (0-25%), hard, low plasticity, dry. *(continued)*					4.5					
			44											
12 CS	60 60		45						4.5					
			46											
			47						4.5					
			48											
			49		CL/ML				4.5					
13 CS	60 60		50											
			51						4.5					
			52						4.5					
			53											
			54											
14 CS	60 60		55	55 - 56.4' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), yellowish brown mottling (0-5%), sand (0-5%), hard, medium plasticity, moist.										
			56		CL/ML				4.5					
			57	56.4 - 58.6' **SILT:** ML, dark gray (10YR 4/1), clay (15-25%), sand (0-5%), moist.										
			58		ML									
			59	58.4' - 58.6' layer of clayey sand. 58.6 - 70.8' **LEAN CLAY:** to **SILTY CLAY:** CL, dark gray (10YR 4/1), gravel (15-25%), sand (0-5%), hard, low plasticity, dry.					4.5					
15 CS	60 60		60											
			61						4.5					
			62											
			63						4.5					
			64		CL									
16 CS	60 60		65						4.5					
			66											
			67						4.5					
			68											
			69											

Boring Number APW12

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
17 CS	60 60		70	58.6 - 70.8' **LEAN CLAY:** to **SILTY CLAY:** CL, dark gray (10YR 4/1), gravel (15-25%), sand (0-5%), hard, low plasticity, dry. *(continued)*	CL				4.5					
			71–72	70.8 - 72.6' **SILT:** ML, dark gray (10YR 4/1), sand (0-5%), dry to moist.	ML									
			73	72.6 - 74' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), sand (0-5%), gravel (0-5%), hard, low plasticity, dry.	CL/ML									
18 CS	60 60		74–77	74 - 77.5' **SILT:** ML, dark gray (10YR 4/1), sand (0-5%), dry.	ML									
19 CS	60 60		78–85	77.5 - 85' **SILTY CLAY:** CL/ML, gray (10YR 4/1), sand (0-5%), gravel (0-5%), dry.	CL/ML									
20 SH	24 24		85–87	85 - 87' **LEAN CLAY:** CL.	CL					14.4	29	15	80.2	
			87	87' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW13

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/22/2021	1/22/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW13	Feet (NAVD88)	535.16 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 822,591.02 N, 1,001,013.30 E (E)/ W
1/4 of 1/4 of Section 25, T 6 N, R 8 E

Lat 38° 55' 32.35"
Long -88° 16' 27.88"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60			0 - 0.4' **SILTY SAND:** SM, dark brown (10YR 3/3), clay (15-25%), moist.	SM									CS= Core Sample
			1	0.4 - 2.3' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), gray mottling (0-5%), sand (0-5%), gravel (0-5%), firm to stiff, medium plasticity, moist.	CL/ML				1					
			2											
			3	2.3 - 6.2' **SILTY CLAY:** to **LEAN CLAY:** CL/ML, yellowish brown (10YR 5/6), sand (0-5%), gravel (0-5%), stiff, low plasticity, moist.	CL/ML				2					
2 CS	60 60		5						2					
			6						1.5					
			7	6.2 - 8.7' **SANDY LEAN CLAY:** (CL)g, yellowish brown (10YR 5/6), gravel (0-5%), stiff, low plasticity, moist. 6.5' yellowish brown and gray mottling (15-25%).	(CL)g				1.5					
			8						1.5					
			9	8.7 - 10' **SILTY CLAY:** to **LEAN CLAY:** CL/ML, yellowish brown (10YR 5/6), sand (0-5%), gravel (0-5%), stiff, low plasticity, moist.	CL/ML				1.5					
3 CS	60 60		10	10 - 13.8' **SANDY LEAN CLAY:** (CL)g, yellowish brown (10YR 5/6), gravel (15-25%), hard, low plasticity, moist. 10.8' - 11.1' layer of clayey sand.	(CL)g				2					
			11						4.5					
			14	13.8 - 22.1' **SILT:** ML, dark gray (10YR 4/1), clay (0-25%), sand (0-5%), gravel (0-5%), hard, dry.	ML									
4 CS	60 60		16											

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

Signature	Firm	
St Wb	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Boring Number APW13

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			17–22	13.8 - 22.1' **SILT:** ML, dark gray (10YR 4/1), clay (0-25%), sand (0-5%), gravel (0-5%), hard, dry. *(continued)* 17.8' clay (0-5%).	ML									
5 CS	60 60		20											
			22						4.5					
			22–25	22.1 - 25' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), gravel (0-5%), sand (0-5%), hard, low plasticity, dry.	CL/ML									
6 SH	24 24		25–27	25 - 27' **POORLY-GRADED SAND WITH SILT:** SP-SM.	SP-SM					21.2	9		11.1	SH= Shelby Tube
7 CS	36 36		27–31	27 - 31.2' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), gravel (0-5%), sand (0-5%), hard, low plasticity, dry. 27.8' - 28' layer of sand, moist.	CL/ML				4.5					
			29						4.5					
8 CS	60 60		30											
			31						4.5					
			31–35	31.2 - 35' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), yellowish brown and gray mottling (0-5%), gravel (15-25%), sand (0-5%), hard, low plasticity, dry.	CL/ML				4.5					
9 CS	60 60		35–42	35 - 51.7' **SILTY CLAY:** CL/ML, brown (10YR 5/3), gravel (0-5%), sand (0-5%), hard, low plasticity, dry. 37.2' - 38.3' gray mottling (15-25%).	CL/ML									
10 CS	60 60		40	40' very stiff to hard, medium plasticity.										
			41						3					
			42						3.5					

Boring Number APW13

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
11 CS 12 CS	60 60 60 60		43–51.7	35 - 51.7' **SILTY CLAY:** CL/ML, brown (10YR 5/3), gravel (0-5%), sand (0-5%), hard, low plasticity, dry. *(continued)*	CL/ML				4.5 3.5 4.5 4.5 3.5 3.5 4.5 4.5 4.5					
			51.7–54.6	51.7 - 54.6' **SILT:** ML, brown (10YR 5/3), gray mottling (15-25%), sand (0-5%), gravel (0-5%).	ML									
13 CS	60 60		54.6–57.6	54.6 - 57.6' **SILTY CLAY:** CL/ML, brown (10YR 5/3), sand (0-5%), gravel (0-5%), hard, low plasticity.	CL/ML				4.5					
			57.6–60	57.6 - 60' **SILTY SAND:** SM, brown (10YR 5/3), fine sand, clay (0-5%), wet.	SM									
14 MC	24 24		60–62	60 - 62' **SILTY SAND:** SM.	SM					14.5	8		24.5	MC= Modified California Sample
15 CS	96 96		62–63.7	62 - 63.7' **SILTY SAND:** SM, brown (10YR 5/3), fine sand, clay (0-5%), wet. 62.5' - 63.1' layer of silt.	SM									
			63.7–65	63.7 - 65' **SILT:** ML, brown (10YR 5/3), sand (0-5%), clay (0-5%), dry.	ML									
			65–67.6	65 - 67.6' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-5%), stiff to very stiff, medium plasticity, dry.	CL				2 2					
			67.6–69	67.6 - 89.7' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), gravel (15-25%), sand (15-25%), hard, low plasticity, dry.	CL/ML				4.5					

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Boring Number APW13

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
16 CS	120 120		70	67.6 - 89.7' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), gravel (15-25%), sand (15-25%), hard, low plasticity, dry. *(continued)* 70' dark green mottling, gravel (0-5%).	CL/ML				4.5					
			71						4.5					
			73						4.5					
			75						4.5					
			77						4.5					
			79						4.5					
17 CS	120 120		80											
			90	89.7 - 90' **SHALE:** BDX (SH), black (10YR 2/1). 90' End of Boring.	BDX (SH)									

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW14

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade Drilling	1/23/2021	1/23/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW14	Feet (NAVD88)	523.85 Feet (NAVD88)	6.0 inches

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

State Plane 822,006.47 N, 999,995.70 E Ⓔ/ W

1/4 of 1/4 of Section 25, T 6 N, R 8 E

Lat 38° 55' 26.58"

Long -88° 16' 40.76"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 51		0–7.1	0 - 7.1' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/4), yellowish brown (10YR 5/6) mottling (10-20%), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL/ML				3 (1 ft); 3.5 (3 ft); 2.5 (5 ft); 0.5 (7 ft)					CS= Core Sample
2 CS	60 53		5											
			7.1–10.6	7.1 - 10.6' **SILTY SAND:** s(ML), yellowish brown (10YR 5/6), clay (5-10%), soft, slow dilatancy, low toughness, low plasticity, moist.	s(ML)									
3 CS	60 57		10											
			10.6–12	10.6 - 14.2' **CLAYEY SILT** ML/CL, brown (10YR 5/3), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, low plasticity, dry.	ML/CL				4.5					

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

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Boring Number APW14

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	10.6 - 14.2' **CLAYEY SILT** ML/CL, brown (10YR 5/3), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, low plasticity, dry. *(continued)*	ML/CL				4					
			14	14.2 - 15' **SILTY SAND:** SM, yellowish brown (10YR 5/6), subrounded to rounded, medium to fine sand, loose, moist.	SM									
4 CS	60 57		15	15 - 45' **LEAN CLAY:** CL, gray (10YR 5/1), silt (15-25%), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, medium plasticity, dry to moist.					4					
			16											
			17						4.5					
			18											
			19						4.5					
5 CS	120 104		20	20' yellowish brown (10YR 5/6) mottling (15-20%).										
			21						3.5					
			22											
			23						3					
			24		CL									
			25						3.5					
			26											
			27						4					
			28											
			29						4.5					
6 CS	60 60		30	30' silt stringers 1mm to 3mm diameter in fractures.										
			31						4.5					
			32											

Boring Number APW14

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	15 - 45' **LEAN CLAY:** CL, gray (10YR 5/1), silt (15-25%), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, medium plasticity, dry to moist. *(continued)*					4.5					
			34											
7 CS	60 60		35						4.5					
			36											
			37						4.5					
			38		CL									
			39						4.5					
8 CS	60 60		40											
			41						4.5					
			42											
			43						4.5					
			44											
9 SH	24 24		45	45 - 47' **LEAN CLAY:** CL.						12.4	26	12	63.3	SH= Shelby Tube
			46		CL									
10 CS	96 94		47	47 - 48.7' **LEAN CLAY:** CL, gray (10YR 5/1), yellowish brown (10YR 5/6) mottling (15-20%), silt (15-25%), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, medium plasticity, dry to moist.					4.5					
			48		CL									
			49	48.7 - 55' **CLAYEY SAND:** to **SANDY LEAN CLAY WITH GRAVEL:** SC, dark grayish brown (10YR 4/2), subrounded to rounded, medium sand, dense, moist.					4.5					
			50		SC									
			51						2.25					
			52											

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Boring Number APW14

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			53	48.7 - 55' **CLAYEY SAND:** to **SANDY LEAN CLAY WITH GRAVEL:** SC, dark grayish brown (10YR 4/2), subrounded to rounded, medium sand, dense, moist. *(continued)*	SC									
			54											
11 MC	24 24		55	55 - 57' **LEAN CLAY:** CL.	CL					18	25	10	72.2	MC= Modified California Sample
			56											
12 CS	96 96		57	57 - 91' **LEAN CLAY:** CL, gray (10YR 5/1), yellowish brown (10YR 5/6) mottling (0-5%), silt (15-25%), sand (5-10%), gravel (0-5%), organic material (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry.	CL				3.75					
			58											
			59						4.25					
			60											
			61						4.25					
			62											
			63						4.25					
			64											
13 CS	120 120		65						4					
			66											
			67						2.25					
			68											
			69						4.5					
			70											
			71						4.5					
			72											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	57 - 91' **LEAN CLAY:** CL, gray (10YR 5/1), yellowish brown (10YR 5/6) mottling (0-5%), silt (15-25%), sand (5-10%), gravel (0-5%), organic material (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry. *(continued)*					4.5					
			74											
14 CS	120 120		75						4.5					
			76											
			77						4.5					
			78											
			79						4					
			80											
			81						4.25					
			82		CL									
			83						2.5					
			84	83.7' greenish gray (GLEY1 6/5GY) mottling (10-15%), yellowish brown (10YR 5/6) mottling (10-15%), stiff.										
15 CS	60 46		85						2.75					
			86											
			87						3					
			88											
			89						3.5					
16 CS	60 56		90											
			91	91 - 95' **Weathered SHALE Bedrock** BDX (SH), gray (10YR 6/1) to grayish brown (10YR 5/2).	BDX (SH)				4.5					
			92											

Boring Number APW14

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			93 94 95	91 - 95' **Weathered SHALE Bedrock** BDX (SH), gray (10YR 6/1) to grayish brown (10YR 5/2). *(continued)*	BDX (SH)									
				95' End of Boring.										

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SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW15

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade Drilling	1/21/2021	1/22/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW15	Feet (NAVD88)	522.06 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 821,107.90 N, 997,938.87 E Ⓔ/ W
1/4 of 1/4 of Section 26, T 6 N, R 8 E

Lat 38° 55' 17.71"
Long -88° 17' 6.79"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 54		0	0 - 6.3' **FILL, LEAN CLAY:** CL, brown (10YR 5/3), silt (15-25%) sand (0-5%), stiff, no dilatancy, low toughness, medium plasticity, moist.	(FILL) CL									CS= Core Sample
			1						1.75					
			3						1.75					
2 CS	60 40		5											
			6.3	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%) sand (0-5%), gravel (0-5%), organic material (0-5%), very stiff to stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL									
			7						2.25					
			9						4					
3 CS	60 50		10											
			11						1					

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

Signature	Firm	
	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%) sand (0-5%), gravel (0-5%), organic material (0-5%), very stiff to stiff, no dilatancy, medium toughness, medium plasticity, moist. *(continued)*					2.5					
			14											
4 CS	60 54		15						1.5					
			16		CL									
			17						2.25					
			18											
			19	19.2' brown (10YR 4/3), yellowish brown (10YR 5/6) mottling (10-15%), stiff.					2.5					
5 SH	24 23		20	20 - 22' **LEAN CLAY:** CL.						18.5	33	23	59.2	SH= Shelby Tube
			21		CL									
6 CS	96 96		22	22 - 23.5' **LEAN CLAY:** CL, brown (10YR 4/3), yellowish brown (10YR 5/6) mottling (10-15%), stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				1.25					
			23						1					
			24	23.5 - 26.7' **SANDY LEAN CLAY:** s(CL), brown (10YR 5/3), gray (10YR 5/1) mottling (5-10%), stiff, slow dilatancy, low toughness, medium plasticity, moist.										
			25		s(CL)				3.75					
			26											
			27	26.7 - 39.2' **LEAN CLAY:** CL, brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (10-15%), gray (10YR 5/1) mottling (5-10%), sand (5-10%), gravel (0-5%), cobbles (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry to moist.					4.5					
			28											
			29		CL				4.5					
6 CS	60 49		30	30' hard, dry.										
			31						4.5					
			32											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	26.7 - 39.2' **LEAN CLAY:** CL, brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (10-15%), gray (10YR 5/1) mottling (5-10%), sand (5-10%), gravel (0-5%), cobbles (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry to moist. *(continued)*					4.5					
			34											
7 CS	60 49		35						4.5					
			36		CL									
			37						4.5					
			38											
			39						4.5					
8 CS	60 60		40	39.2 - 52.5' **LEAN CLAY:** CL, dark gray (10YR 4/1), no mottling, organic material (0-5%), sand (5-10%), gravel (0-5%), cobbles (0-5%), hard, no dilatancy, medium toughness, medium plasticity, dry, silt stringers 1mm to 3mm diameter fracture planes.										
			41						4.5					
			42											
			43						4.5					
			44											
9 CS	60 60		45						4.5					
			46		CL									
			47						4.5					
			48											
			49						4.5					
10 CS	60 60		50											
			51						4.5					
			52											

Boring Number APW15

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			53	52.5 - 61.4' **SILT:** ML, dark gray (10YR 4/1), clay (15-25%), hard, no dilatancy, medium toughness, non-plastic, dry.	ML				4.5					
11 CS	60 57		55						4.5					
			57						4.5					
			59						4.5					
12 CS	60 52		60											
			61						4.5					
			62	61.4 - 97.2' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry.	CL									
			63						2.75					
13 CS	60 60		65						2.75					
			67						2.25					
			69						2					
14 CS	60 60		70											
			71						2.5					
			72											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			72-73	61.4 - 97.2' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry. *(continued)*					2.5					
15 CS	60 53		75						2					
			77						2.5					
			79						2.25					
16 CS	60 60		80											
			81						2.25					
			82		CL									
			83						4.5					
			84	83.8' - 83.9' layer of silty sand, moist.										
17 CS	60 60		85	85' - 85.4' later of silty sand, moist.					2.75					
			87						2.5					
			89						2.75					
18 CS	60 60		90											
			91						2.5					
			92											

Boring Number APW15

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
19 CS	60 60		93, 94, 95, 96, 97	61.4 - 97.2' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry. *(continued)*	CL				2.75					
			98, 99	97.2 - 100' **POORLY-GRADED SAND WITH SILT:** SP-SM, dark gray (10YR 4/1), subrounded to rounded, medium to fine sand, loose, wet.	SP-SM									
20 SH	24 24		100, 101	100 - 102' **SILTY SAND:** SM.	SM					12.1	15	3	45.8	
21 CS	36 36		102, 103, 104	102 - 104.3' **SANDY SILT:** s(ML), gray (10YR 5/1), firm, slow dilatancy, low toughness, non-plastic, wet.	s(ML)				1					
				104.3 - 105' **LEAN CLAY:** CL, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL									
22 MC	24 24		105, 106	105 - 107' **LEAN CLAY:** CL.	CL					19.1	29	16	76.2	MC= Modified California Sample
23 CS	36 36		107, 108, 109	107 - 110' **LEAN CLAY:** CL, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				2.25 2.5					
			110	110' End of Boring.										

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SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW16

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade Drilling	1/19/2021	1/20/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW16	Feet (NAVD88)	529.16 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 820,642.46 N, 996,213.53 E (E)/ W
1/4 of 1/4 of Section 35, T 6 N, R 8 E
Lat 38° 55' 13.12"
Long -88° 17' 28.63"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 48		0	0 - 20' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/4), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), firm to stiff, slow dilatancy, medium to low toughness, medium plasticity, moist.										CS= Core Sample
			1						0.75					
			3						1.75					
2 CS	60 60		5	5' very dark grayish brown (10YR 3/2) mottling (0-5%), yellowish brown (10YR 5/6) mottling (0-5%), silt stringers 1mm diameter (5-10%), very stiff, dry.					2					
			6		CL/ML									
			7						3.5					
			9						3.75					
3 CS	60 60		10	10' hard.										
			11						4.5					
			12											

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

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

RAMBOLL

Boring Number APW16

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	0 - 20' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/4), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), firm to stiff, slow dilatancy, medium to low toughness, medium plasticity, moist. *(continued)*					4.5					
			14											
4 CS	60 60		15	15' grayish brown (10YR 5/2), yellowish brown (10YR 5/6) mottling (5-10%).					4.5					
			16		CL/ML									
			17						4.5					
			18											
			19						4.5					
5 CS	120 65		20	20 - 30' **SILT:** ML, brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (5-10%), sand (5-10%), gravel (0-5%), hard, no dilatancy, high toughness, low plasticity, dry.										
			21						4.5					
			22											
			23						4.5					
			24											
			25		ML				4.5					
			26											
			27						4.5					
			28											
			29						4.5					
6 CS	60 57		30	30 - 69.2' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), cobbles (0-5%), hard to very stiff, no dilatancy, medium toughness, medium plasticity, dry to moist.										
			31		CL/ML				4.5					
			32											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			33	30 - 69.2' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), cobbles (0-5%), hard to very stiff, no dilatancy, medium toughness, medium plasticity, dry to moist. *(continued)*					4.25					
			34											
7 CS	60 60		35						4					
			36											
			37						4.5					
			38											
			39						4.5					
8 CS	60 60		40											
			41						4.5					
			42	41.5' organic material (0-5%), wood (0-5%).	CL/ML									
			43						4.5					
			44											
9 CS	60 60		45						4.5					
			46											
			47						4.25					
			48											
			49						4.25					
10 CS	60 60		50											
			51						4.5					
			52											

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	30 - 69.2' **SILTY CLAY:** CL/ML, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), cobbles (0-5%), hard to very stiff, no dilatancy, medium toughness, medium plasticity, dry to moist. *(continued)*	CL/ML				4.5					
			54											
11 CS	60 60		55						4.5					
			56											
			57						3.75					
			58											
			59						3.75					
12 CS	60 60		60											
			61						4.5					
			62											
			63						3.75					
			64											
13 CS	180 45		65						2.25					
			66											
			67						1.25					
			68											
			69						0.25					
			70	69.2 - 70.6' **SILT WITH SAND:** (ML)s, gray (10YR 6/1), soft, rapid dilatancy, low toughness, non-plastic, wet.	(ML)s									
			71	70.6 - 85.6' **POORLY-GRADED SAND:** SP, gray (10YR 5/1), subrounded to rounded, medium to coarse sand, gravel (0-5%), loose, wet.	SP									
			72											

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	70.6 - 85.6' **POORLY-GRADED SAND:** SP, gray (10YR 5/1), subrounded to rounded, medium to coarse sand, gravel (0-5%), loose, wet. *(continued)*										
			74											
			75											
			76											
			77											
			78											
			79		SP									
14 CS	60 60		80											
			81											
			82											
			83											
			84											
15 CS	120 120		85	85' gravel (10-15%).										
			86	85.6 - 99.2' **LEAN CLAY:** CL, gray (10YR 5/1), silt (5-15%), sand (5-10%), gravel (0-5%), very stiff, no dilatancy, medium toughness, medium plasticity, moist.										
			87						3.5					
			88											
			89		CL				2.75					
			90											
			91						3.25					
			92											

Boring Number APW16

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
16 CS	60 48		93–99	85.6 - 99.2' **LEAN CLAY:** CL, gray (10YR 5/1), silt (5-15%), sand (5-10%), gravel (0-5%), very stiff, no dilatancy, medium toughness, medium plasticity, moist. *(continued)*	CL				3.25, 3.5, 2.5, 2.25					
17 CS	120 120		99.2–100	99.2 - 100' **POORLY-GRADED SAND:** SP, dark gray (10YR 4/1), subrounded to rounded, coarse sand, loose, wet.	SP									
			100–110	100 - 110' **LEAN CLAY:** CL, gray (10YR 5/1), silt (5-15%), sand (5-10%), organic material (0-10%), gravel (0-5%), very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				2, 1.75, 2, 2, 2					
			110	110' End of Boring.										

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SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW17

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	1/22/2021	1/22/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW17	Feet (NAVD88)	529.84 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 822,681.14 N, 995,462.29 E Ⓔ/ W
1/4 of 1/4 of Section 26, T 6 N, R 8 E
Lat 38° 55' 33.27"
Long -88° 17' 38.12"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 120		0–1	0 - 0.3' **POORLY-GRADED SAND WITH SILT:** SP, yellowish brown (10YR 5/8), subrounded, fine sand, roots (15-30%), clay (5-15%), gravel (5-15%), loose, wet.	SP									CS= Core Sample
			1–4	0.3 - 4' **LEAN CLAY WITH SAND:** (CL)s, yellowish brown (10YR 5/8), grayish brown (10YR 5/2) mottling (15-30%), gravel (0-5%), roots (0-5%), rapid dilatancy, low toughness, low to medium plasticity, wet.	(CL)s									
			4–7	4 - 12.3' **LEAN CLAY:** CL, yellowish brown (10YR 5/6), dark yellowish brown (10R 4/4) mottling (0-5%), silt (15-30%), sand (5-15%), gravel (0-5%), roots (0-5%), organic material (0-5%), slow dilatancy, medium toughness, low plasticity, moist.	CL									
			7.5	7.5' dry.										
2 CS	120 108		10											
			11.6	11.6' - 11.8' layer of gravel with clay, wet.										
			12.2	12.2' layer of sand for 1/8".										
			12.3–15	12.3 - 26.3' **SILTY CLAY:** CL/ML, dark grayish brown (10YR 4/2), strong brown (10YR 5/8) mottling (5-15%), sand (0-5%), no dilatancy, medium toughness, low plasticity, dry sand seams 1/16" (0-5%).	CL/ML									

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

Signature	Firm	
	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

Boring Number APW17

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	12.3 - 26.3' **SILTY CLAY:** CL/ML, dark grayish brown (10YR 4/2), strong brown (10YR 5/8) mottling (5-15%), sand (0-5%), no dilatancy, medium toughness, low plasticity, dry sand seams 1/16" (0-5%). *(continued)*										
			17	16.5' white (10YR 8/1) for 1/16".										
			18											
			19											
3 CS	240 240		20											
			21		CL/ML									
			22											
			23											
			24											
			25											
			26	26' - 26.3' layer of silt, yellowish brown (10YR 5/4) to (10YR 5/6), sand (5-15%), dry.										
			27	26.3 - 40' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2), yellowish brown (10YR 5/4) mottling (5-15%), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, non-plastic to low plasticity, dry to moist.										
			28											
			29											
			30											
			31											
			32											
			33		ML/CL									
			34											
			35											
			36											
			37											
			38											
			39											
			40											

Boring Number APW17

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 SH	24 21		40–42	40 - 42' **LEAN CLAY:** CL.	CL					16.6	26	13	71.1	SH= Shelby Tube
5 CS	96 96		42–43	42 - 43' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2), yellowish brown (10YR 5/4) mottling (5-15%), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, non-plastic to low plasticity, dry to moist.	ML/CL									
			43–44.5	43 - 44.5' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, non-plastic to low plasticity, dry to moist.	ML/CL									
			44.5–46.3	44.5 - 46.3' **SILT WITH SAND:** (ML)s, gray (10YR 5/1) to grayish brown (10YR 5/2), clay (5-15%), moist.	(ML)s									
6 CS	120 118		46.3–58	46.3 - 58' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, non-plastic to low plasticity, dry to moist.	ML/CL									
7 CS	120 120		58–63.3	58 - 63.3' **SILT WITH SAND:** (ML)s, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), clay (5-15%), gravel (0-5%), non-cohesive to cohesive, no dilatancy, medium to high toughness, non-plastic to low plasticity, moist.	(ML)s									
			63.3–64.7	63.3 - 64.7' **WELL-GRADED SAND:** SW, gray (10YR 5/1), subangular to subrounded, gravel (5-15%), clay (5-15%), wet.	SW									

Boring Number APW17

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
				64.7 - 65.5' **POORLY-GRADED SAND WITH SILT:** SP, gray (10YR 5/1) to grayish brown (10YR 5/2), subrounded, fine to medium sand, gravel (5-15%), wet. *(continued)*	SP									
			66 67 68 69 70	65.5 - 70' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, gray (10YR 5/1), subangular to subrounded, gravel (5-15%), clay (0-5%), cobbles (0-5%), moist to wet. 68.5' - 69' cobbles (5-15%). 69.6' very dark gray (10YR 3/1).	(SW)g									
8 MC	24 24		71 72	70 - 72' **WELL-GRADED SAND WITH SILT:** SW-SM.	SW-SM					7.8	3.8	9	8.9	MC= Modified California Sample
9 CS	216 216		73 74 75 76	72 - 76.4' **WELL-GRADED GRAVEL WITH SAND:** (GW)s, gray (10YR 5/1), subrounded to rounded gravel, cobbles (5-15%), clay (5-15%), dense, wet.	(GW)s									
			77 78	76.4 - 78.6' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, gray (10YR 5/1), cobbles (0-5%), dense, wet.	(SW)g									
			79 80	78.6 - 79.9' **WELL-GRADED GRAVEL WITH SAND:** (GW)s, gray (10YR 5/1) to grayish brown (10YR 5/2), subrounded to rounded gravel, cobbles (5-15%), clay (5-15%), dense, wet.	(GW)s									
			81 82 83 84 85 86	79.9 - 86.8' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, grayish brown (10YR 5/2), clay (0-5%), cobbles (0-5%), dense, wet to moist.	(SW)g									
			87 88	86.8 - 88' **POORLY-GRADED SAND WITH GRAVEL:** (SP)g, grayish brown (10YR 5/2), rounded to subrounded, medium to coarse sand, clay (0-5%), loose, wet.	(SP)g									
			89 90	88 - 90' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, silt (5-15%), loose, wet to moist.	(SW)g									

Boring Number APW17

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
10 MC	24 24		91	90 - 92' **POORLY-GRADED SAND WITH SILT:** SP-SM.	SP-SM					6.1	6		6.7	
11 CS	72 72		92, 93	92 - 93.4' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, silt (5-15%), loose, wet to moist.	(SW)g									
			94, 95, 96, 97	93.4 - 98' **SILT:** ML, dark gray (10YR 4/1) to gray (10YR 5/1), very dark gray (10YR 3/1) mottling (0-5%), clay (15-30%), sand (5-15%), gravel (0-5%), organic material (0-5%), no dilatancy, high toughness, low plasticity, moist.	ML									
12 SH	24 24		98, 99	98 - 100' **SILT:** ML, Not Analyzed.	ML									
			100	100' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name: Newton Power Station	License/Permit/Monitoring Number:	Boring Number: APW18
Boring Drilled By: Name of crew chief (first, last) and Firm: Dave Gordon, Cascade Drilling	Date Drilling Started: 1/20/2021	Date Drilling Completed: 1/21/2021 — Drilling Method: Mini Sonic
Common Well Name: APW18	Final Static Water Level: Feet (NAVD88) — Surface Elevation: 540.55 Feet (NAVD88)	Borehole Diameter: 6.0 inches
Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒ State Plane 824,525.91 N, 996,544.05 E Ⓔ/ W; 1/4 of 1/4 of Section 26, T 6 N, R 8 E	Lat 38° 55' 51.5"; Long -88° 17' 24.42"	Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W
Facility ID:	County: Jasper	State: IL — Civil Town/City/ or Village: Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 113		0	0 - 0.3' **FILL, SILT:** ML, dark grayish brown (10R 4/2), roots (15-30%), sand (5-15%), wet.	(FILL) ML									CS= Core Sample
			0.3	0.3 - 3.4' **SILTY SAND:** SM, yellowish brown (10YR 5/6), dark grayish brown (10YR 4/2) mottling (15-30%), fine sand, gravel (0-5%), roots (0-5%), dense, moist.	SM									
			3.4	3.4 - 11' **LEAN CLAY WITH SAND:** (CL)s, yellowish brown (10YR 5/6), dark grayish brown (10YR 4/2) mottling (5-15%), strong brown (7.5YR 5/8) mottling (5-15%), slow dilatancy, low toughness, low to medium plasticity, moist.	(CL)s									
2 CS	120 113		10											
			11	11 - 12.5' **CLAYEY SAND:** SC, dark yellowish brown (10YR 4/6), rounded, fine sand, gravel (0-5%), wet.	SC									

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

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number APW18

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				11.6' medium sand.										
			13	12.5 - 13.9' **LEAN CLAY WITH SAND:** (CL)s, yellowish brown (10YR 5/6), slow dilatancy, low toughness, low to medium plasticity, wet.	(CL)s									
			14–16	13.9 - 16.8' **SILT:** ML, dark grayish brown (10YR 4/2), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, low to medium toughness, low plasticity, dry.	ML									
			17	16.8 - 17.6' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/6), rounded, fine sand, clay (5-15%), moist.	SP									
			18–19	17.6 - 20' **SILT:** ML, dark grayish brown (10YR 4/2), yellowish brown (10YR 5/6) mottling (0-5%), very dark grayish brown (10YR 3/2) mottling (0-5%), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, low to medium toughness, low plasticity, dry.	ML									
3 CS	120 120		20	20 - 20.9' **WELL-GRADED SAND:** SW, yellowish brown (10YR 5/6), clay (5-15%), gravel (0-5%), wet.	SW									
			21–22	20.9 - 23.2' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2), yellowish brown (10YR 5/6) mottling (0-5%), very dark grayish brown (10YR 3/2) mottling (0-5%), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, low to medium toughness, low plasticity, moist.	ML/CL									
			23	23.2 - 23.7' **WELL-GRADED SAND:** SW, subrounded, fine sand, gravel (5-15%), silt (5-15%), moist.	SW									
			24–28	23.7 - 28.9' **LEAN CLAY:** CL, dark gray (10YR 4/1), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, high plasticity, moist. 28.2' sand (0-5%).	CL									
4 CS	120 120		29–32	28.9 - 50' **CLAYEY SILT** ML/CL, dark gray (10YR 4/1), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, dry.	ML/CL									

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
5 CS	120 120		33–49	28.9 - 50' **CLAYEY SILT** ML/CL, dark gray (10YR 4/1), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, dry. *(continued)*	ML/CL									
6 SH	24 24		50–52	50 - 52' **LEAN CLAY:** CL.	CL					12.9	32	20	76.8	SH= Shelby Tube

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 CS	96 96		52 - 58.2	52 - 58.2' **CLAYEY SILT** ML/CL, dark gray (10YR 4/1), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, medium plasticity, dry.	ML/CL									
			58.2 - 60	58.2 - 60' **POORLY-GRADED SAND:** SP, gray (10YR 6/1) to light gray (10YR 7/1), subrounded, fine to medium sand, gravel (0-5%), silt (0-5%), loose, dry to moist.	SP									
8 MC	24 12		60 - 62	60 - 62' **SILTY SAND:** SM.	SM					13.6	5		17.1	MC= Modified California Sample
9 MC	24 16		62 - 64	62 - 64' **SILTY CLAY:** CL/ML.	CL/ML					11.1	20	6	57.6	
10 CS	72 72		64 - 67.5	64 - 67.5' **SANDY SILT:** s(ML), dark grayish brown (10YR 4/2), clay (0-5%), non-cohesive, moist.	s(ML)									
			67.5 - 70	67.5 - 70' **SILT:** ML, dark gray (10YR 4/1), clay (15-30%), sand (5-15%), gravel (0-5%), medium to high toughness, low plasticity, moist to wet.	ML									
11 SH	24 11		70 - 72	70 - 72' **SILT:** ML, Not Analyzed.	ML									

Boring Number APW18

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
12 CS	96 92		72	72 - 72.4' **SILT:** ML, dark grayish brown (10YR 4/2), clay (15-30%), sand (5-15%), gravel (0-5%), medium to high toughness, low plasticity, moist to wet.	ML									
			73–76	72.4 - 76.7' **CLAYEY SAND:** SC, rounded, fine sand, dense, wet.	SC									
			77–79	76.7 - 79.4' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, subrounded to subangular, silt (0-5%), moist.	(SW)g									
				79.4 - 80' **SILT:** ML, dark gray (10YR 4/1), clay (15-30%), sand (5-15%), gravel (0-5%), medium to high toughness, low plasticity, moist to wet.	ML									
13 CS	120 72		80	80 - 80.7' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, subrounded to subangular, silt (0-5%), wet.	(SW)g									
			81–89	80.7 - 94.2' **SILT:** ML, dark gray (10YR 4/1), clay (15-30%), sand (5-15%), gravel (0-5%), medium to high toughness, low plasticity, moist.	ML									
14 CS	180 180		90–92											

Boring Number APW18

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			93 94	80.7 - 94.2' **SILT:** ML, dark gray (10YR 4/1), clay (15-30%), sand (5-15%), gravel (0-5%), medium to high toughness, low plasticity, moist. *(continued)*	ML									
			95 96 97	94.2 - 105' **CLAYEY SILT** ML/CL, dark gray (10YR 4/1) to dark grayish brown (10YR 4/2), sand (5-15%), gravel (5-15%), slow dilatancy, medium toughness, low plasticity, moist.	ML/CL									
			98 99 100 101 102 103 104	97.4' grayish brown (10YR 5/2), reddish gray (5YR 5/2) mottling (0-5%), yellowish brown (10YR 5/6) mottling (0-5%).										
15 SH	24 24		105 106	105 - 107' **LEAN CLAY:** CL.	CL					14.1	28	15	69.3	
			107	107' End of Boring.										

SOIL BORING LOG INFORMATION

RAMBOLL

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		APW5S

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	1/19/2021	1/19/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
APW5S	Feet (NAVD88)	541.05 Feet (NAVD88)	6.0 inches

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

State Plane 825,612.15 N, 999,129.20 E Ⓔ/ W

1/4 of 1/4 of Section 26, T 6 N, R 8 E

Lat 38° 55' 2.22"

Long -88° 16' 51.7"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 115		0–1	0 - 0.7' **FILL, LEAN CLAY:** CL, very dark gray (10YR 3/1), yellowish brown (10YR 5/4) mottling (30-45%), roots (5-15%), sand (5-15%), gravel (0-5%), very stiff, no dilatancy, low to medium toughness, low plasticity, wet.	(FILL) CL				3.25					CS= Core Sample
			1–5.5	0.7 - 5.5' **FILL, LEAN CLAY:** CL, yellowish brown (10YR 5/4), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), very stiff to stiff, no dilatancy , medium toughness, low plasticity, moist. 2.8' - 2.9' black (10YR 2/1), black (2.5Y 2.5/1) mottling (0-5%), coal (0-5%). 3.1' strong brown (7.5YR 5/6), gray (10YR 5/1) mottling (0-5%), black (10YR 2/1) mottling (0-5%), sand (5-15%), gravel (0-5%).	(FILL) CL				3.25 3.25					
			5.5–6.3	5.5 - 6.3' **LEAN CLAY:** CL, grayish brown (10YR 5/2) to brown (10YR 5/3), light olive brown (2.5Y 5/6) mottling (15-30%), stiff, no dilatancy, low toughness, medium plasticity, moist. 5.9' no mottling.	CL									
			6.3–12	6.3 - 14.3' **LEAN CLAY WITH SAND:** (CL)s, gray (10YR 5/1), organic material (0-5%), stiff to firm, no dilatancy, low toughness, medium plasticity, moist.	(CL)s				2 2.25					
2 CS	36 36		10–12						2					

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

Signature [signature]

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Boring Number APW5S

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
3 CS	120 94		13–14	6.3 - 14.3' **LEAN CLAY WITH SAND:** (CL)s, gray (10YR 5/1), organic material (0-5%), stiff to firm, no dilatancy, low toughness, medium plasticity, moist. *(continued)* 12.4' yellowish brown (10YR 5/6), gravel (0-5%).	(CL)s				0.75					
			15–17	14.3 - 17.5' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/6) , subrounded to rounded, fine sand, clay (5-15%), gravel (0-5%), moist.	SP									
			18–23	17.5 - 23' **SILT:** ML, yellowish brown (10YR 5/6) to dark gray (10YR 4/1), strong brown (7.5YR 4/6) mottling (5-15%), very dark gray (7.5YR 3/1) mottling (0-5%), clay (5-15%), sand (5-15%), gravel (0-5%), very stiff to hard, no dilatancy, medium to high toughness, low plasticity. 19.4' yellowish brown (10YR 5/6), gray (10YR 5/1) mottling (0-5%).	ML				4.5 4 3.5					
			23	23' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		SB301

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	1/19/2021	1/20/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
	Feet (NAVD88)	543.39 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒	Lat / Long	Local Grid Location
State Plane 825,067.09 N, 997,264.71 E (E)/W 1/4 of 1/4 of Section 25, T 6 N, R 8 E	Lat ° ' " Long ° ' "	Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 99		0–2.6	0 - 2.6' **FILL, POORLY-GRADED SAND WITH GRAVEL:** (SP)g, black (10YR 2/1), loose. 1.8' - 2.2' layer of clay, dark grayish brown (10YR 4/2), silt (15-30%), sand (5-15%), low toughness, low plasticity, moist.	(FILL) (SP)g									CS= Core Sample
			2.6–6.5	2.6 - 6.5' **SILTY CLAY:** CL/ML, brown (10YR 5/3) to light olive brown (2.5Y 5/3), olive (5Y 4/3) mottling (15-30%), dark olive gray (5Y 3/2) mottling (0-5%), sand (0-5%), gravel (0-5%), roots (0-5%), stiff to very stiff, no dilatancy, low toughness, low plasticity, moist. 4.5' medium toughness.	CL/ML				1.75 3.5					
			6.5–9	6.5 - 9' **LEAN CLAY:** CL, gray (10YR 5/1), dark yellowish brown (10YR 4/6) mottling (5-15%), silt (15-30%), sand (0-5%), gravel (0-5%), very stiff, no dilatancy, low to medium toughness, medium plasticity, moist.	CL				3.25					
2 CS	120 114		9–12	9 - 23.3' **SILT:** ML, grayish brown (10YR 5/2), gray (10YR 5/1) mottling (0-5%), dark gray (10YR 4/1) mottling (0-5%), hard, no dilatancy, high toughness, low plasticity, dry.	ML				3.5 4.5					

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

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

Boring Number SB301

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	9 - 23.3' **SILT:** ML, grayish brown (10YR 5/2), gray (10YR 5/1) mottling (0-5%), dark gray (10YR 4/1) mottling (0-5%), hard, no dilatancy, high toughness, low plasticity, dry. *(continued)*	ML				4.5					
			14											
			15						4.5					
			16											
			17						4.5					
			18											
			19						4.5					
3 CS	120 120		20											
			21						4.5					
			22											
			23						4.5					
			24	23.3 - 24.8' **POORLY-GRADED SAND:** SP, yellowish brown (10YR 5/6), subrounded to rounded, fine sand, silt (0-5%), loose, moist to dry.	SP									
			25	24.8 - 48' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-30%), sand (0-5%), gravel (0-5%), hard, no dilatancy, high toughness, medium to high plasticity, dry to moist, gravel and sand increase to (5-15%) with depth.	CL				4.5					
			26											
			27						4.5					
			28											
			29						4.5					
4 CS	96 96		30											
			31						4.5					
			32											

Boring Number SB301

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
5 CS	120 120		33–48	24.8 - 48' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-30%), sand (0-5%), gravel (0-5%), hard, no dilatancy, high toughness, medium to high plasticity, dry to moist, gravel and sand increase to (5-15%) with depth. *(continued)*	CL									
6 SH	24 20		48–50	48 - 50.						14.1	27	13	65.4	SH= Shelby Tube
7 CS	96 60		50–52	50 - 56.2' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2) to light olive brown (2.5Y 5/4), sand (5-15%), gravel (5-15%), hard, no dilatancy, high toughness, medium to high plasticity, dry.	CL/ML									

Boring Number SB301

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53–56	50 - 56.2' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2) to light olive brown (2.5Y 5/4), sand (5-15%), gravel (5-15%), hard, no dilatancy, high toughness, medium to high plasticity, dry. *(continued)*	CL/ML									
			57	56.2 - 57' **POORLY-GRADED SAND:** SP, gray (10YR 5/1), rounded to subrounded, fine to medium sand, gravel (0-5%), dense, moist.	SP									
				57 - 57.4' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2) to light olive brown (2.5Y 5/4), sand (5-15%), gravel (5-15%), hard, no dilatancy, high toughness, medium to high plasticity, moist.	CL/ML									
8 MC	24 24		58	57.4 - 58' **WELL-GRADED GRAVEL WITH CLAY AND SAND:** (GW-GC)s, subangular to subrounded gravel, dense, wet.	(GW-GC)s									MC= Modified California Sample
			59	58 - 60.										
9 CS	96 96		60–63	60 - 63.8' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2) to light olive brown (2.5Y 5/4), sand (5-15%), gravel (5-15%), hard, no dilatancy, high toughness, medium to high plasticity, dry.	CL/ML									
			64–66	63.8 - 66.4' **WELL-GRADED SAND WITH GRAVEL:** (SW)g, dark grayish brown (10YR 4/2), subrounded sand, clay (5-15%), clay nodules (0-5%), loose, wet.	(SW)g									
			67	66.4 - 68' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist.	ML									
10 MC	24 24		68–69	68 - 70.						13.1	23	9	68.7	
11 CS	60 60		70–72	70 - 87.5' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist.	ML									

Boring Number SB301

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
12 CS	60 43			70 - 87.5' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist. *(continued)*	ML									
13 CS	120 120													
				87.5 - 88.3' **SILTY SAND:** SM, dark grayish brown (10YR 4/2), dense.	SM									
				88.3 - 90' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist.	ML									
14 SH	24 0			90 - 92.										

Depth scale: 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92

Boring Number SB301

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
15 CS	96 96		93, 94, 95	92 - 95.3' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist.	ML									
			96	95.3 - 96.8' **SANDY SILT:** s(ML), gray (10YR 5/1) to grayish brown (10YR 5/2), cohesive, high to medium toughness, non-plastic, moist.	s(ML)									
			97, 98	96.8 - 98' **SILT:** ML, dark grayish brown (10YR 4/2), gravel (0-5%), sand (0-5%), low toughness, non-plastic, moist.	ML									
16 SH	24 24		99, 100	98 - 100.						15.7	37	22	82.2	
				100' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		XPW01

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/20/2021	1/20/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW01	Feet (NAVD88)	548.62 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 824,975.39 N, 997,851.62 E (E)/ W
1/4 of 1/4 of Section 26, T 6 N, R 8 E

Lat 38° 55' 55.93"
Long -88° 17' 7.87"

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

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60		0	0 - 6' ASH, gray (10YR 5/1), silt sized grains, fine sand (0-5%), gravel (0-5%), dry.	(FILL) ASH									CS= Core Sample
2 CS	36 36		5	5 - 6' cobbles.	(FILL)									
			6	6 - 8' ASH, gray (10YR 5/1), silt sized grains, fine sand (0-5%), gravel (0-5%), dry.	(FILL) ASH									
3 MC	24 24		8	8 - 10' ASH, sand and silt sized grains.	(FILL) ASH				87.7	18.6	47		11.8	MC= Modified California Sample
4 CS	60 60		10	10 - 15' ASH, gray (10YR 5/1), sand with gravel sized grains, slag-like material (0-5%), wet.	(FILL) ASH									

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

Signature	Firm	
S W	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Boring Number XPW01

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13, 14	10 - 15' ASH, gray (10YR 5/1), sand with gravel sized grains, slag-like material (0-5%), wet. *(continued)*	(FILL) ASH									
5 MC	24 24		15, 16	15 - 17' ASH, clay sized grains.	(FILL) ASH				84.4 0.5	12.6	35	18	61.3	
6 CS	36 36		17	17 - 18' **LEAN CLAY:** CL, gray (10YR 5/1), medium plasticity, orange mottling (0-5%), medium stiff, moist.	CL									
			18, 19	18 - 20' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), subrounded fine gravel (0-5%), low plasticity, hard, moist.	CL/ML				4.5					
			20	20' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		XPW02

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/19/2021	1/19/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW02	Feet (NAVD88)	551.97 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 825,023.53 N, 998,601.28 E Ⓔ/ W
1/4 of 1/4 of Section 26, T 6 N, R 8 E
Lat 38° 55' 56.41"
Long -88° 16' 58.38"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60			0 - 4.4' ASH, brown (10YR 5/3), silt and sand sized grains , slag-like material (0-5%), fine to coarse gravel (0-5%), dry.	(FILL) ASH									CS= Core Sample
				4.4 - 5' **FILL, LEAN CLAY:** CL, very dark gray (10YR 3/1), gravel (0-5%), coal (0-5%), low plasticity, hard.	(FILL) CL				4					
2 MC	24 24			5 - 7' not analyzed.										MC= Modified California Sample
3 MC	24 24			7 - 9' **FILL, LEAN CLAY:** CL, very dark gray (10YR 3/1), gravel (0-5%), coal fragments (0-5%), low plasticity, hard.	(FILL) CL				92.9	29.1	36	20	54.9	
4 CS	12 12			9 - 13.5' **FILL, WELL-GRADED SAND WITH GRAVEL:** (SW)g, brown (10YR 5/3), fine to coarse sand, fine to coarse gravel (15-25%), coal (0-5%), wet.	(FILL) (SW)g									
5 CS	60 60													

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

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

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number XPW02

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13	9 - 13.5' **FILL, WELL-GRADED SAND WITH GRAVEL:** (SW)g, brown (10YR 5/3), fine to coarse sand, fine to coarse gravel (15-25%), coal (0-5%), wet. *(continued)* 12.8 - 13.8' shale fragments (20-30%).	(FILL) (SW)g									
			14	13.5 - 15' **FILL, CLAYEY SILT** ML/CL, very dark gray (10YR 3/1), organic material (15-25%), very fine to fine sand (0-5%), wet.	(FILL) ML/CL									
6 MC	24 24		15, 16	15 - 17' **FILL, LEAN CLAY:** CL, very dark gray (10YR 3/1).	(FILL) CL				103.7	21.8	36	22	80.2	
7 CS	36 36		17, 18	17 - 19' **LEAN CLAY:** CL, very dark gray (10YR 3/1), medium plasticity, medium stiff, moist.	CL				0.5					
			19, 20	19 - 20' **LEAN CLAY:** CL, grayish brown (10YR 5/2), fine to coarse gravel (0-5%), low plasticity, very stiff, moist.	CL				2.5					
				20' End of Boring.										

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		XPW03

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/19/2021	1/19/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW03	Feet (NAVD88)	550.81 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒	Lat / Long	Local Grid Location
State Plane 824,558.16 N, 1,000,444.81 E Ⓔ/ W 1/4 of 1/4 of Section 25, T 6 N, R 8 E	Lat 38° 55' 51.8" Long -88° 16' 35.06"	Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60		0–5	0 - 5' ASH, gray (10YR 5/1), silt sized grains, very fine to fine sand (5-15%), slag-like material (5-10%), dry. 3.5' moist.	(FILL) ASH									CS= Core Sample
2 MC	24 24		5–7	5 - 7' ASH, sand and silt sized grains. 5.5' moist to wet.	(FILL) ASH				75.3	17.4	33	6	21.5	MC= Modified California Sample
3 CS	36 36		7–9	7 - 9' ASH, gray (10YR 5/1), silt sized grains, wet.	(FILL) ASH									
			9–10	9 - 10' ASH, light gray (10YR 7/1), gravel sized grains, angular, fine to coarse gravel, coarse sand (0-5%), wet.	(FILL) ASH									
4 CS	60 60		10–12	10 - 13.6' ASH, grayish brown (10YR 5/2), sand to gravel sized grains, fine to coarse sand, fine to coarse gravel (15-25%), coal (0-5%), wet.	(FILL) ASH									

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

Signature	Firm	
S W	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

Boring Number XPW03

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	10 - 13.6' ASH, grayish brown (10YR 5/2), sand to gravel sized grains, fine to coarse sand, fine to coarse gravel (15-25%), coal (0-5%), wet. *(continued)*	(FILL) ASH									
			14	13.6 - 14.7' ASH, gray (10YR 5/1), sand sized grains, fine to medium sand, fine to coarse gravel (0-5%), coal (0-5%), wet.	(FILL) ASH									
5 MC	24 18		15	14.7 - 15' ASH, gray (10YR 5/1), silt sized grains, very fine to fine sand (0-5%), wet.	(FILL) ASH				103.6	16.7	12		16.3	
			16	15 - 17' ASH, sand and silt sized grains.	(FILL) ASH									
6 CS	36 36		17, 18	17 - 19' ASH, gray (10YR 5/1), silt sized grains, very fine to coarse sand (0-5%), fine gravel (0-5%) , wet.	(FILL) ASH									
			19, 20	19 - 20' **SILTY CLAY:** CL/ML, yellowish brown (10YR 5/6), subrounded fine gravel (0-5%), low plasticity, very stiff, moist.	CL/ML				2					
				20' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Newton Power Station		XPW04

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Russ Gordon Cascade Drilling	1/19/2021	1/19/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
XPW04	Feet (NAVD88)	551.90 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 824,130.99 N, 1,001,110.06 E Ⓔ/ W
1/4 of 1/4 of Section 25, T 6 N, R 8 E
Lat 38° 55' 47.57"
Long -88° 16' 26.64"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Jasper	IL	Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60		0–5	0 - 5' ASH, gray (10YR 5/1), silt sized grains, very fine to fine sand (0-5%), fine to coarse gravel (0-5%), dry.	(FILL) ASH									CS= Core Sample
2 MC	12 4		5–6	5 - 6.										MC= Modified California Sample, 4" of concrete recovered in MC
3 MC	24 24		6–8	6 - 8' ASH, sand and silt sized grains. 7' moist.	(FILL) ASH				73.9	31.1	41	3	13.9	
4 CS	24 24		8–12	8 - 12' ASH, gray (10YR 5/1), silt sized grains, very fine to fine sand (0-5%), fine to coarse gravel (0-5%), moist.	(FILL) ASH									
5 CS	60 60													

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

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

Boring Number XPW04

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13, 14	12 - 15' ASH, gray (10YR 5/1), sand to gravel sized grains, very fine to fine sand (0-5%), fine to coarse gravel (0-5%), moist. 12.5' wet.	(FILL) ASH									
6 MC	24 24		15, 16	15 - 17' ASH, sand and silt sized grains.	(FILL) ASH				80.8	31.1	46	4	33.3	
7 CS	36 36		17, 18, 19	17 - 19.5' ASH, gray (10YR 5/1), sand to gravel sized grains, very fine to fine sand (0-5%), fine to coarse gravel (0-5%), wet.	(FILL) ASH									
			20	19.5 - 20' **LEAN CLAY WITH SAND:** (CL)s, brown (10YR 5/3), fine to medium sand (15-25%), fine gravel (0-5%), wet.	(CL)s									
				20' End of Boring.										

Surface Elevation: 529.93

Datum msl

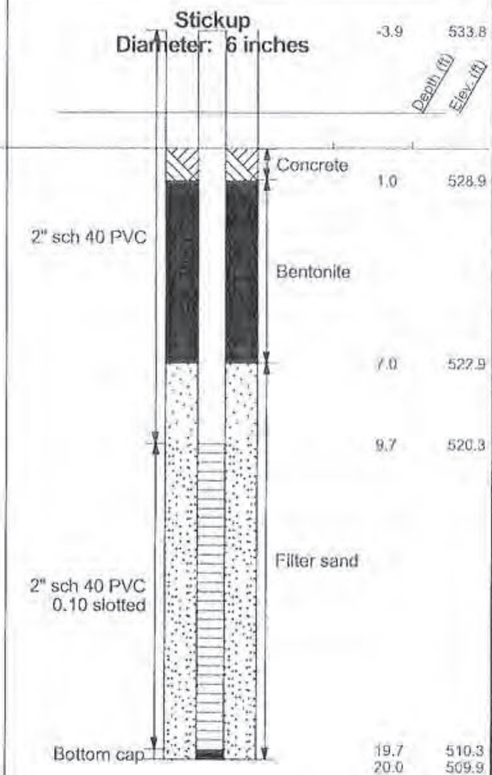
Completion Date: 6/19/10

Northing: 822688.04

Easting: 995465.25

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
4	Stiff, brown, sandy CLAY - CL			
7	Hard, brown, sandy CLAY with gravel - CL ▽			
13	Hard, dark gray CLAY and glacial till - CH			
20	Boring terminated at 20 feet.			

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0638301.GDT 12/22/10

GROUNDWATER DATA

ENCOUNTERED AT 8.5 FEET ▽

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RBP	App'vd. by: DTK
Date: 6/29/10	Date: 2-7-11	Date: 2-7-11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-2

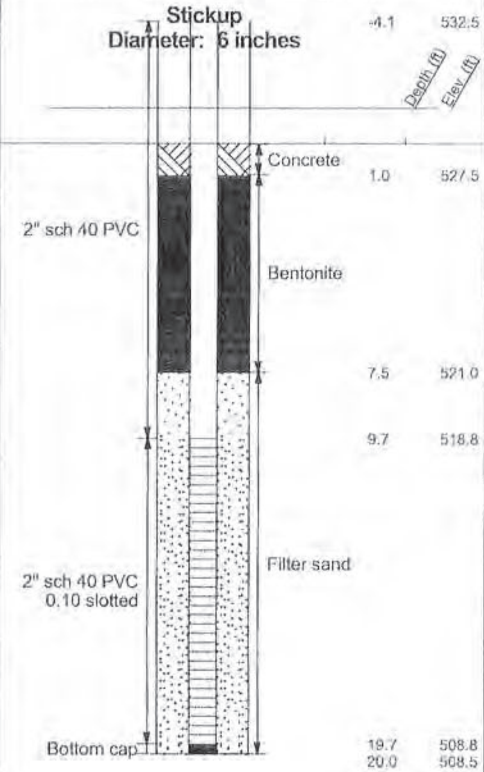
Project No. J017150.01

Surface Elevation: 528.47 | Datum: msl | Completion Date: 6/18/10 | Northing: 821379.76 | Easting: 998975.74

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
6	Soft, brown, sandy CLAY with gravel - CL			
9	Hard, brown, sandy CLAY with gravel - CL			
13	Hard, brownish-gray, sandy CLAY with gravel - CL			
20	Boring terminated at 20 feet.			

Depth scale: 5, 10, 15, 20, 25, 30, 35

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RSJ	App'vd. by: DTK
Date: 6/29/10	Date: 2/7/11	Date: 2-7-11

GEOTECHNOLOGY INC FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-3

Project No. J017150.01

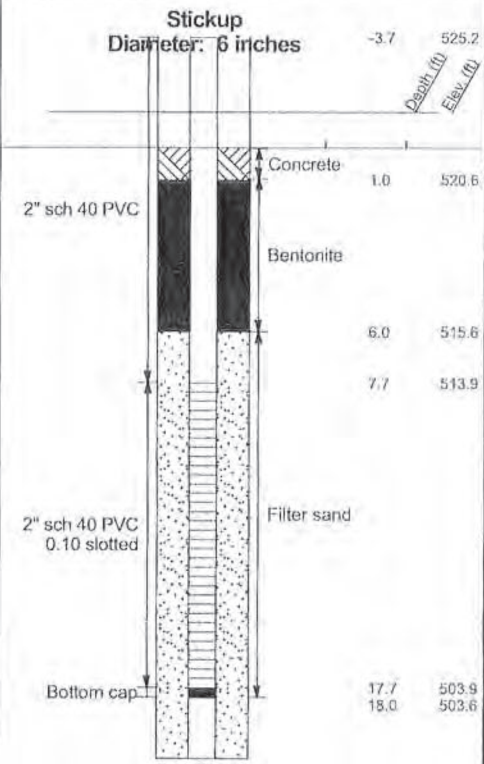
LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0538301.GPJ 2/22/11

Surface Elevation: 521.56 | Completion Date: 6/19/10

Datum msl | Northing: 823246.45 | Easting: 1001379.56

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
7	Soft, brown, sandy CLAY - CL ▽			
12	Stiff, brown, sandy CLAY with gravel - CL			
18	Boring terminated at 18 feet.			

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 8 FEET ▽

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RJS	App'vd. by: DK
Date: 6/29/10	Date: 2-7-11	Date: 2-7-11

GEOTECHNOLOGY INC FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-4

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0638301.GPJ 2/7/11

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/22/2015
Finish: 10/22/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW5
Well ID: APW5
Surface Elev: 541.57 ft. MSL
Completion: 68.00 ft. BGS
Station: 7,758.02N
9,318.19E

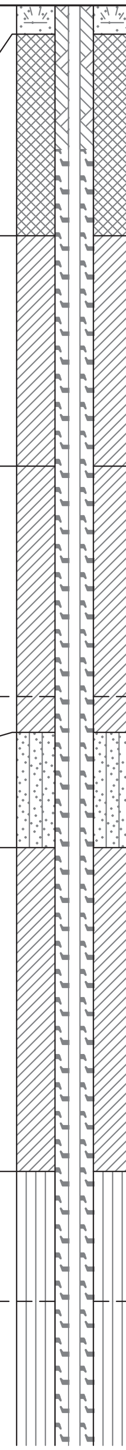
TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 58.00 - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	60/60 *100%*	DP		7		*3.00*
1B				13		*2.50*
2A	60/60 *100%*	DP		25		*3.25*
2B				22		*2.25*
3A	60/60 *100%*	DP		19		*1.50*
3B				19		*3.00*
4A	36/36 *100%*	DP		9		*2.00*
5A	23/24 *96%*	SS	*14-28 40-50* N=68	9		*4.50*

Depth ft. BGS	Lithologic Description
	Very dark grayish brown (10YR3/2), dry, very stiff, SILT with little clay and trace very fine- to medium-grained sand, roots.
2	Yellowish brown (10YR5/6), dry, very stiff, SILT with little clay and few very fine- to medium-grained sand.
4	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, very stiff, silty CLAY with few very fine- to medium-grained sand and trace small gravel.
6–8	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, very stiff, CLAY with some silt, trace very fine- to fine-grained sand.
10	Dark grayish brown (10YR4/2), moist, stiff, CLAY with little silt and trace very fine- to fine-grained sand.
	Gray (10YR6/1), moist, medium dense, very fine- to fine-grained SAND and SILT with little clay.
12–14	Gray (10YR5/1) with 5% yellowish brown (10YR5/6) mottles, moist, very stiff, silty CLAY with few fine- to coarse-grained sand and trace small gravel.
16	Yellowish brown (10YR5/6) with 15% grayish brown (10YR5/2) mottles, moist, stiff, SILT with little clay and trace fine- to coarse-grained sand and small gravel.
18–20	Brown (10YR5/3), moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel.

Borehole Detail



Elevation ft. MSL: 540, 538, 536, 534, 532, 530, 528, 526, 524, 522

Remarks

NOTE(S): APW5 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/22/2015
Finish: 10/22/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW5
Well ID: APW5
Surface Elev: 541.57 ft. MSL
Completion: 68.00 ft. BGS
Station: 7,758.02N
9,318.19E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 58.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
6A	21/24 *88%*	SS	*11-26 21-14* N=47	9		*4.50*		Brown (10YR5/3), moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel. *[Continued from previous page]*	520	
7A	24/24 *100%*	SS	*5-5 8-13* N=13	16		*4.25*	22	Brown (10YR5/3) with 5% gray (10YR6/1) and 5% yellowish brown (10YR5/6) mottles, moist, hard, SILT with some clay and trace very fine- to fine-grained sand and small gravel.	518	
8A	22/24 *92%*	SS	*18-31 43-27* N=74	9		*4.50*	24	Brown (10YR5/3), moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel.	516	
9A	21/24 *88%*	SS	*4-5 11-11* N=16	14		*2.75*	26		514	
10A	22/24 *92%*	SS	*3-6 9-12* N=15	15		*3.75*	28	Brown (10YR5/3) with 5% gray (10YR6/1) and 5% yellowish brown (10YR5/6) mottles, moist, hard, SILT with some clay and trace very fine- to fine-grained sand and small gravel.	512	
11A	24/24 *100%*	SS	*4-7 13-16* N=20	14		*4.50*	30		510	
12A	24/24 *100%*	SS	*4-7 11-17* N=18	16		*4.50*	32	Dark gray (10YR4/1), moist, hard, SILT with some clay, few very fine- to coarse-grained sand and trace small gravel.	508	
13A	24/24 *100%*	SS	*5-9 12-15* N=21	18		*4.50*	34, 36	Light olive brown (2.5Y5/3) with 5% gray (10YR5/1) mottles, moist, hard, SILT with little clay and trace very fine- to medium-grained sand.	506	
14A	24/24 *100%*	SS	*4-8 11-14* N=19	16		*4.50*			504	
15A	24/24 *100%*	SS	*5-13 16-23* N=29	12		*4.50*	38, 40	Olive brown (2.5Y4/3) with 10% gray (N6/1) mottles, moist, hard, silty CLAY with little fine- to coarse-grained sand and trace small gravel.	502	

NOTE(S): APW5 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/22/2015
Finish: 10/22/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW5
Well ID: APW5
Surface Elev: 541.57 ft. MSL
Completion: 68.00 ft. BGS
Station: 7,758.02N
9,318.19E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 58.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
16A	24/24 *100%*	SS	*6-13 16-30* N=29	12		*4.50*
17A	24/24 *100%*	SS	*5-10 13-22* N=23	15		*4.50*
18A	24/24 *100%*	SS	*7-13 17-25* N=30	13		*4.50*
19A	24/24 *100%*	SS	*6-13 20-28* N=33	13		*4.50*
20A	24/24 *100%*	SS	*5-10 16-21* N=26	13		*4.50*
21A	24/24 *100%*	SS	*6-10 18-21* N=28	13		*4.50*
22A	24/24 *100%*	SS	*7-14 19-26* N=33	13		*4.50*
23A	24/24 *100%*	SS	*6-10 17-24* N=27	13		*4.50*
24A	24/24 *100%*	SS	*12-16 28-36* N=44	11		*4.50*
25A	24/24 *100%*	SS	*2-6 12-15* N=18	23		
25B				15		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
42	Olive brown (2.5Y4/3) with 10% gray (N6/1) mottles, moist, hard, silty CLAY with little fine- to coarse-grained sand and trace small gravel. *[Continued from previous page]*	500, 498
44–56	Olive brown (2.5Y4/3) with 10% gray (N6/1) mottles, moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.	496, 494, 492, 490, 488, 486
	Olive gray (5Y5/2) with 40% olive brown (2.5Y4/4) mottles, moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.	484
▼ 58	Greenish gray (10G5/1) with 40% olive gray (5Y4/2) mottles, moist, medium dense, SILT with few clay and trace very fine- to fine-grained sand.	
60	Very dark gray (10YR3/1), wet, medium dense, very fine- to coarse-grained SAND with few silt.	482

Borehole Detail | Remarks

NOTE(S): APW5 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/22/2015
Finish: 10/22/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW5
Well ID: APW5
Surface Elev: 541.57 ft. MSL
Completion: 68.00 ft. BGS
Station: 7,758.02N
9,318.19E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 58.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
26A	19/24 *79%*	SS	*3-19 34-48* N=53	13						480	
27A	20/24 *83%*	SS	*22-38 33-34* N=71	16			62			478	
28A	22/24 *92%*	SS	*18-28 31-33* N=59	14			64	Very dark gray (10YR3/1), wet, very dense, very fine- to coarse-grained SAND with few silt.		476	
29A	24/24 *100%*	SS	*21-27 24-23* N=51	16			66				
29B				14		*4.50*	68	Dark gray (10YR4/1), moist, hard, SILT with little clay and few very fine- to coarse-grained sand.		474	

End of boring = 68.0 feet

NOTE(S): APW5 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/20/2015
Finish: 10/21/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW6
Well ID: APW6
Surface Elev: 543.38 ft. MSL
Completion: 74.00 ft. BGS
Station: 7,688.54N
7,811.93E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 14.00 - During Drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0–0.3	Gray (10YR6/1), dry, very stiff, SILT with few clay and trace very fine- to coarse- grained sand, trace roots.		
1A	60/60 *100%*	DP		15		*4.00*	0.3–3.2	Brown (10YR5/3) with 5% dark yellowish brown (10YR4/6) and 5% gray (10YR6/1) mottles, dry, very stiff, SILT with few clay and very fine- to coarse-grained sand, trace small gravel, trace roots.	542	
1B				26		*3.00*	3.2–4.8	Gray (10YR5/1) with 35% dark yellowish brown (10YR4/6) mottles, moist, very stiff, CLAY with little silt and trace very fine- to fine-grained sand.	540	
2A	60/60 *100%*	DP		18		*2.50*	4.8–8.2	Gray (10YR5/1) with 40% dark yellowish brown (10YR3/6) mottles, moist, very stiff, SILT with little clay and trace very fine- to medium-grained sand.	538, 536	
2B				18		*1.00*	8.2–11	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, SILT with some clay and few very fine- to medium-grained sand.	534	
3A	60/60 *100%*	DP		27		*1.50*	11–14	Dark yellowish brown (10YR4/6) with 25% gray (10YR5/1) mottles, moist, stiff, CLAY with some silt and few very fine- to medium-sand.	532, 530	
3B				21		*1.50*	14–15	Dark yellowish brown (10YR3/4), wet, soft, fine- to coarse grained sandy CLAY with little silt.		
4A	12/12 *100%*	DP		10			15–16.3	Brown (10YR4/3), moist, stiff, SILT with little clay and few very fine- to coarse-grained sand.	528	
5A	22/24 *92%*	SS	*15-29 41-50* N=70	8		*4.50*	16.3–20	Grayish brown (10YR5/2) with 15% dark gray (10YR4/1) mottles, dry, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.	526	
6A	21/24 *88%*	SS	*14-30 40-50* N=70	8		*4.50*			524	

NOTE(S): APW6 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/20/2015
Finish: 10/21/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW6
Well ID: APW6
Surface Elev: 543.38 ft. MSL
Completion: 74.00 ft. BGS
Station: 7,688.54N
7,811.93E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 14.00 - During Drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
7A	15/17 *88%*	SS	*16-46 50/5"*	9		*4.50*
8A	12/24 *50%*	SS	*14-37 45-50* N=82	7		*4.50*
9A	24/24 *100%*	SS	*8-17 23-32* N=40	10		*4.50*
10A	24/24 *100%*	SS	*10-22 26-36* N=48	11		*4.50*
11A	24/24 *100%*	SS	*10-18 23-26* N=41	10		*4.50*
12A	24/24 *100%*	SS	*6-13 17-23* N=30	13		*4.50*
13A	24/24 *100%*	SS	*5-7 12-19* N=19	17		*4.50*
14A	24/24 *100%*	SS	*5-9 13-19* N=22	16		*4.50*
15A	24/24 *100%*	SS	*5-10 15-22* N=25	15		*4.50*
16A	24/24 *100%*	SS	*5-9 15-22* N=24	15		*4.50*

Lithologic Description (Depth ft. BGS 20–40; Elevation ft. MSL 522–504)

Brown (10YR5/3), moist, very dense, silty, very fine- to medium-grained SAND with trace small gravel.

Brown (10YR5/3), dry, hard, SILT with little clay and few very fine- to coarse-grained sand.

Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.

Dark gray (10YR4/1) with 30% dark greenish gray (10Y4/1) mottles, moist, hard, SILT with some clay, few very fine- to coarse-grained sand and trace small gravel.

Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small to large gravel.

NOTE(S): APW6 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/20/2015
Finish: 10/21/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW6
Well ID: APW6
Surface Elev: 543.38 ft. MSL
Completion: 74.00 ft. BGS
Station: 7,688.54N
7,811.93E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 14.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
17A	21/24 *88%*	SS	*4-14 18-25* N=32	12		*4.25*
18A	24/24 *100%*	SS	*8-12 16-22* N=28	15		*4.50*
19A	22/24 *92%*	SS	*7-11 15-18* N=26	16		*4.25*
20A	22/24 *92%*	SS	*7-16 26-45* N=42	13		*4.50*
21A	21/24 *88%*	SS	*11-19 30-37* N=49	13		*4.50*
22A	19/24 *79%*	SS	*5-13 26-38* N=39	14		
23A	24/24 *100%*	SS	*12-18 29-40* N=47	13		*4.50*
24A	24/24 *100%*	SS	*7-18 30-37* N=48	13		
25A	24/24 *100%*	SS	*11-18 27-38* N=45	14		*4.50*
26A	24/24 *100%*	SS	*10-15 23-33* N=38	17		*4.50*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
40–46.3	Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small to large gravel. *[Continued from previous page]*	502, 500, 498
46.3–54.6	Olive gray (5Y4/2) with 20% dark gray (10YR4/1) mottles, moist, hard, SILT with little clay and trace very fine- to coarse- grained sand and small gravel.	496, 494, 492, 490
54.6–56.7	Dark gray brown (2.5Y4/2) with 15% dark gray (10YR4/1) mottles, moist, hard, SILT with little clay and trace very fine- to coarse-grained sand.	488
56.7–58	Olive brown (2.5Y4/3) with 5% gray (N6/1) mottles, moist, hard, SILT with little clay and trace very fine- to medium-grained sand.	486
58–60	Olive brown (2.5Y4/3) with 5% gray (N6/1) mottles, moist, hard, SILT with little clay and trace very fine- to coarse-grained sand and small gravel.	484

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

Borehole Detail | Remarks

NOTE(S): APW6 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/20/2015
Finish: 10/21/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW6
Well ID: APW6
Surface Elev: 543.38 ft. MSL
Completion: 74.00 ft. BGS
Station: 7,688.54N
7,811.93E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 14.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
27A	24/24 *100%*	SS	*5-4 21-32* N=25	13		*4.50*	62	Olive brown (2.5Y4/3) with 5% gray (N6/1) mottles, moist, hard, SILT with little clay and trace very fine- to coarse-grained sand and small gravel. *[Continued from previous page]*	482	
28A	24/24 *100%*	SS	*7-18 23-31* N=41	12		*4.50*	64	Dark gray (10YR4/1) with 5% dark olive brown (2.5Y3/3) mottles, moist, hard, SILT with little clay and trace very fine- to coarse-grained sand and small gravel.	480	
29A	24/24 *100%*	SS	*7-14 18-30* N=32	13		*4.25*	66	Dark gray (10YR4/1), moist, hard, SILT with little clay and trace very fine- to coarse-grained sand and small gravel.	478	
30A	24/24 *100%*	SS	*13-21 33-33* N=54	14			68	Dark gray (10YR4/1), wet, very dense, silty, very fine- to coarse-grained SAND with trace small gravel.	476	
31A	16/23 *70%*	SS	*3-27 49-50/5"* N=76	13			70		474	
32A	20/23 *87%*	SS	*6-29 38-50/5"* N=67	22			72	Gray (10YR5/1), wet, very dense, SILT with few very fine- to fine-grained sand.	472	
								Dark gray (10YR4/1), wet, very dense, silty, very fine- to medium-grained SAND with trace small gravel.		
33A	20/24 *83%*	SS	*26-28 34-37* N=62	12		*4.50*	74	Dark gray (10YR4/1), moist, hard, SILT with little clay and few very fine- to coarse-grained sand.	470	

End of boring = 74.0 feet

NOTE(S): APW6 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/3/2015
Finish: 11/5/2015
WEATHER: Sunny, warm, lo-70s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW7a
Well ID: APW7
Surface Elev: 536.21 ft. MSL
Completion: 83.10 ft. BGS
Station: 5,688.85N
6,151.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										536	
							2	Yellowish brown (10YR5/6), moist, medium, CLAY with some silt and trace very fine- to fine-grained sand, roots.		534	
							4	Light gray (10YR7/2), moist, medium, SILT with few very fine-grained sand and trace roots.		532	
							6	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, medium, CLAY with some silt, trace very fine-grained sand, and trace roots.		530	
							8, 10, 12	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, medium, CLAY with some silt and trace very fine- to medium-grained sand, trace small gravel, and trace roots.		528, 526, 524	
							14, 16	Yellowish brown (10YR5/4), moist, hard, SILT with few clay, little very fine- to coarse-grained sand, and trace small to medium gravel.		522	
								Yellowish brown (10YR5/6), wet, dense, fine- to coarse-grained SAND with little silt.		520	
							18	Gray (10YR5/1), moist, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel.		518	
							20	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, dry, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel.			

NOTE(S): APW7 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/3/2015
Finish: 11/5/2015
WEATHER: Sunny, warm, lo-70s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW7a
Well ID: APW7
Surface Elev: 536.21 ft. MSL
Completion: 83.10 ft. BGS
Station: 5,688.85N
6,151.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, dry, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel. *[Continued from previous page]*	516	
							22	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, dry, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel, horizontal and vertical fractures with dark brown (10YR3/3) oxidized faces.	514	
							24	Gray (10YR5/1), moist, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel, horizontal and vertical fractures with dark brown (10YR3/3) oxidized faces.	512, 510, 508, 506	
							32	Gray (10YR5/1), moist, hard, SILT with few clay, little very fine- to very coarse-grained sand, and trace small to medium gravel.	504, 502, 500	
								Gray (10YR5/1), moist, dense, very fine- to fine-grained SAND with trace silt.	498	
								Gray (10YR5/1), moist, dense, very fine- to very coarse-grained SAND with trace silt and small gravel.		
							40	Gray (10YR5/1), moist, dense, very fine- to fine-grained SAND with trace silt.		

NOTE(S): APW7 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**BOREHOLE ID:** APW7a	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA	**Well ID:** APW7	
Project: 15E0030		**Surface Elev:** 536.21 ft. MSL	
DATES: Start: 11/3/2015	**FIELD STAFF: Driller:** J. Gates	**Completion:** 83.10 ft. BGS	
Finish: 11/5/2015	**Helper:** C. Clines	**Station:** 5,688.85N	
WEATHER: Sunny, warm, lo-70s	**Eng/Geo:** R. Hasenyager	6,151.60E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) % Recovery	Type	TESTING: Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							40–46.7	Gray (10YR5/1), moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, trace small gravel, and trace wood fragments.		496–490	
							46.7–60	Gray (10YR5/1), moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments.		490–476	

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

Elevation scale: 496, 494, 492, 490, 488, 486, 484, 482, 480, 478

NOTE(S): APW7 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/3/2015
Finish: 11/5/2015
WEATHER: Sunny, warm, lo-70s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW7a
Well ID: APW7
Surface Elev: 536.21 ft. MSL
Completion: 83.10 ft. BGS
Station: 5,688.85N
6,151.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							60–71	Gray (10YR5/1), moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments. *[Continued from previous page]*		476–465	
							71–71.3	Gray (10YR5/1), moist, dense, very fine- to very coarse-grained SAND with some clay and silt.			
							71.3–76	Gray (10YR5/1), moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, trace small gravel, and trace wood fragments.			
							76–80	Gray (10YR5/1), wet, loose, very fine- to very coarse-grained SAND with trace small gravel.		460–456	

Depth scale: 62, 64, 66, 68, 70, 72, 74, 76, 78, 80
Elevation scale: 476, 474, 472, 470, 468, 466, 464, 462, 460, 458

NOTE(S): APW7 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/3/2015
Finish: 11/5/2015
WEATHER: Sunny, warm, lo-70s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW7a
Well ID: APW7
Surface Elev: 536.21 ft. MSL
Completion: 83.10 ft. BGS
Station: 5,688.85N
6,151.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							82	Gray (10YR5/1), wet, loose, very fine- to very coarse-grained SAND with trace small gravel. *[Continued from previous page]*		456, 454	
								Bluish black (10B2.5/1), wet dense, very fine- to very coarse-grained SAND with little silt and trace small gravel.			

End of boring = 83.1 feet

NOTE(S): APW7 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/28/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW8
Well ID: APW8
Surface Elev: 526.75 ft. MSL
Completion: 82.00 ft. BGS
Station: 3,839.59N
6,082.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 33.70 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
1A	60/60 *100%*	DP		13		*4.50*
1B				21		*3.00*
2A	60/60 *100%*	DP		18		*2.50*
2B				28		*2.00*
3A	20/24 *83%*	DP		8		*2.00*
4A	0/17 *0%*	SS	*23-43* *50/5"*			
5A	21/24 *88%*	SS	*13-20* *24-28* N=44	10		*4.50*
6A	24/24 *100%*	SS	*7-14* *20-48* N=34	11		*4.50*
7A	24/24 *100%*	SS	*14-21* *26-32* N=47	10		

Depth ft. BGS	Lithologic Description	Remarks
0 – ~0.6	Black (10YR2/1), moist, very stiff, SILT with little clay and trace very fine- to medium-grained sand, roots.	
~0.6 – ~2.5	Yellowish brown (10YR5/4) with 30% light gray (10YR7/2) mottles, dry, hard, SILT with little clay and trace very fine- to medium-grained sand.	
~2.5 – ~8.2	Grayish brown (10YR5/2) with 15% dark yellowish brown (10YR4/6) and 10% black (10YR2/1) mottles, moist, very stiff, silty CLAY with few very fine- to coarse-grained sand and trace small gravel.	
~8.2 – 10	Grayish brown (10YR5/2) with 15% dark yellowish brown mottles, moist, stiff, silty CLAY with few very fine- to coarse-grained sand and trace small gravel.	
10 – 14	Brown (10YR5/3) with 20% dark yellowish brown (10YR5/6) mottles, dry, stiff, SILT with little clay and trace very fine- to coarse-grained sand.	Rock in shoe of sampler.
14 – 20	Dark gray (10YR4/1), moist, hard, SILT with little clay, trace very fine- to coarse-grained sand and small gravel.	

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Elevation (ft. MSL): 526, 524, 522, 520, 518, 516, 514, 512, 510, 508

NOTE(S): APW8 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/28/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW8
Well ID: APW8
Surface Elev: 526.75 ft. MSL
Completion: 82.00 ft. BGS
Station: 3,839.59N 6,082.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 33.70 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
8A	24/24 *100%*	SS	*7-13 19-23* N=32	11		*4.50*
9A	24/24 *100%*	SS	*7-14 19-27* N=33	11		*4.50*
10A	24/24 *100%*	SS	*8-15 30-37* N=45	11		*4.50*
11A	24/24 *100%*	SS	*8-16 24-33* N=40	11		*4.50*
12A	24/24 *100%*	SS	*9-31 33-30* N=64	11		
12B				12		*4.50*
13A	24/24 *100%*	SS	*10-23 40-35* N=63	11		*4.50*
14A	21/24 *88%*	SS	*16-16 29-50* N=45	10		*4.50*
15A	20/24 *83%*	SS	*9-24 34-41* N=58	13		
	22/24 *92%*	SS	*16-18 29-35* N=47			
16A				11		*4.50*
17A	21/24 *88%*	SS	*10-17 21-31* N=38	11		*4.50*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
20.0–29.1	Dark gray (10YR4/1), moist, hard, SILT with little clay, trace very fine- to coarse-grained sand and small gravel. *[Continued from previous page]*		506, 504, 502, 500, 498	
29.1–29.7	Gray (10YR5/1), moist, dense, silty, very fine- to medium-grained SAND.			
29.7–33.7	Dark gray (10YR4/1), moist, hard SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel.		496, 494	
33.7–36.3	Dark gray (10YR4/1), wet, very dense, silty, very fine- to coarse-grained SAND with trace small gravel.		492	
36.3–40.0	Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel.		490, 488	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

NOTE(S): APW8 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/28/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW8
Well ID: APW8
Surface Elev: 526.75 ft. MSL
Completion: 82.00 ft. BGS
Station: 3,839.59N
6,082.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 33.70 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
18A	24/24 *100%*	SS	*9-16 26-32* N=42	11		*4.50*			486	
							42			
19A	24/24 *100%*	SS	*10-16 23-34* N=39	12		*4.50*			484	
							44			
20A	24/24 *100%*	SS	*10-15 26-44* N=41	13		*4.50*			482	
							46			
21A	24/24 *100%*	SS	*12-21 32-48* N=53	12		*4.50*			480	
							48			
22A	24/24 *100%*	SS	*11-17 22-31* N=39	13		*4.50*		Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel. *[Continued from previous page]*	478	
							50			
23A	24/24 *100%*	SS	*10-13 21-32* N=34	13		*4.50*			476	
							52			
24A	24/24 *100%*	SS	*8-13 50-26* N=63	13		*4.50*			474	
							54			
25A	24/24 *100%*	SS	*8-11 19-28* N=30	14		*4.25*			472	
							56			
26A	24/24 *100%*	SS	*10-12 18-26* N=30	13		*4.50*			470	
							58			
27A	22/24 *92%*	SS	*7-10 15-22* N=25	21		*4.50*		Olive gray (5Y4/2), moist, hard, silty CLAY with few very fine- to coarse-grained sand and trace small gravel.	468	
							60			

NOTE(S): APW8 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/28/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, macro-core sampler, split spoon sampler
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW8
Well ID: APW8
Surface Elev: 526.75 ft. MSL
Completion: 82.00 ft. BGS
Station: 3,839.59N
6,082.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 33.70 - During Drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
28A	20/24 *83%*	SS	*7-15 19-20* N=34	14		*4.50*		Dark gray (10YR4/1), moist, hard, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.	466	
							62			
29A	21/24 *88%*	SS	*7-8 11-16* N=19	11		*3.75*		Dark gray (10YR4/1), moist, very stiff, SILT with little clay, few very fine- to coarse-grained sand and trace small gravel.	464	
							64			
30A	21/24 *88%*	SS	*6-13 14-11* N=27	14		*4.00*			462	
30B				10				Gray (10YR6/1), wet, medium dense, silty, very fine- to coarse-grained SAND with trace small to large gravel.		
							66	Dark gray (10YR4/1), moist, very stiff, SILT with little clay and few very fine- to coarse-grained sand.		
31A	18/24 *75%*	SS	*4-3 4-3* N=7	28				Dark gray (10YR4/1), wet, loose, silty, very fine- to coarse-grained SAND with trace small gravel and trace wood fragments.	460	
31B				15		*3.25*				
							68	Dark gray (10YR4/1), moist, very stiff, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel, trace wood fragments.		
32A	20/24 *83%*	SS	*1-3 3-2* N=6	17				Dark gray (10YR4/1), wet, loose, SILT with little very fine- to fine-grained sand.	458	
32B				28				Dark gray (10YR4/1), wet, loose, silty, very fine- to coarse-grained SAND.		
							70	Dark gray (10YR4/1), wet, loose, SILT with little very fine- to fine-grained sand, trace wood fragments.		
33A	15/24 *63%*	SS	*woh-2 6-6* N=8	17				Dark gray (10YR4/1), wet, loose, silty, very fine- to coarse-grained SAND, trace wood fragments.	456	
							72			
34A	16/24 *67%*	SS	*9-11 15-20* N=26	9				Dark gray (10YR4/1), wet, medium dense, silty, very fine- to coarse-grained SAND with trace small gravel.	454	
								Dark gray (10YR4/1), wet, medium dense, silty, very fine- to coarse-grained SAND with few small to large gravel.		
							74			
35A	15/24 *63%*	SS	*16-21 23-24* N=44	9				Dark gray (10YR4/1), wet, dense, silty, very fine- to coarse-grained SAND with few small to large gravel.	452	
							76			
36A	14/24 *58%*	SS	*11-20 25-24* N=45	11					450	
							78	Dark gray (10YR4/1), wet, dense, silty, very fine- to coarse-grained SAND with trace small gravel.		
37A	15/24 *63%*	SS	*20-25 24-25* N=49	10					448	
							80			

NOTE(S): APW8 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**BOREHOLE ID:** APW8	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA, macro-core sampler, split spoon sampler	**Well ID:** APW8	
Project: 15E0030		**Surface Elev:** 526.75 ft. MSL	
DATES: Start: 10/27/2015	**FIELD STAFF: Driller:** C. Dutton	**Completion:** 82.00 ft. BGS	
Finish: 10/28/2015	**Helper:** C. Jones	**Station:** 3,839.59N	
WEATHER: Sunny, breezy, warm, lo-80s	**Eng/Geo:** S. Keim	6,082.37E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 33.70 - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
38A	18/24 *75%*	SS	*26-26* *26-31* N=52	8				Dark gray (10YR4/1), wet, dense, silty, very fine- to coarse-grained SAND with trace small gravel. *[Continued from previous page]*		446	
38B				11		*4.50*	82	Dark gray (10YR4/1), moist, hard, SILT with little clay and few very fine- to coarse-grained sand.			

End of boring = 82.0 feet

NOTE(S): APW8 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/2/2015
Finish: 11/3/2015
WEATHER: Foggy, mild, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW9
Well ID: APW9
Surface Elev: 528.82 ft. MSL
Completion: 62.00 ft. BGS
Station: 3,519.59N
9,125.33E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 27.00 - During Drilling
▼ = 26.10 - 11/3/15
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1	0/60 *0%*	BD					0–5	Blind drill - see APW3 boring log for lithology, sample, and testing data			
2	0/60 *0%*	BD					5–10				
3	0/60 *0%*	BD					10–15				
4	0/60 *0%*	BD					15–20				

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 528, 526, 524, 522, 520, 518, 516, 514, 512, 510

NOTE(S): APW9 installed in borehole.
Lithology, sample, and testing data can be found on APW-3 Field Boring Log.

FIELD BORING LOG

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/2/2015
Finish: 11/3/2015
WEATHER: Foggy, mild, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

HANSON

BOREHOLE ID: APW9
Well ID: APW9
Surface Elev: 528.82 ft. MSL
Completion: 62.00 ft. BGS
Station: 3,519.59N
9,125.33E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 27.00 - During Drilling
▼ = 26.10 - 11/3/15
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
5A	24/24 *100%*	SS	*10-13 21-28* N=34	10		*4.25*
6A	24/24 *100%*	SS	*13-15 21-29* N=36	10		*4.50*
7A	2/24 *8%*	SS	*15-28 33-39* N=61	11		*4.50*
8A	23/23 *100%*	SS	*9-15 39-50/5"* N=54	11		
8B				11		
9A	24/24 *100%*	SS	*12-22 28-27* N=50	11		
9B				12		*4.50*
10A	24/24 *100%*	SS	*14-22 32-44* N=54	11		*4.50*
11A	23/24 *96%*	SS	*8-16 24-35* N=40	11		*4.50*
12A	16/24 *67%*	SS	*12-25 35-32* N=60	12		*4.50*
13A	24/24 *100%*	SS	*6-12 24-25* N=36	11		*4.50*
14A	24/24 *100%*	SS	*4-7 16-32* N=23	14		*4.50*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
22	Gray (10YR5/1), moist, hard, SILT with some very fine-grained sand, little clay, and trace small to medium gravel. Vertical and horizontal fractures with yellowish brown (10YR5/8) faces.	508, 506	
24, 26	Gray (10YR5/1), moist, hard, SILT with some very fine-grained sand, little clay, and trace small to medium gravel.	504, 502	Rock in shoe of sampler.
28	Gray (10YR5/1), wet, dense, very fine- to very coarse-grained SAND with some silt, few clay and trace small to medium gravel.	500	
30, 32, 34, 36	Gray (10YR5/1), moist, hard, SILT with little clay and very fine-grained sand and trace small gravel.	498, 496, 494, 492	
38, 40	Gray (10YR5/1) moist, stiff, CLAY with some silt, little very fine-grained sand and trace small gravel.	490	

NOTE(S): APW9 installed in borehole.
Lithology, sample, and testing data can be found on APW-3 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/2/2015
Finish: 11/3/2015
WEATHER: Foggy, mild, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler
FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: APW9
Well ID: APW9
Surface Elev: 528.82 ft. MSL
Completion: 62.00 ft. BGS
Station: 3,519.59N
9,125.33E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 27.00 - During Drilling
▼ = 26.10 - 11/3/15
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
15A	24/24 *100%*	SS	*5-11 19-23* N=30	14		*4.50*
16A	24/24 *100%*	SS	*4-8 14-29* N=22	15		*4.50*
16B				12		
17A	24/24 *100%*	SS	*8-17 24-34* N=41	11		*4.50*
18A	24/24 *100%*	SS	*7-13 20-29* N=33	12		*4.50*
19A	24/24 *100%*	SS	*6-12 18-24* N=30	12		*4.50*
20A	24/24 *100%*	SS	*7-12 17-22* N=29	15		*4.50*
21A	24/24 *100%*	SS	*5-11 12-18* N=23	14		*4.25*
22A	23/23 *100%*	SS	*6-14 24-50/5"* N=38	13		*4.50*
22B				13		
23A	24/24 *100%*	SS	*7-15 21-30* N=36	13		
24A	18/24 *75%*	SS	*13-38 43-40* N=81	15		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
42	Gray (10YR5/1) moist, stiff, CLAY with some silt, little very fine-grained sand and trace small gravel, trace wood fragments.		488, 486	
44	Light olive brown (2.5Y5/3), moist, stiff, CLAY with some silt, few very fine- to very coarse-grained sand, and trace small gravel.		484	
46	Light olive brown (2.5Y5/3) with 30% yellowish brown (10YR5/8) mottles, moist, stiff, CLAY with some silt, few very fine- to very coarse-grained sand, and trace small gravel.		482	
48, 50	Grayish brown (2.5Y5/2) with 10% gray (2.5Y5/3) mottles, moist, hard, SILT with little very fine- to very coarse-grained sand, few clay and trace small to large gravel.		480	
52, 54	Yellowish brown (10YR5/6) with 25% gray (10YR6/1) mottles, moist, stiff, CLAY with some silt, little very fine-medium-grained sand, and trace small gravel.		478, 476, 474	
56	Dark gray (10YR4/1), moist, dense, very fine- to fine-grained SAND with few silt.			
58	Gray (10YR5/1), wet, loose, very fine- to very coarse-grained SAND with trace small gravel.		472	
60	Gray (10YR5/1), wet, loose, very fine- to coarse-grained SAND.		470	

NOTE(S): APW9 installed in borehole.
Lithology, sample, and testing data can be found on APW-3 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**BOREHOLE ID:** APW9	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA, split spoon sampler	**Well ID:** APW9	
Project: 15E0030		**Surface Elev:** 528.82 ft. MSL	
DATES: Start: 11/2/2015	**FIELD STAFF: Driller:** J. Gates	**Completion:** 62.00 ft. BGS	
Finish: 11/3/2015	**Helper:** C. Clines	**Station:** 3,519.59N	
WEATHER: Foggy, mild, lo-50s	**Eng/Geo:** R. Hasenyager	9,125.33E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 27.00 - During Drilling
▼ = 26.10 - 11/3/15
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
25A	24/24 *100%*	SS	*4-18* *25-30* N=43	21				Gray (10YR5/1), wet, loose, very fine- to coarse-grained SAND. *[Continued from previous page]*		468	
								Gray (10YR5/1), moist, stiff, CLAY with some silt and trace very fine-grained sand.			
25B				16			62	Gray (10YR5/1), wet, dense, SILT and very fine-grained SAND.			

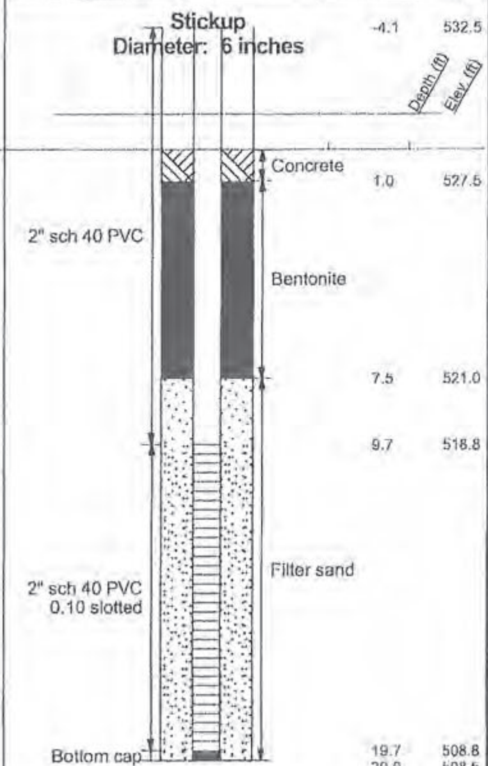
End of boring = 62.0 feet

NOTE(S): APW9 installed in borehole.
Lithology, sample, and testing data can be found on APW-3 Field Boring Log.

Surface Elevation: 528.47 | Datum: msl | Completion Date: 6/18/10 | Northing: 821379.76 | Easting: 998975.74

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
6	Soft, brown, sandy CLAY with gravel - CL			
9	Hard, brown, sandy CLAY with gravel - CL			
13	Hard, brownish-gray, sandy CLAY with gravel - CL			
20	Boring terminated at 20 feet.			

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: JRS	App'vd. by: DTK
Date: 6/29/10	Date: 2/7/11	Date: 2-7-11

GEOTECHNOLOGY INC — FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-3

Project No. J017150.01

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/27/2015
WEATHER: Cool, rainy, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW10a
Well ID: APW10
Surface Elev: 521.98 ft. MSL
Completion: 45.94 ft. BGS
Station: 5,371.32N
11,541.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 25, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 36.00 - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							2			520	
							4			518	
							6			516	
							8			514	
							10	Blind drill - see APW4 boring log for lithology, sample, and testing data		512	
							12			510	
							14			508	
							16			506	
							18			504	
							20			502	

NOTE(S): APW10 installed in borehole.
Lithology, sample, and testing data can be found on APW-4 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/27/2015
WEATHER: Cool, rainy, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW10a
Well ID: APW10
Surface Elev: 521.98 ft. MSL
Completion: 45.94 ft. BGS
Station: 5,371.32N
11,541.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 25, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 36.00 - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							22	Yellowish brown (10YR5/6) with 5% gray (N6/1) mottles, moist, hard, SILT with little clay, few very fine-grained sand, and trace small gravel.		500	
							24	Yellowish brown (10YR5/4) with 5% dark yellowish brown (10YR4/6) and 5% gray (N6/1) mottles, moist, hard, SILT with little clay, few very fine-grained sand, and trace small gravel.		498	
							26			496	
							28			494	
							30			492	
							32	Brown (10YR5/3) with 5% gray (N6/1) mottles, moist, hard, SILT with little clay, few very fine-grained sand, and trace small gravel.		490	
							34			488	
							▼ 36			486	
							38			484	
							40	Brown (10YR5/3), wet, very dense, silty, very fine- to medium-grained SAND with trace small gravel.		482	

NOTE(S): APW10 installed in borehole.
Lithology, sample, and testing data can be found on APW-4 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/27/2015
Finish: 10/27/2015
WEATHER: Cool, rainy, lo-50s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: APW10a
Well ID: APW10
Surface Elev: 521.98 ft. MSL
Completion: 45.94 ft. BGS
Station: 5,371.32N
11,541.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 25, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 36.00 - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							42 44	Brown (10YR5/3), wet, very dense, silty, very fine- to medium-grained SAND with trace small gravel. *[Continued from previous page]*		480 478	

End of boring = 45.94 feet

NOTE(S): APW10 installed in borehole.
Lithology, sample, and testing data can be found on APW-4 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/9/2015
Finish: 11/10/2015
WEATHER: Sunny, mild, lo-60s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler
FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: G06D
Well ID: G06D
Surface Elev: 529.69 ft. MSL
Completion: 96.00 ft. BGS
Station: 5,328.80N
4,925.99E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1	0/60 *0%*	BD					0–5	Blind drill - see G106 boring log for lithology, sample, and testing data		528, 526, 524	
2	0/60 *0%*	BD					5–10			522, 520	
3	0/60 *0%*	BD					10–15			518, 516	
4	0/60 *0%*	BD					15–20			514, 512, 510	

NOTE(S): G06D installed in borehole.
Lithology, sample, and testing data can be found on G106 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550 ATV Drill	**BOREHOLE ID:** G06D	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA, split spoon sampler	**Well ID:** G06D	
Project: 15E0030		**Surface Elev:** 529.69 ft. MSL	
DATES: Start: 11/9/2015	**FIELD STAFF: Driller:** J. Gates	**Completion:** 96.00 ft. BGS	
Finish: 11/10/2015	**Helper:** C. Clines	**Station:** 5,328.80N	
WEATHER: Sunny, mild, lo-60s	**Eng/Geo:** R. Hasenyager	4,925.99E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	0/60 *0%*	BD					22–25	Blind drill - see G106 boring log for lithology, sample, and testing data *[Continued from previous page]*	508–504	
5	0/60 *0%*	BD					25–30			
6	0/60 *0%*	BD					30–35			
7	0/12 *0%*	BD					35–36			
8							36		494	
9A	24/24 *100%*	SS	*3-8* *12-15* N=20	13		*3.75*	36–37.5	Gray (10YR5/1), moist, stiff, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel.		
							37.5–38	Gray (10YR5/1), wet, loose, very fine- to medium-grained SAND.	492	
10A	14/24 *58%*	SS	*6-11* *19-22* N=30	14		*4.00*	38–40	Gray (10YR5/1), moist, stiff, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel.	490	

NOTE(S): G06D installed in borehole.
Lithology, sample, and testing data can be found on G106 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/9/2015
Finish: 11/10/2015
WEATHER: Sunny, mild, lo-60s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: G06D
Well ID: G06D
Surface Elev: 529.69 ft. MSL
Completion: 96.00 ft. BGS
Station: 5,328.80N
4,925.99E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
11A	24/24 *100%*	SS	*3-7 13-16* N=20	12		*4.50*
12A	24/24 *100%*	SS	*3-7 11-12* N=18	13		*4.50*
13A	24/24 *100%*	SS	*6-8 12-14* N=20	14		*4.50*
14A	3/24 *13%*	SS	*13-14 16-20* N=30	13		
15A	23/24 *96%*	SS	*3-7 11-14* N=18	13		*4.50*
16A	24/24 *100%*	SS	*5-9 11-15* N=20	15		*4.00*
17A	21/24 *88%*	SS	*10-14 12-15* N=26	13		*3.75*
18A	23/24 *96%*	SS	*4-7 10-14* N=17	14		*3.25*
19A	24/24 *100%*	SS	*2-4 9-12* N=13	15		*3.25*
20A	24/24 *100%*	SS	*3-7 10-14* N=17	13		*3.50*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
42	Gray (10YR5/1), moist, hard, CLAY with some silt, few very fine- to medium-grained sand, and trace small gravel.		488	
44–52	Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments.		486, 484, 482, 480, 478	
52–60	Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small to medium gravel, trace wood fragments.		476, 474, 472, 470	

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

NOTE(S): G06D installed in borehole.
Lithology, sample, and testing data can be found on G106 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/9/2015
Finish: 11/10/2015
WEATHER: Sunny, mild, lo-60s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler
FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: G06D
Well ID: G06D
Surface Elev: 529.69 ft. MSL
Completion: 96.00 ft. BGS
Station: 5,328.80N
4,925.99E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
21A	24/24 *100%*	SS	*4-8 11-16* N=19	13		*4.25*
22A	24/24 *100%*	SS	*2-6 10-14* N=16	14		*3.75*
23A	24/24 *100%*	SS	*6-10 16-21* N=26	13		*4.50*
24A	24/24 *100%*	SS	*4-8 11-14* N=19	13		*4.50*
25A	24/24 *100%*	SS	*2-6 8-9* N=14	15		*3.60*
26A	24/24 *100%*	SS	*1-4 8-9* N=12	17		*2.75*
27A	24/24 *100%*	SS	*woh-4 5-8* N=9	18		*2.25*
28A	24/24 *100%*	SS	*woh-3 5-8* N=8	17		*1.50*
29A	24/24 *100%*	SS	*wor-1 5-7* N=6	18		*1.50*
30A	24/24 *100%*	SS	*1-4 5-8* N=9	19		*1.00*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
60–62	Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small to medium gravel, trace wood fragments. *[Continued from previous page]*		468	
62–64	Gray (10YR5/1), moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small to medium gravel, trace wood fragments.		466	
64–68.4	Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small to medium gravel, trace wood fragments.		464, 462	
68.4–73	Gray (10YR5/1), moist, stiff, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments.		460, 458	
73–78	Gray (10YR5/1), moist, medium, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments.		456, 454, 452	
78–80	Gray (10YR5/1), moist, soft, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments.		450	

NOTE(S): G06D installed in borehole.
Lithology, sample, and testing data can be found on G106 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 11/9/2015
Finish: 11/10/2015
WEATHER: Sunny, mild, lo-60s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA, split spoon sampler
FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: G06D
Well ID: G06D
Surface Elev: 529.69 ft. MSL
Completion: 96.00 ft. BGS
Station: 5,328.80N
4,925.99E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
31A	24/24 100%	SS	woh-3 5-8 N=8	19		0.75
32A	24/24 100%	SS	1-4 6-8 N=10	18		1.25
33A	24/24 100%	SS	woh-4 6-8 N=10	19		1.00
34A	24/24 100%	SS	woh-4 9-10 N=13	16		1.00
34B				18		
35A	24/24 100%	SS	4-9 7-8 N=16	19		1.25
36A	24/24 100%	SS	woh-2 5-6 N=7	20		0.75
37A	24/24 100%	SS	woh-2 5-7 N=7	19		0.75
38A	24/24 100%	SS	woh-3 5-8 N=8	19		0.75

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
80–86.7	Gray (10YR5/1), moist, soft, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small gravel, trace wood fragments. *[Continued from previous page]*	448, 446, 444
86.7–87.3	Gray (10YR5/1), moist, dense, SILT and very fine-grained SAND with trace very coarse-grained sand.	
87.3–90	Gray (10YR5/1), moist, soft, CLAY with some silt, little very fine- to coarse-grained sand, and trace small gravel, trace wood fragments.	442, 440
90–96	Gray (10YR5/1), moist, soft, CLAY with some silt, trace very fine- to coarse-grained sand, and trace small gravel, trace wood fragments.	438, 436, 434

Depth scale: 82, 84, 86, 88, 90, 92, 94, 96

End of boring = 96.0 feet

Borehole Detail | Remarks

NOTE(S): G06D installed in borehole.
Lithology, sample, and testing data can be found on G106 Field Boring Log.

CIPS NEWTON POWER STATION	BORING G-106	SHEET 1 of 1

DATE STARTED 8/1/90 | DATE COMPLETED 8/1/90 | LOGGED BY RAB | SURFACE EL. 529.0

DRILLING CONTRACTOR: BROTCKE ENG. | DRILL METHOD: H.S. AUGER

Depth (ft)	Graphic Log	N-Value	SOIL/ROCK DESCRIPTION	VAPOR CONCENTRATION (ppm) 10^0 10^1 10^2 10^3	COMMENTS	Depth (ft)
0		22	Brn. clayey SILT, tr. roots, blocky, dry.			0
		20 18	Brn. sandy silty CLAY, tr. pebbles, sl. moist, blocky.			
		33	Mottled gray & brn. silty sandy CLAY, tr. pebbles, moist.			
10		50 72	Brn. sandy CLAY, tr. pebbles, vert. med. sand filled fract., so. mn & iron oxid., moist.			10
		50	Brn. coarse SAND.			
20		80 43 59 45	Gray brn. sandy silty CLAY, tr. pebbles, coal frag., oxid. vert. fract., hard.			20
		9	Gray coarse - v. coarse SAND.		▽	
		63	Gray sandy silty CLAY, tr. pebbles, moist.			
30		39	Coarse - v. coarse SAND grading downward to gravel.			30
		33	Gray sandy silty CLAY, tr. pebbles, unweathered.			
			End of Boring = 36.0'			
40						40

SOIL/ROCK BORING DATA

HANSON ENGINEERS INCORPORATED

PAC 11-19-90
REVIEWED DATE
RKC 11-19-90
APPROVED DATE

CIPS
NEWTON POWER STATION
NEWTON, ILLINOIS

JOB NO. 89S5008A

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**BOREHOLE ID:** G48MG	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA	**Well ID:** G48MG	
Project: 15E0030		**Surface Elev:** 543.17 ft. MSL	
DATES: Start: 10/19/2015	**FIELD STAFF: Driller:** C. Dutton	**Completion:** 77.06 ft. BGS	
Finish: 10/20/2015	**Helper:** C. Jones	**Station:** 9,706.71N	
WEATHER: Sunny, breezy, warm, lo-80s	**Eng/Geo:** S. Keim	5,052.58E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE			TESTING			
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	Grayish brown (10YR5/2), moist, very soft, silty CLAY, trace roots.			
	Grayish brown (10YR5/2) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY, slight trace roots.		542	
2				
	Brown (10YR5/3) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		540	
4			538	
6				
	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		536	
8	Gray (10YR5/1) with 40% dark yellowish brown (10YR4/6) mottles, very moist, soft, silty CLAY with trace sand and slight trace gravel.		534	
10	Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, soft, wet, sandy CLAY with slight trace gravel.			
	Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		532	
12	Dark gray (10YR4/1) with 30% brown (10YR4/3) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		530	
14	Dark gray (10YR4/1) with 20% dark grayish brown (10YR4/2) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		528	
16	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		526	
18			524	
20				

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.		
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**BOREHOLE ID:** G48MG	
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA	**Well ID:** G48MG	
Project: 15E0030		**Surface Elev:** 543.17 ft. MSL	
DATES: Start: 10/19/2015	**FIELD STAFF: Driller:** C. Dutton	**Completion:** 77.06 ft. BGS	
Finish: 10/20/2015	**Helper:** C. Jones	**Station:** 9,706.71N	
WEATHER: Sunny, breezy, warm, lo-80s	**Eng/Geo:** S. Keim	5,052.58E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							20–25.8	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel. *[Continued from previous page]*			
							25.8–26.4	Dark gray (10YR4/1), moist, firm, silty CLAY with slight trace sand and gravel.			
							26.4–27	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.			
							27–30.5	Dark gray (10YR4/1), slightly moist, firm, clayey SILT with trace sand and slight trace gravel.			
							30.5–37.3	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.			
							37.3–40	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.			

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40. Elevation scale: 522, 520, 518, 516, 514, 512, 510, 508, 506, 504.

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/19/2015
Finish: 10/20/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: G48MG
Well ID: G48MG
Surface Elev: 543.17 ft. MSL
Completion: 77.06 ft. BGS
Station: 9,706.71N
5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
∇ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							42	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*		502, 500	
							44	Dark gray (10YR4/1), slightly moist, firm, SILT with slight trace sand.			
							46, 48, 50	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.		498, 496, 494, 492	
							52	Olive gray (5Y4/2), slightly moist, firm, silty CLAY with slight trace sand and gravel.			
							54	Dark greenish gray (10Y4/1) with 20% greenish gray (10Y6/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.		490	
							56	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, hard, silty CLAY with slight trace sand and gravel.		488	
							58, 60	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.		486, 484	

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
13A	24/24 100%	ss	8-13 17-17 N=30	10.1		12.36 Sh
14A	18/18 100%	ss	7-11 14 N=25	10.1		10.47 Sh
15A	18/18 100%	ss	7-11 13 N=24	9.9		9.31 Sh
16A				11.4		11.06 Sh
16B	24/24 100%	ss	5-7 12-14 N=19	16.3		2.13 BSh
17A	18/18 100%	ss	4-6 11 N=17	11.2		6.79 Sh
18A	18/18 100%	ss	5-9 16 N=25	11.4		9.70 Sh
19A	24/24 100%	ss	4-8 14-19 N=22	10.4		10.47 Sh
20A	18/18 100%	ss	6-13 17 N=30	11.4		
21A	18/18 100%	ss	7-13 19 N=32	11.3		10.28 Sh
22A	24/24 100%	ss	7-12 19-22 N=31	10.3		11.44 Sh
23A	18/18 100%	ss	6-12 19 N=31	11.5		10.86 Sh
24A	18/18 100%	ss	7-11 19 N=30	12.7		5.24 Sh

Depth ft. BGS / Lithologic Description / Borehole Detail / Elevation ft. MSL / Remarks

Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.
[Continued from previous page]

Dark gray (10YR4/1), moist, firm, silty CLAY with slight trace sand and gravel.

Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.

Dark gray (10YR4/1), slightly moist, firm, clayey SILT with trace sand and slight trace gravel.

Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.

Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.

Depth scale (ft. BGS): 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale (ft. MSL): 522, 520, 518, 516, 514, 512, 510, 508, 506, 504

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/19/2015
Finish: 10/20/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA
FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: G48MG
Well ID: G48MG
Surface Elev: 543.17 ft. MSL
Completion: 77.06 ft. BGS
Station: 9,706.71N
5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*		482	
								Light olive gray (5Y5/2), very moist, very soft, sandy CLAY with slight trace gravel.			
							62				
								Light olive gray (5Y5/2) with 10% greenish gray (5GY5/1) mottles, slightly moist, firm, silty CLAY with trace sand and slight trace gravel.		480	
							64			478	
							66	Greenish gray (10Y5/1) with 10% olive gray (5Y4/2) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.		476	
							68			474	
								Greenish gray (10G5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, dense, SILT with slight trace sand.			
							70	Dark greenish gray (10GY4/1), slightly moist, very hard, clayey SILT with trace sand and slight trace gravel.		472	
							72	Dark greenish gray (10GY4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.		470	
							74	Dark greenish gray (10GY4/1), wet, very dense, silty, coarse-grained SAND and gravel.		468	
							76	Dark gray (10YR4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.			

End of boring = 77.06 feet

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	13/18 *72%*	SS	*woh-2* *3* N=5	25.8		
2A	17/18 *94%*	SS	*2-3* *4* N=7	22.0		3.88 Sh
3A	17/18 *94%*	SS	*2-4* *4* N=8	15.7		1.90 Sh
4A	24/24 *100%*	SS	*woh-1* *2-3* N=3	20.5		1.78 BSh
5A	18/18 *100%*	SS	*1-1* *2* N=3	22.7		1.40 Sh
6A	24/24 *100%*	SS	*1-2* *3-3* N=5	18.3		1.27 Sh
7-1	23/24 *96%*	SH				
7-2				19.9		
7-3				15.0		
7-4				19.5		
8A	18/18 *100%*	SS	*8-13* *17* N=30	10.2		8.92 Sh
9A	18/18 *100%*	SS	*6-12* *17* N=29	9.7		5.62 Sh
10A	24/24 *100%*	SS	*7-14* *20-20* N=34	9.0		7.18 Sh
11A	18/18 *100%*	SS	*6-14* *15* N=29	8.5		9.89 Sh
12A	18/18 *100%*	SS	*5-12* *14* N=26	10.2		11.25 Sh

Depth ft. BGS: 2, 4, 6, 8, 10 ▼, 12, 14, 16, 18, 20

Elevation ft. MSL: 542, 540, 538, 536, 534, 532, 530, 528, 526, 524

Lithologic Description (Borehole Detail, Remarks)

- Grayish brown (10YR5/2), moist, very soft, silty CLAY, trace roots.
- Grayish brown (10YR5/2) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY, slight trace roots.
- Brown (10YR5/3) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.
- Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.
- Gray (10YR5/1) with 40% dark yellowish brown (10YR4/6) mottles, very moist, soft, silty CLAY with trace sand and slight trace gravel.
- Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, soft, wet, sandy CLAY with slight trace gravel.
- Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.
- Dark gray (10YR4/1) with 30% brown (10YR4/3) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.
- Dark gray (10YR4/1) with 20% dark grayish brown (10YR4/2) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.
- Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) % Recovery	Type	TESTING: Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
25A	24/24 100%	SS	8-12 22-26 N=34	11.5		10.47 Sh
26A	18/18 100%	SS	7-12 18 N=30	11.7		7.76 Sh
27A	18/18 100%	SS	7-15 18 N=33	13.1		
27B				10.9		11.64 Sh
28A	24/24 100%	SS	8-10 16-21 N=26	13.7		
29A	18/18 100%	SS	7-10 16 N=26	14.5		5.82 Sh
30A	18/18 100%	SS	4-9 13 N=22	14.1		2.52 B
31-1						
31-2	19/24 79%	SH		14.0		
31-3						
31-4						
32A	18/18 100%	SS	7-13 19 N=32	12.9		10.28 Sh
32B				12.5		8.92 Sh
33A	18/18 100%	SS	5-10 16 N=26	14.9		2.13 BSh
33B				14.6		6.59 Sh
34A	24/24 100%	SS	6-10 16-19 N=26	15.5		3.88 Sh
35A	18/18 100%	SS	2-7 14 N=21	18.2		1.94 BSh
36A	18/18 100%	SS	3-7 14 N=21	13.8		5.04 BSh

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
40–44	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*	502, 500
44–44.5	Dark gray (10YR4/1), slightly moist, firm, SILT with slight trace sand.	
44.5–52	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.	498, 496, 494, 492
52–52.5	Olive gray (5Y4/2), slightly moist, firm, silty CLAY with slight trace sand and gravel.	
52.5–54.4	Dark greenish gray (10Y4/1) with 20% greenish gray (10Y6/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.	490
54.4–57	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, hard, silty CLAY with slight trace sand and gravel.	488, 486
57–60	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.	484

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

Remarks:

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE / TESTING

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type
37-1	19/24 79%	SH		16.5		1.75 BSh
37-2				12.7		3.50 None
37-3				15.0		
37-4						
38A	18/18 100%	SS	8-13 15 N=28	14.5		3.10 B
39A	18/18 100%	SS	6-9 15 N=24	12.8		5.04 BSh
40A	24/24 100%	SS	4-9 13-15 N=22	13.6		5.43 Sh
41A	18/18 100%	SS	12-13 14 N=27	13.2		4.07 BSh
42A	16/17 94%	SS	6-32 28/5"	15.2		
43A	3/3 100%	SS	60/3"	15.4		
44A	13/14 93%	SS	28-47 15/2"	16.7		
45A	16/17 94%	SS	31-33 27/5"	13.6		
46A	12/15 80%	SS	20-38 22/3"	15.3		
47A	18/18 100%	SS	3-11 17 N=28	13.9		5.62 B
48A	17/18 94%	SS	5-10 14 N=24	14.9		5.24 BSh

Depth ft. BGS / Lithologic Description / Borehole Detail / Elevation ft. MSL / Remarks

Depth scale: 62, 64, 66, 68, 70, 72, 74, 76, 78, 80
Elevation scale: 482, 480, 478, 476, 474, 472, 470, 468, 466, 464

Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.
[Continued from previous page]

Light olive gray (5Y5/2), very moist, very soft, sandy CLAY with slight trace gravel.

Light olive gray (5Y5/2) with 10% greenish gray (5GY5/1) mottles, slightly moist, firm, silty CLAY with trace sand and slight trace gravel.

Greenish gray (10Y5/1) with 10% olive gray (5Y4/2) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.

Greenish gray (10G5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, dense, SILT with slight trace sand.

Dark greenish gray (10GY4/1), slightly moist, very hard, clayey SILT with trace sand and slight trace gravel.

Dark greenish gray (10GY4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.

Dark greenish gray (10GY4/1), wet, very dense, silty, coarse-grained SAND and gravel.

Dark gray (10YR4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.

Dark gray (N4/1), moist, firm, silty CLAY with slight trace sand and gravel.

Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
49A	24/24 100%	SS	5-7 12-14 N=19	15.5		5.04 BSh
50A	18/18 100%	SS	4-8 10 N=18	15.4		5.24 BSh
51A	18/18 100%	SS	4-9 10 N=19	15.7		5.04 B
52-1 52-2 52-3	18/18 100%	SH		14.3		
53A	24/24 100%	SS	9-12 21-26 N=33	13.9		6.21 B
54A	18/18 100%	SS	6-11 17 N=28	13.8		6.79 Sh
55A	24/24 100%	SS	6-12 15-24 N=27	13.6		7.37 Sh
56A	18/18 100%	SS	5-8 12 N=20	13.9		3.88 Sh
57A	18/18 100%	SS	5-12 19 N=31	13.4		6.21 Sh
58A	24/24 100%	SS	4-18 20-22 N=38	12.5		
58B				13.4		5.82 BSh
59A	16/16 100%	SS	16-33 27/4"	16.0		
59B				15.7		3.69 Sh
60A	18/18 100%	SS	16-21 15 N=36	12.6		
60B						

Depth ft. BGS	Lithologic Description
82–87	Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*
88	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
90–94	Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.
96	Dark gray (N4/1), very moist, dense, silty, fine- to coarse-grained SAND with slight trace gravel.
	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
	Dark gray (N4/1), wet, dense, silty, fine- to medium-grained SAND with slight trace gravel.
98	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
	Dark gray (N4/1), wet, dense, silty, very fine- to medium-grained SAND with slight trace gravel.
100	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.

Elevation ft. MSL: 462, 460, 458, 456, 454, 452, 450, 448, 446, 444

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station	**CONTRACTOR:** Skinner Limited		
Site: Gypsum Management Facility	**Rig mfg/model:** CME-550 ATV Drill	**BOREHOLE ID:** B48	
Location: Newton, Jasper Co., IL	**Drilling Method:** 4¼" hollow stem auger w/split spoon sampler	**Well ID:** n/a	
Project: 07E0150A 3000		**Surface Elev:**	542.9 ft. MSL
DATES: Start: 5/12/2009	**FIELD STAFF: Driller:** T. Skinner	**Completion:**	103.5 ft. BGS
Finish: 5/14/2009	**Helper:** T. Skinner/J. Austin	**Station:**	9,703.88N
WEATHER: Sunny, warm, windy, (mid-60's)	**Eng/Geo:** S. Suzanna Simpson		5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
61A	24/24 100%	SS	7-12 18-25 N=30	13.4		6.59 Sh		Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.		442	
62A	17/18 94%	SS	12-18 22 N=40	15.3		3.88 BSh	102	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.		440	

EOB = 103.5 feet bgs

NOTE(S): Borehole abandoned using bentonite grout.

CIPS NEWTON POWER STATION	BORING G-106		SHEET 1 of 1
DATE STARTED 8/1/90	DATE COMPLETED 8/1/90	LOGGED BY RAB	SURFACE EL. 529.0
DRILLING CONTRACTOR: BROTCKE ENG.		DRILL METHOD: H.S. AUGER	

Depth (ft)	Graphic Log	N-Value	SOIL/ROCK DESCRIPTION	VAPOR CONCENTRATION (ppm) 10^0 10^1 10^2 10^3	COMMENTS	Depth (ft)
0		22	Brn. clayey SILT, tr. roots, blocky, dry.			0
		20 18	Brn. sandy silty CLAY, tr. pebbles, sl. moist, blocky.			
		33	Mottled gray & brn. silty sandy CLAY, tr. pebbles, moist.			
10		50 72	Brn. sandy CLAY, tr. pebbles, vert. med. sand filled fract., so. mn & iron oxid., moist.			10
		50	Brn. coarse SAND.			
20		80 43 59 45	Gray brn. sandy silty CLAY, tr. pebbles, coal frag., oxid. vert. fract., hard.			20
		9	Gray coarse – v. coarse SAND.		▽	
		63	Gray sandy silty CLAY, tr. pebbles, moist.			
30			Coarse – v. coarse SAND grading downward to gravel.			30
		39 33	Gray sandy silty CLAY, tr. pebbles, unweathered.			
			End of Boring = 36.0'			
40						40

SOIL/ROCK BORING DATA

HANSON ENGINEERS INCORPORATED

PAC	11-19-90
REVIEWED	DATE
RKC	11-19-90
APPROVED	DATE

CIPS
NEWTON POWER STATION
NEWTON, ILLINOIS

JOB NO. 89S5008A

RAPPS

BORING LOG

ENGINEERING and APPLIED SCIENCE

2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

Client: CIPS-NEWTON Project: WELL INSTALLATION Boring No: G202

Drilling Firm: PROFESSIONAL SERVICE IND. Drilling Method: 4-1/4 ID HSA Surface Elev. 537.24

Logged By: MSS Checked By: Date Started: 10-16-96 Completed: 10-16-96

Depth	Material Description (Classification System UNIFIED)	Tube No.	Type	% Rec.	OVM (ppm)	Qu t/sf PEN	Moist	Comments	Well
0–10.0	Fill Material: Drilled through built drilling pad (10.0)	1	5.0' CME continuous sampler	0		NA	NA		
		2		0		NA	NA		
10.0–12.5	Brown-gray silty SAND (SM) w/clay & trace pebbles (12.5)	3		30		NA	moist		
12.5–16.5	Brown-clayey SILT (ML) w/ sand & pebbles (16.5)					0.25	wet		
						NA			
16.5–18.0	Gray silty CLAY (ML-CL) w/pebbles (18.0)	4		30		NA			
						NA	moist	Very weathered	
18.0–20.8	Brown coarse SAND (SM) w/silt (20.8)					NA	moist		
						NA			
20.8–30	Gray silty CLAY (ML-CL) w/pebbles	5		60		4.5+			
						4.5+	dry		
						4.5+			
		6		100		4.5+	moist		
						4.5+			
						4.5+	moist		
						4.5+			

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 6649.68, E 6587.20

RAPPS

ENGINEERING and APPLIED SCIENCE

BORING LOG

2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

Client: CIPS–NEWTON Project: WELL INSTALLATION Boring No: G202
Drilling Firm: PROFESSIONAL SERVICE IND. Drilling Method: 4–1/4 ID HSA Surface Elev. 537.24
Logged By: MSS Checked By: ______ Date Started: 10–8–96 Completed: 10–8–96

Classification System UNIFIED

Depth	Material Description	Tube No.	Type	% Rec.	OVM (ppm)	Qu t/sf PEN	Moist	Comments	Well
30–31.3	Gray silty CLAY (ML–CL) w/pebbles 31.3	7	5.0' CME continuous sampler	100		4.5+, 4.5+	moist		
31.3–32.3	Brownish Gray CLAY (CH) w/silt 32.3					3.0	wet		
32.3–36.0	Gray silty CLAY (ML–CL) w/pebbles 36.0					4.5+, 4.5+	moist		
35–40		8		100		4.5+			
36.0–36.5	Gray silty SAND (SM) 36.5					NA	wet		
36.5–60	Gray silty CLAY (ML–CL) w/pebbles					4.5+, 4.5+, 4.5+	moist		
40–45		9		90		4.5+, 4.5+, 4.5+, 4.5+, 4.5+	moist, moist		
45–50		10		100		4.5+, 3.75, 4.5+, 4.5+, 4.5+	moist, moist		
50–55		11		100		4.5+, 4.5+, 4.5+, 4.5+, 4.5+	moist, moist		
55–60		12		100		4.5+, 4.5+, 4.5+, 4.5+, 4.5+	moist, moist		

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 6649.68, E 6587.20

Sheet 2 of 3

RAPPS

ENGINEERING and APPLIED SCIENCE

2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

BORING LOG

Client: CIPS-NEWTON Project: WELL INSTALLATION Boring No: G202

Drilling Firm: PROFESSIONAL SERVICE IND. Drilling Method: 4-1/4 ID HSA Surface Elev. 537.24

Logged By: MSS Checked By: ______ Date Started: 10-16-96 Completed: 10-16-96

DEPTH	Material Description (Classification System UNIFIED)	Sampling: Tube No.	Sampling: Type	Sampling: % Rec.	Tests: OVM (ppm)	Tests: Qu t/sf PEN	Tests: Moist	Comments	Well	DEPTH
60	Gray silty CLAY (ML-CL) w/pebbles — 61.4		5.0' CME continuous sampler			4.5+				60
	Gray GRAVEL (GM) w/silt — 62.0					4.5+	wet			
	Gray silty CLAY (ML-CL) w/pebbles	13		100		4.5+				
						4.5+	wet			
						4.5+				
65						4.5+				65
						4.5+	wet			
		14		100		4.5+				
						4.5+	wet			
	— 69.5					4.5+				
	Gray fine sandy SILT (SM)					NA		Blind drill: Augers plugged w/SILT-SAND		
70	End Of Boring @70.0'									70
75										75
80										80
85										85
90										90

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 6649.68, E 6587.20

RAPPS

ENGINEERING and APPLIED SCIENCE

2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

BORING LOG

Client: CIPS-NEWTON
Project: WELL INSTALLATION
Boring No: G203

Drilling Firm: PROFESSIONAL SERVICE IND.
Drilling Method: 4-1/4 ID HSA
Surface Elev. 530.97

Logged By: MSS
Checked By:
Date Started: 10-15-96
Completed: 10-15-96

Material Description — Classification System UNIFIED

Depth	Material Description	Tube No.	Type	% Rec.	OVM (ppm)	Qu t/sf PEN	Moist	Comments	Well
0–5	Tan, mottled reddish clayey SILT (MH) — 3.5 Gray, mottled brown silty CLAY (MH-CH) w/trace coarse sand & pebbles	1	5.0' CME continuous sampler	75		4.5+ 4.5+ 4.0 2.75	dry moist	Very soft	
5–10		2		100		1.75 1.0 0.75 1.75 2.5	moist moist		
10–15	— 11.5 Brown silty clay (CL-ML) w/coarse sand & pebbles	3		60		NA NA 2.5 2.75	dry dry		
15–20		4		70		NA NA NA NA	dry dry		
20–25	— 21.5 Brown SAND (SM) w/silt, poorly sorted — 23.0 Gray, mottled brown silty CLAY (CL) w/pebbles	5		70		4.0 4.0 NA 4.5+	dry dry		
25–30	— 28.0 Gray silty CLAY (CL-ML) w/pebbles	6		95		4.5+ 4.5+ 4.25 4.5 4.5+	moist dry		

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 5821.29, E 6113.10

Sheet 1 of 3

RAPPS

BORING LOG

ENGINEERING and APPLIED SCIENCE
2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

Client: CIPS-NEWTON   Project: WELL INSTALLATION   Boring No: G203

Drilling Firm: PROFESSIONAL SERVICE IND.   Drilling Method: 4-1/4 ID HSA   Surface Elev. 530.97

Logged By: MSS   Checked By: ____   Date Started: 10-15-96   Completed: 10-15-96

Material Description — Classification System UNIFIED

DEPTH	Material Description	Sampling: Tube No.	Type	% Rec.	Tests: OVM (ppm)	Qu t/sf PEN	Moist	Comments	Well
30–35	Gray silty CLAY (ML-CL) w/pebbles — 33.2; Gray fine grain SAND (SM) w/silt — 34.5	7	5.0' CME continuous sampler	100		4.5+, 4.5+, 4.5+, 4.5	dry, dry		
35–40	Brownish gray silty CLAY (CL) w/pebbles — 36.5	8		100		4.0, 4.5, 4.5+, 4.5	dry, dry		
40–45	Gray silty CLAY (ML-CL) w/pebbles	9		100		4.5+, 4.5+, 4.5+, 4.5+	dry, dry		
45–50		10		100		4.5+, 4.5+, 4.5+, 4.5+	dry, dry		
50–55		11		100		4.5+, 4.5+, 4.5+, 4.5+, 4.5+	moist, moist		
55–60	57.5; Gray fine SAND (SM) w/silt — 58.0; Gray silty CLAY (ML-CL) w/pebbles	12		100		4.5+, 4.5+, 4.5+, 4.5+, 4.5+	moist, moist		

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 5821.29, E 6113.10

RAPPS

ENGINEERING and APPLIED SCIENCE

BORING LOG

2387 WEST MONROE - SPRINGFIELD IL 62704 - (217)787-2118

Client: CIPS-NEWTON Project: WELL INSTALLATION Boring No: G203

Drilling Firm: PROFESSIONAL SERVICE IND. Drilling Method: 4-1/4 ID HSA Surface Elev. 530.97

Logged By: MSS Checked By: ______ Date Started: 10-15-96 Completed: 10-15-96

DEPTH	Material Description Classification System UNIFIED	Sampling Tube No.	Sampling Type	Sampling % Rec.	Tests OVM (ppm)	Tests Qu t/sf PEN	Tests Moist	Comments	Well	DEPTH
60	Gray silty CLAY (ML-CL) w/pebbles 65.6	13	5.0' CME continuous sampler	100		4.5+, 4.5+, 4.0, 4.5, 4.5+	moist, moist			60
65	Gray fine SAND (SM) w/silt 66.4	14		80		3.0, 4.0, NA	wet, wet			65
	Gray fine SAND-SILT (SM) w/trace gravel 70.0									
70	Blind Drill: Auger plugged & redrilled to 73.0'									70
	End Of Boring @73.0'									
75										75
80										80
85										85
90										90

Water Level NA of NA hrs.
Water Level NA of NA hrs.

N 5821.29, E 6113.10

Sheet 3 of 3

Illinois Environmental Protection Agency

Field Boring Log

Site ID No. 0798085001 Federal ID No. ____

Site Name: Newton Power Station Landfill Phase II

Quadrangle: Latona Sec. 27 T. 6N R. 8E

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 6208.18 E. (Y) 4417.18

Latitude: ____ ° ____ ' ____ " Longitude: ____ ° ____ ' ____ "

Boring Location: South side of Area 3

Drilling Equipment: CME 550

County: Jasper

Boring No. B208 Monitoring Well No. G208

Surface Elevation: 533.06 Completion Depth: 95'

Auger Depth: 95' Rotary Depth: NA

Date: Start: 10/11/11 Finish: 10/13/11

Personnel

G - Ken Miller
D - Todd Skinner
H - Justin Lance
H - Scott Walsh

Elev.	Description of Material	Depth In Feet	Sample No.	Sample Type	Sample Recovery (%)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
	Clayey fill								
	Brown mottled gray silty clay (ML-CL); Trace sand & gravel; Moist; Firm		1	5' CS	100 %				
528.06		5	2	5' CS	100 %				
523.06		10	3	5' CS	100 %				
	Gray silty clay (ML-CL); Trace sand & gravel; Dry; Very firm to hard								
518.06		15	4	5' CS	100 %				
513.06	Brown silty sand (SM) to sand (SW); Some gravel; Moist	20	5	5' CS	100 %				
	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Moist; Very firm to hard								
508.06		25	6	5' CS	100 %				
503.06		30	7	5' CS	60 %				
498.06		35	8	5' CS	80 %				Fe staining
493.06		40	9	2' SS	100 %				Drove split spoon to remove obstruction
	Gray fine sand (SP); Wet		10	5' CS	30 %				
488.06		45	11	5' CS	100 %				

Illinois Environmental Protection Agency

Field Boring Log

Site ID No. 0798085001 Federal ID No. ______

Site Name: Newton Power Station Landfill Phase II

Quadrangle: Latona Sec. 27 T. 6N R. 8E

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 6208.18 E. (Y) 4417.18

Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Boring Location: South side of Area 3

Drilling Equipment: CME 550

County: Jasper

Boring No. B208 Monitoring Well No. G208

Surface Elevation: 533.06 Completion Depth: 95'

Auger Depth: 95' Rotary Depth: NA

Date: Start: 10/11/11 Finish: 10/13/11

Personnel

G - Ken Miller
D - Todd Skinner
H - Justin Lance
H - Scott Walsh

Elev.	Description of Material	Graphic Log	Depth In Feet	Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Moist; Very firm to hard			12	5' CS	100 %				
478.06			55	13	5' CS	100 %				
473.06			60	14	5' CS	60 %				
468.06			65	15	5' CS	100 %				
463.06	*Softer		70	16	2' SS	100 %				Drove split spoon to remove obstruction
				17	5' CS	100 %				
458.06			75	18	5' CS	100 %				
453.06			80	19	5' CS	100 %				
448.06	Large wood pieces & plant debris		85	20	5' CS	100 %				
443.06			90	21	5' CS	100 %				
438.06	EOB @ 95' BGS		95							

RAPPS

BORING LOG

ENGINEERING&APPLIED SCIENCE
821 S. DURKIN DRIVE-SPRINGFIELD IL 62704 - (217) 787-2118

Client: CIPS **Project:** Newton LF Monitoring Wells **Boring No:** G217

Drilling Firm: PSI **Drilling Method:** 4¼ HSA **Surface Elev:** 535.67

Logged By: MSS **Checked By:** - - - **Date Started:** 8/26/97 **Completed:** 8/26/97

DEPTH	Material Description Classification System (Unified)	Sampling Tube No.	Sampling Type	Sampling % Rec.	Tests Pocket Pen Qu tsf	Tests % Moist	Comments	DEPTH
			5		4.0			
	Brown silty CLAY (CL): Fill Material		-		2.0			
	3.0	1	F	100		dry		
			o		3.0			
-5-			o		2.5			-5-
	Gray-Brown silty CLAY (CL) w/coarse sand		t		2.0			
	8.2	2	C	100	2.0	mst	Gray, medium SAND (SM) w/silt from 8.2 to 8.6	
	see comments 8.6		o					
-10-			n		1.75			-10-
			t		2.5			
	Gray, mottled brown CLAY (CH-CL) w/silt		i		3.0			
		3	n	100	4.5+	mst		
	14.0		o		4.5+			
-15-	Brown silty CLAY (CL) w/pebbles 15.0		u		4.0			-15-
			s		4.5+			
					4.5+			
		4	S	100	4.5+	dry	very weathered	
			a		4.5+			
-20-	Gray, mottled Brown silty CLAY (CL) w/ pebbles		m		4.5+			-20-
			p		4.5+			
			l		4.5+			
		5	e	100	4.5+	dry		
			r		4.5+			
-25-					4.5+		End Boring at 25.0	-25-

Water Level NA at NA Hrs.
Water Level NA at NA Hrs.

Illinois Environmental Protection Agency

Field Boring Log

Site ID No. 0798085001 Federal ID No. ______

Site Name: Newton Power Station Landfill Phase II

Quadrangle: Latona Sec. 27 T. 6N R. 8E

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 5322.24 E. (Y) 3989.08

Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Boring Location: South side of Area 3

Drilling Equipment: CME 550

County: Jasper

Boring No. B222 Monitoring Well No. G222

Surface Elevation: 532.12 Completion Depth: 80'

Auger Depth: 80' Rotary Depth: NA

Date: Start: 10/24/11 Finish: 10/25/11

Personnel

G - Ken Miller
D - Todd Skinner
H - Justin Lance
H - Tim Skinner

Elev.	Description of Material	Graphic Log	Depth In Feet	Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
527.12			5							
522.12			10							
517.12			15							
512.12			20							
507.12	Blind drill to 50'		25							
502.12			30							
497.12			35							
492.12			40							
487.12			45							

Illinois Environmental Protection Agency

Field Boring Log

Site ID No. 0798085001 Federal ID No. ______

Site Name: Newton Power Station Landfill Phase II

Quadrangle: Latona Sec. 27 T. 6N R. 8E

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 5322.24 E. (Y) 3989.08

Latitude: ° ' " Longitude: ° ' "

Boring Location: South side of Area 3

Drilling Equipment: CME 550

County: Jasper

Boring No. B222 Monitoring Well No. G222

Surface Elevation: 532.12 Completion Depth: 80'

Auger Depth: 80' Rotary Depth: NA

Date: Start: 10/24/11 Finish: 10/25/11

Personnel

G - Ken Miller
D - Todd Skinner
H - Justin Lance
H - Tim Skinner

Elev.	Description of Material	Graphic Log	Depth In Feet	Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
	Dk. gray to black silt (ML); Thinly laminated; Fissile; Hard									
	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Moist; Firm to hard			1	5' CS	100 %				
477.12			55	2	5' CS	100 %				
472.12			60	3	5' CS	100 %				
467.12	Coarse sand (SP) w/ gravel; Wet		65	4	5' CS	30 %				Poor recovery
462.12	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Moist; Firm to hard		70	5	2' SS	100 %				Drove split spoon to remove obstruction
				6	5' CS	100 %				
457.12			75	7	5' CS	100 %				
452.12	EOB @ 80' BGS		80							

Illinois Environmental Protection Agency

Field Boring Log

County: Jasper

Site ID No. 0798085001 Federal ID No. ____

Boring No. B224 Monitoring Well No. G224

Site Name: Newton Power Station Landfill Phase II

Surface Elevation: 532.26 Completion Depth: 74'

Quadrangle: Latona Sec. 26 T. 6N R. 8E

Auger Depth: 74' Rotary Depth: NA

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 6976.66 E. (Y) 6067.30

Date: Start: 10/04/11 Finish: 10/04/11

Latitude: ° ' " Longitude: ° ' "

Boring Location: South side of Area 3

Drilling Equipment: Diedrich D-50

Personnel:
G - Ken Miller
D - Tim Fuhl
H - Eric Sievers
H - Clifford Ohman

Elev.	Description of Material	Graphic Log	Depth In Feet	Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
	Brown silty clay (ML-CL); Moist; Firm			1	5' CS	10 %				
527.26	Reddish brown mottled gray silty clay (ML-CL); Trace sand & gravel; Moist; Firm		5	2	5' CS	90 %				
522.26	*Softer, less mottling		10	3	5' CS	10 %				
517.26	Dark gray silty clay (ML-CL) w/ sand; Moist to wet; Soft		15	4	5' CS	60 %				Plant debris
	Medium to coarse sand (SP); Wet									
512.26	Brown mottled gray silty clay (ML-CL) w/ sand & gravel; Dry; Hard		20	5	5' CS	100 %				
507.26	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Dry to moist; Hard		25	6	5' CS	60 %				
502.26			30	7	5' CS	0 %				
497.26			35	8	5' CS	0 %				Hard drilling
492.26	No recovery		40	9	5' CS	0 %				
487.26			45	10	2' SS	0 %				Drove split spoons to remove possible obstruction
				11	2' SS	0 %				
				12	2' SS	100 %				

Illinois Environmental Protection Agency

Field Boring Log

Site ID No. 0798085001 Federal ID No. ____

Site Name: Newton Power Station Landfill Phase II

Quadrangle: Latona Sec. 26 T. 6N R. 8E

~~UTM (or State~~ Plant ~~Plane)~~ Coord. N. (X) 6976.66 E. (Y) 6067.30

Latitude: ° ' " Longitude: ° ' "

Boring Location: South side of Area 3

Drilling Equipment: CME 550

County: Jasper

Boring No. B224 Monitoring Well No. G224

Surface Elevation: 532.26 Completion Depth: 74'

Auger Depth: 74' Rotary Depth: NA

Date: Start: 10/04/11 Finish: 10/04/11

Personnel:
G - Ken Miller
D - Tim Fuhl
H - Eric Sievers
H - Clifford Ohman

Elev.	Description of Material	Graphic Log	Depth In Feet	Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	REMARKS
	Med. gray silty clay (ML-CL) w/ gravel; Trace sand; Moist; Very firm to hard			13	5' CS	100 %				
477.26			55	14	5' CS	100 %				
472.26			60	15	5' CS	100 %				
467.26	Gray silt (ML), silty sand (SM) and sand (SP); Wet *w/ gravel		65	16	5' CS	60 %				Large wood pieces
462.26	No recovery		70	17	5' CS	0 %				Trace sand & gravel in tube; Harder drilling @ 72.5'
457.26	EOB @ 74' BGS		75							

TEST BORING REPORT

HALEY ALDRICH

Boring No. HAB-N-1

Project: Ash Pond, Newton, Illinois
Client: Dynegy
Contractor: CEC & Strata

File No. 129673-005
Sheet No. 1 of 1
Start: 25 April 2017
Finish: 26 April 2017
Driller: J. Cooley
H&A Rep.: J. Gerger
Elevation: 535.0
Datum:
Location: See Plan

	Casing	Sampler	Barrel
Type		SS	--
Inside Diameter (in.)		1.375	--
Hammer Weight (lb)		140	-
Hammer Fall (in.)		30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-25
Bit Type: Cutting Head
Drill Mud:
Casing:
Hoist/Hammer: /
PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
40						Water from 0 to 41.5 ft (El. 535)
	WOR WOR WOR WOR	SS1 6	41.5 43.5	493.5 41.5		Very loose gray SILT/FLYASH -FILL-
	WOR WOR WOR WOR	SS2 10	43.5 45.5			
45	WOR WOR 2 2	SS3 24	45.5 47.5	490.0 45.0	CL	Very soft black CLAY (CL)
				488.5 46.5	CL	Very soft gray CLAY (CL), with trace roots (very fine small roots)
	2 1 2 3	SS4 24	47.5 49.5	486.7 48.3	CL	Very soft gray and brown mottled silty CLAY (CL), trace sand, moist
50	WOH WOH 1 3	SS5 22	49.5 51.5			
	1 3 3 2	SS6 20	51.5 53.5			Similar to above, except not as soft, trace fine gravel
	2 5 5 8	SS7 21	53.5 55.5			
55				480.0 55.0	SP-SC	Medium dense brown coarse SAND (SP-SC), moist
	2 1 1 1	SS8 21	55.5 57.5			Similar to above, except gray
				477.5 57.5		BOTTOM OF EXPLORATION 57.5 FT
60						

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 16.0
Rock Cored (ft) 0.0
Samples 8SS

Boring No. HAB-N-1

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. HAB-N-2

Project	Ash Pond, Newton, Illinois
Client	Dynegy
Contractor	CEC & Strata
File No.	129673-005
Sheet No.	1 of 1
Start	27 April 2017
Finish	27 April 2017
Driller	J. Cooley
H&A Rep.	J. Gerger
Elevation	535.2
Datum	
Location	See Plan

	Casing	Sampler	Barrel
Type		SS	--
Inside Diameter (in.)		1.375	--
Hammer Weight (lb)		140	-
Hammer Fall (in.)		30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-25
Bit Type: Roller Bit
Drill Mud:
Casing:
Hoist/Hammer: /
PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
40						Water from 0 to 41.0 ft (El. 535.2) [2.2 ft on Dynegy water level gauge]
	WOR WOR WOR WOR	SS1 4	41.0 43.0	494.2 41.0		Dark gray SILT/ASH, wet -FILL-
	WOR WOR WOR WOR	SS2 4	43.0 45.0			
45	WOR WOR WOR WOR	SS3 12	45.0 47.0			
				488.9 46.3	CL	Very soft black CLAY (CL)
				488.5 46.7	CL	Similar to above, except gray/light gray
	WOR WOR WOR WOR	SS4 15	47.0 49.0	488.2 47.0	CL	Very soft dark gray CLAY (CL), trace sand, moist, organics present
	WOR WOR 1 1	SS5 12	49.0 51.0			
50				485.2 50.0	CL	Dark brown sandy CLAY (CL), trace organics
	WOH 2 3 2	SS6 16	51.0 53.0	484.2 51.0	SP-SC	Brown medium clayey SAND (SP-SC)
				483.2 52.0	SC	Brown clayey SAND (SC)
				482.2 53.0		BOTTOM OF EXPLORATION 53.0 FT
55						
60						

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 12.0
Rock Cored (ft) 0.0
Samples 6SS

Boring No. HAB-N-2

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

HALEY ALDRICH

Boring No. HAB-N-4

Project	Ash Pond, Newton, Illinois
Client	Dynegy
Contractor	CEC & Strata

File No.	129673-005
Sheet No.	1 of 1
Start	27 April 2017
Finish	27 April 2017
Driller	J. Cooley
H&A Rep.	J. Gerger
Elevation	535.2
Datum	
Location	See Plan

	Casing	Sampler	Barrel
Type		SS	--
Inside Diameter (in.)		1.375	--
Hammer Weight (lb)		140	-
Hammer Fall (in.)		30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-25
Bit Type:
Drill Mud:
Casing:
Hoist/Hammer: /
PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
40						Water from 0 to 40.5 ft (El. 535.2) [2.2 ft on Dynegy water level gauge]
	WOR WOR WOR WOR	SS1 4	40.5 42.5	494.7 40.5		Dark gray ASH -FILL-
	WOR WOR WOR WOR	SS2 8	42.5 44.5			Similar to above
45	WOR WOR WOR WOR	SS3 19	44.5 46.5			Similar to above, except darker black in color
	WOR WOR WOR WOR	SS4 4	46.5 48.5	488.7 46.5	CL	Soft black CLAY (CL)
				488.2 47.0	ML	Gray clayey SILT (ML)
	WOR WOR WOR WOR	SS5 24	48.5 50.5	486.7 48.5	SM	Gray silty SAND (SM), trace organics and very fine gravel
50				485.7 49.5	CL	Medium dense grayish-brown mottled sandy CLAY (CL), moist
	2 2 3 3	SS6 10	50.5 52.5			
	2 3 2 3	SS7 24	52.5 54.5	482.0 53.3	SP	Gray-brown SAND (SP)
				481.7 53.5	CL	Dense grayish-brown silty CLAY (CL), trace organics
55				480.7 54.5		BOTTOM OF EXPLORATION 54.5 FT

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	14.0
Rock Cored (ft)	0.0
Samples	7SS

Boring No. HAB-N-4

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. HAB-N-5

Project	Ash Pond, Newton, Illinois
Client	Dynegy
Contractor	CEC & Strata

File No.	129673-005
Sheet No.	1 of 1
Start	27 April 2017
Finish	27 April 2017
Driller	J. Cooley
H&A Rep.	J. Gerger
Elevation	535.2
Datum	
Location	See Plan

	Casing	Sampler	Barrel
Type		SS	--
Inside Diameter (in.)		1.375	--
Hammer Weight (lb)		140	-
Hammer Fall (in.)		30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-25
Bit Type: Roller Bit
Drill Mud:
Casing:
Hoist/Hammer: /
PID Make & Model: N/A

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
						Water from 0 to 34.5 ft (El. 535.2) [2.2 ft on Dynegy water level gauge]
35	WOR WOR WOR WOR	SS1 11	34.5 36.5	500.7 34.5		Gray SILT/ASH -FILL-
	WOR WOR WOR 1	SS2 22	36.5 38.5	497.7 37.5	CL	Black CLAY (CL)
				497.2 38.0	CL	Medium stiff grayish-brown sandy CLAY (CL), trace gravel, moist
	2 4 3 2	SS3 13	38.5 40.5	496.2 39.0	CL	Stiff gray sandy CLAY (CL), trace gravel, moist
40				495.2 40.0	CL	Hard brown sandy CLAY (CL), trace gravel, moist
	1 3 3 4	SS4 16	40.5 42.5			
	2 2 4 6	SS5 21	42.5 44.5	492.2 43.0	SP	Well graded coarse brown SAND (SP)
				491.7 43.5	CL	Stiff brown sandy CLAY (CL), trace gravel, moist
				490.7 44.5		BOTTOM OF EXPLORATION 44.5 FT
45						
50						

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	10.0
Rock Cored (ft)	0.0
Samples	5SS

Boring No. HAB-N-5

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Newton Power Station
Location: 6725 N 500th St, Newton, IL 62448
Project: 16E0044A
DATES: Start: 9/25/2017
Finish: 9/26/2017
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Bulldog Drilling
Rig mfg/model: CME-750 ATV Drill
Drilling Method: Mud Rotary w/split spoon
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: R. Hasenyager

BOREHOLE ID: R217D
Well ID: R217D
Surface Elev: 535.91 ft. MSL
Completion: 65.24 ft. BGS
Station: 7,126.90N
6,712.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1	0/60 *0%*	BD					0–3	FILL - Brown, silty CLAY.		
							3–8.2	Gray-brown, silty CLAY with coarse sand.		
2	0/60 *0%*	BD					8.2–8.6	Gray, medium SAND with silt.		
3	0/60 *0%*	BD					8.6–14	Gray, mottled brown, CLAY with silt.		
							14–15	Brown, silty CLAY with pebbles.		
4	0/60 *0%*	BD					15–20	Gray, mottles brown, silty CLAY with pebbles.		6"Ø permanent, PVC casing set to 20'

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 534, 532, 530, 528, 526, 524, 522, 520, 518, 516

NOTE(S): R217D drilled 15.5 feet west of G217D.
Borehole reamed to 6" diameter to set well.
Lithology description to 25 ft. taken from G217 boring log as prepared by Rapps Engineering & Applied Science (1997).

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Newton Power Station
Location: 6725 N 500th St, Newton, IL 62448
Project: 16E0044A
DATES: Start: 9/25/2017
Finish: 9/26/2017
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Bulldog Drilling
Rig mfg/model: CME-750 ATV Drill
Drilling Method: Mud Rotary w/split spoon

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: R. Hasenyager

BOREHOLE ID: R217D
Well ID: R217D
Surface Elev: 535.91 ft. MSL
Completion: 65.24 ft. BGS
Station: 7,126.90N
6,712.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
5	0/60 *0%*	BD					22, 24	Gray, mottles brown, silty CLAY with pebbles. *[Continued from previous page]*		514, 512	
6A	24/24 *100%*	SS	*12-19 27-34* N=46	11.2			26	Gray (10YR5/1), moist, hard, SILT with some clay, few very fine- to very coarse-grained sand, and trace small gravel.		510	
7A	22/24 *92%*	SS	*10-24 31-35* N=55	9.8			28			508	
8A	24/24 *100%*	SS	*9-16 24-25* N=40	11.2			30			506	
9A	24/24 *100%*	SS	*11-16 28-28* N=44	11.0			32			504	
10A	24/24 *100%*	SS	*11-16 24-32* N=40	11.5			34	Gray (10YR5/1), moist, hard, SILT with some clay, few very fine- to very coarse-grained sand, and trace small to medium gravel.		502	
11A	24/24 *100%*	SS	*11-17 26-34* N=43	15.0			36			500	
12A	24/24 *100%*	SS	*10-17 27-34* N=44	11.8			38			498	
	24/24		*9-23*				40	Gray (10YR5/1), moist, hard, CLAY, with some silt, few very fine- to very coarse-grained sand, and trace small to medium gravel.		496	

NOTE(S): R217D drilled 15.5 feet west of G217D.
Borehole reamed to 6" diameter to set well.
Lithology description to 25 ft. taken from G217 boring log as prepared by Rapps Engineering & Applied Science (1997).

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Newton Power Station
Location: 6725 N 500th St, Newton, IL 62448
Project: 16E0044A
DATES: Start: 9/25/2017
Finish: 9/26/2017
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Bulldog Drilling
Rig mfg/model: CME-750 ATV Drill
Drilling Method: Mud Rotary w/split spoon

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: R. Hasenyager

BOREHOLE ID: R217D
Well ID: R217D
Surface Elev: 535.91 ft. MSL
Completion: 65.24 ft. BGS
Station: 7,126.90N
6,712.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
13A	*100%*	SS	*33-35* N=56	10.9		
14A	24/24 *100%*	SS	*8-18 22-29* N=40	13.1		
15A	24/24 *100%*	SS	*9-15 17-22* N=32	14.1		
16A	24/24 *100%*	SS	*6-15 20-30* N=35	13.2		
17A	24/24 *100%*	SS	*8-14 20-25* N=34	14.8		
18A	24/24 *100%*	SS	*5-12 17-20* N=29	14.9		
19A	6/24 *25%*	SS	*9-14 19-24* N=33	23.3		
20A	24/24 *100%*	SS	*5-11 15-20* N=26	16.6		
21A	24/24 *100%*	SS	*6-10 14-20* N=24	19.7		
22A	24/24 *100%*	SS	*7-10 12-14* N=22	19.3		
23A	24/24		*5-8*	22.1		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
42 – 44 – 46 – 48	Gray (10YR5/1), moist, hard, CLAY, with some silt, few very fine- to very coarse-grained sand, and trace small to medium gravel. *[Continued from previous page]*	494 – 492 – 490 – 488
50 – 52	Gray (10YR5/1), moist, hard, CLAY, with some silt, few very fine- to very coarse-grained sand, and trace small to medium gravel, trace wood fragments.	486 – 484
54 – 56 – 58 – 60	Olive gray (5Y4/2) with 10% gray (10YR5/1) mottles, moist, hard, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small to medium gravel.	482 – 480 – 478 – 476

Borehole Detail | Remarks

NOTE(S): R217D drilled 15.5 feet west of G217D.
Borehole reamed to 6" diameter to set well.
Lithology description to 25 ft. taken from G217 boring log as prepared by Rapps Engineering & Applied Science (1997).

FIELD BORING LOG

CLIENT: Illinois Power Generating Co.
Site: Newton Power Station
Location: 6725 N 500th St, Newton, IL 62448
Project: 16E0044A
DATES: Start: 9/25/2017
Finish: 9/26/2017
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Bulldog Drilling
Rig mfg/model: CME-750 ATV Drill
Drilling Method: Mud Rotary w/split spoon

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: R. Hasenyager

HANSON

BOREHOLE ID: R217D
Well ID: R217D
Surface Elev: 535.91 ft. MSL
Completion: 65.24 ft. BGS
Station: 7,126.90N
6,712.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 26, **Tier** 6N; **Range** 8E

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
23B	*100%*	SS	*16-20* N=24	18.8				Gray (10YR5/1), wet, dense, very fine- to very coarse-grained SAND, with little silt and trace small gravel.			
24A				19.5							
24B	24/24 *100%*	SS	*8-9* *22-27* N=31	14.6			62	Yellowish brown (10YR5/6), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small gravel.		474	
25A	24/24 *100%*	SS	*13-19* *27-35* N=46	13.2			64	Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small gravel.		472	
	0/3 *0%*	BD									

End of Boring = 65.24 feet

NOTE(S): R217D drilled 15.5 feet west of G217D.
Borehole reamed to 6" diameter to set well.
Lithology description to 25 ft. taken from G217 boring log as prepared by Rapps Engineering & Applied Science (1997).

RAPPS

ENGINEERING&APPLIED SCIENCE

BORING LOG

821 S. DURKIN DRIVE-SPRINGFIELD IL 62704 - (217) 787-2118

Client: CIPS **Project:** Newton LF Monitoring Wells **Boring No:** G217

Drilling Firm: PSI **Drilling Method:** 4¼ HSA **Surface Elev:** 535.67

Logged By: MSS **Checked By:** - - - **Date Started:** 8/26/97 **Completed:** 8/26/97

DEPTH	Material Description Classification System (Unified)	Sampling Tube No.	Sampling Type	Sampling % Rec.	Tests Pocket Pen Qu tsf	Tests % Moist	Comments	DEPTH
			5		4.0			
	Brown silty CLAY (CL): Fill Material		-		2.0			
	3.0	1	F	100		dry		
			o		3.0			
-5-			o		2.5			-5-
	Gray-Brown silty CLAY (CL) w/coarse sand		t		2.0			
	8.2	2	C	100	2.0	mst	Gray, medium SAND (SM) w/silt from 8.2 to 8.6	
	see comments 8.6		o					
-10-			n		1.75			-10-
			t		2.5			
	Gray, mottled brown CLAY (CH-CL) w/silt		i		3.0			
		3	n	100	4.5+	mst		
	14.0		o		4.5+			
-15-	Brown silty CLAY (CL) w/pebbles 15.0		u		4.0			-15-
			s		4.5+			
					4.5+			
		4	S	100	4.5+	dry	very weathered	
			a		4.5+			
-20-			m		4.5+			-20-
	Gray, mottled Brown silty CLAY (CL) w/ pebbles		p		4.5+			
			l		4.5+			
		5	e	100	4.5+	dry		
			r		4.5+			
-25-					4.5+		End Boring at 25.0	-25-

Water Level NA at NA Hrs.
Water Level NA at NA Hrs.

Sheet 1 of 1

WELL CONSTRUCTION LOGS

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station

Facility License, Permit or Monitoring No.:

Facility ID:

Type of Well: Well Code 72/dp

Distance from Waste/Source: ft.

State: IL

Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.

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

Lat. 38° 55' 58.1" Long. -88° 16' 31.6" or

St. Plane 825,195 ft. N, 1,000,718 ft. E. Ⓔ/W

Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W

Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known

Gov. Lot Number:

Well Name: APW11

Date Well Installed: 01/23/2021

Well Installed By: (Person's Name and Firm) Dave Gordon, Cascade Drilling

A. Protective pipe, top elevation 539.11 ft. (NAVD88)

B. Well casing, top elevation 538.63 ft. (NAVD88)

C. Land surface elevation 536.0 ft. (NAVD88)

D. Surface seal, bottom 534.0 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required): Potable Plant Water

E. Bentonite seal, top 481.0 ft. (NAVD88) or 55.0 ft.

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

G. Filter pack, top 478.0 ft. (NAVD88) or 58.0 ft.

H. Screen joint, top 476.0 ft. (NAVD88) or 60.0 ft.

I. Well bottom 471.0 ft. (NAVD88) or 65.0 ft.

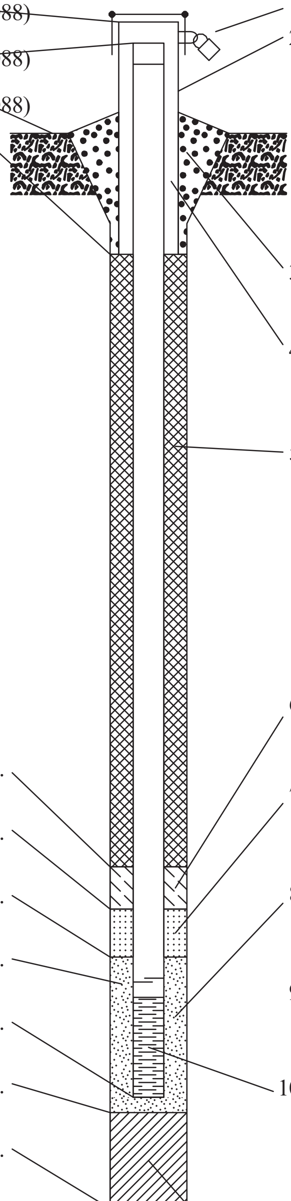
J. Filter pack, bottom 469.0 ft. (NAVD88) or 67.0 ft.

K. Borehole, bottom 436.0 ft. (NAVD88) or 100.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 5.0 ft.
c. Material: Steel ☒ Other ☐
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Bollards

3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐

4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒

5. Annular space seal: a. Granular/Chipped Bentonite ☐
b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
c. 9.6 Lbs/gal mud weight . . . Bentonite slurry ☒
d. ____ % Bentonite . . . Bentonite-cement grout ☐
e. 9.250 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐

6. Bentonite seal: a. Bentonite granules ☐
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
c. ____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
a. Not Applicable
b. Volume added 0 ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Filter Sil, Industrial Quartz
b. Volume added 1.614 ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐

10. Screen material: Schedule 40 PVC
a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
b. Manufacturer Johnson Screens
c. Slot size: 0.010 in.
d. Slotted length: 5.0 ft.

11. Backfill material (below filter pack): None ☐ Benoite Slurry Grout Other ☒

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

Date Modified: 5/3/2021

Signature: [signature]

Firm: Ramboll, 234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Newton Power Station	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	APW12
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 47.1" Long. -88° 16' 19.4" or St. Plane 824,081 ft. N, 1,001,683 ft. E. (E)/W	Date Well Installed: 01/21/2021
Facility ID	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Russ Gordon Cascade Drilling
Type of Well: Well Code 72/dp	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number
Distance from Waste/ Source ____ ft. / State: IL		

A. Protective pipe, top elevation 546.68 ft. (NAVD88)

B. Well casing, top elevation 546.29 ft. (NAVD88)

C. Land surface elevation 543.3 ft. (NAVD88)

D. Surface seal, bottom 541.3 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 541.3 ft. (NAVD88) or 2.0 ft.

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

G. Filter pack, top 525.3 ft. (NAVD88) or 18.0 ft.

H. Screen joint, top 523.3 ft. (NAVD88) or 20.0 ft.

I. Well bottom 513.3 ft. (NAVD88) or 30.0 ft.

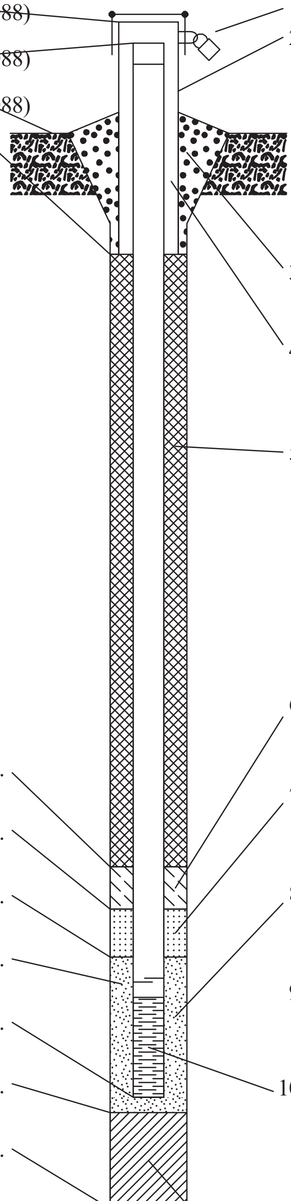
J. Filter pack, bottom 511.3 ft. (NAVD88) or 32.0 ft.

K. Borehole, bottom 456.3 ft. (NAVD88) or 87.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe:
   Bentonite ☐
   Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.000 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 2.487 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐
    Benoite Slurry Grout Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

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

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 32.4" Long. -88° 16' 27.9" or	APW13
Facility ID	St. Plane 822,591 ft. N, 1,001,013 ft. E. (E)/W	Date Well Installed: 01/23/2021
Type of Well: Well Code 72/dp	Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Russ Gordon, Cascade Drilling
Distance from Waste/Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 538.33 ft. (NAVD88)

B. Well casing, top elevation 537.99 ft. (NAVD88)

C. Land surface elevation 535.2 ft. (NAVD88)

D. Surface seal, bottom 533.2 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 481.2 ft. (NAVD88) or 54.0 ft.

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

G. Filter pack, top 479.2 ft. (NAVD88) or 56.0 ft.

H. Screen joint, top 476.7 ft. (NAVD88) or 58.5 ft.

I. Well bottom 471.7 ft. (NAVD88) or 63.5 ft.

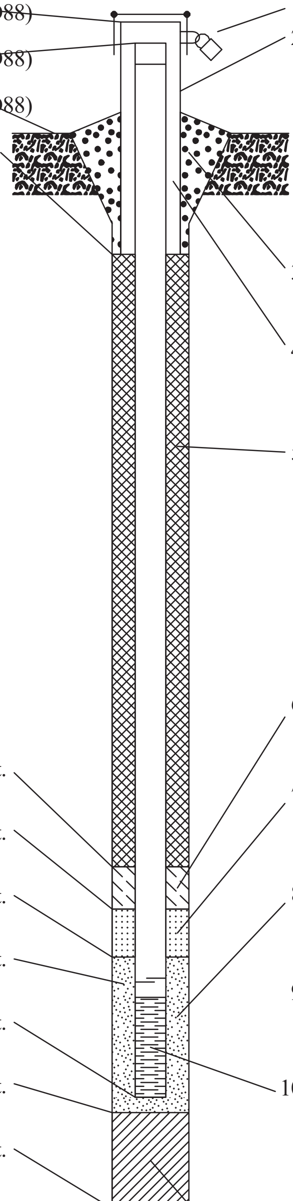
J. Filter pack, bottom 470.2 ft. (NAVD88) or 65.0 ft.

K. Borehole, bottom 445.2 ft. (NAVD88) or 90.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.6 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 9.076 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.604 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐ Formation Materials Other ☒

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

Date Modified: 5/3/2021

Signature: [signature]

Firm: Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Newton Power Station	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	APW14
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 26.6" Long. -88° 16' 40.8" or	
Facility ID	St. Plane 822,006 ft. N, 999,996 ft. E. Ⓔ/W	Date Well Installed 01/23/2021
Type of Well: Well Code 72/dp	Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen, Cascade Drilling
Distance from Waste/Source ft. / State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 526.63 ft. (NAVD88)

B. Well casing, top elevation 526.29 ft. (NAVD88)

C. Land surface elevation 523.9 ft. (NAVD88)

D. Surface seal, bottom 521.9 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required): Potable Plant Water

E. Bentonite seal, top 478.9 ft. (NAVD88) or 45.0 ft.

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

G. Filter pack, top 475.9 ft. (NAVD88) or 48.0 ft.

H. Screen joint, top 473.9 ft. (NAVD88) or 50.0 ft.

I. Well bottom 468.9 ft. (NAVD88) or 55.0 ft.

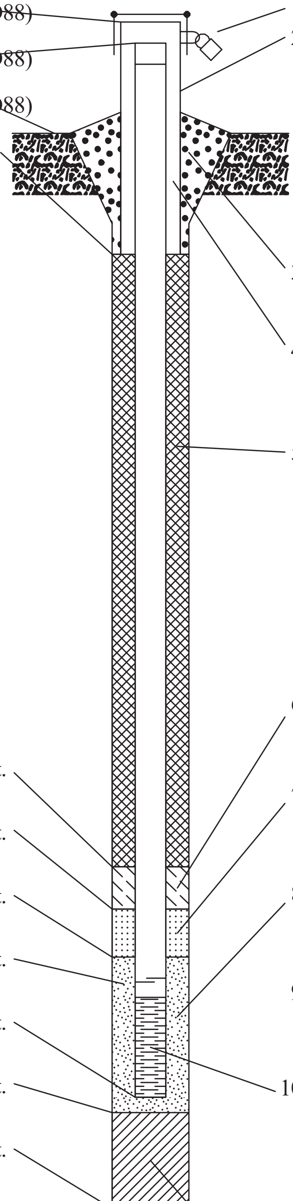
J. Filter pack, bottom 466.9 ft. (NAVD88) or 57.0 ft.

K. Borehole, bottom 428.9 ft. (NAVD88) or 95.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.1 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 7.505 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐ Benoite Slurry Grout Other ☒

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

Date Modified: 5/3/2021

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204

Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

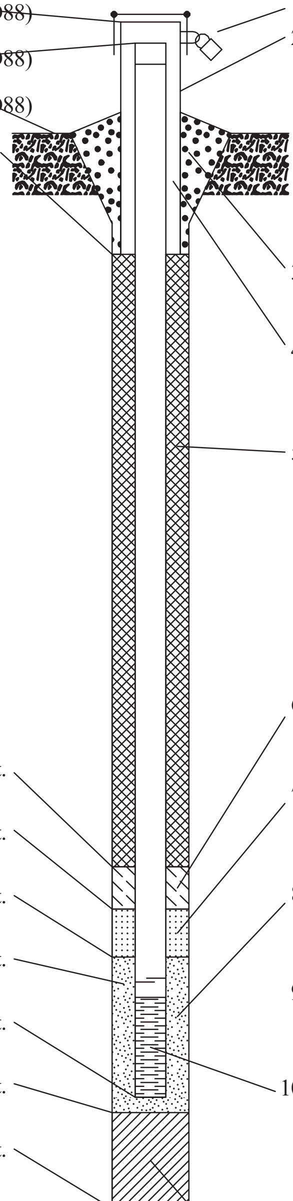
Facility/Project Name Newton Power Station	Local Grid Location of Well ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 17.7" Long. -88° 17' 6.8" or	APW15
Facility ID	St. Plane 821,108 ft. N, 997,939 ft. E. (E)/W Section Location of Waste/Source	Date Well Installed 01/22/2021
Type of Well Well Code 72/dp	____1/4 of ____ 1/4 of Sec. 26, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen
Distance from Waste/ Source ft. | State IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Gov. Lot Number	Cascade Drilling

A. Protective pipe, top elevation 525.07 ft. (NAVD88)

B. Well casing, top elevation 524.69 ft. (NAVD88)

C. Land surface elevation 522.1 ft. (NAVD88)

D. Surface seal, bottom 520.1 ft. (NAVD88) or 2.0 ft.



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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ________

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 429.1 ft. (NAVD88) or 93.0 ft.

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

G. Filter pack, top 426.6 ft. (NAVD88) or 95.5 ft.

H. Screen joint, top 424.1 ft. (NAVD88) or 98.0 ft.

I. Well bottom 419.1 ft. (NAVD88) or 103.0 ft.

J. Filter pack, bottom 417.1 ft. (NAVD88) or 105.0 ft.

K. Borehole, bottom 412.1 ft. (NAVD88) or 110.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe:
   Bentonite ☐
   Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.1 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 15.882 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.702 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
   Benoite Slurry Grout Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Newton Power Station	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒	APW16
	Lat. 38° 55' 13.1" Long. -88° 17' 28.6" or	
Facility ID	St. Plane 820,642 ft. N, 996,214 ft. E. (E)/W	Date Well Installed 01/20/2021
	Section Location of Waste/Source	
Type of Well: Well Code 72/dp	____1/4 of ____ 1/4 of Sec. 35, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen, Cascade Drilling
Distance from Waste/Source ____ ft. / State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 531.82 ft. (NAVD88)

B. Well casing, top elevation 531.18 ft. (NAVD88)

C. Land surface elevation 529.2 ft. (NAVD88)

D. Surface seal, bottom 527.2 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 453.7 ft. (NAVD88) or 75.5 ft.

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

G. Filter pack, top 450.7 ft. (NAVD88) or 78.5 ft.

H. Screen joint, top 448.7 ft. (NAVD88) or 80.5 ft.

I. Well bottom 443.7 ft. (NAVD88) or 85.5 ft.

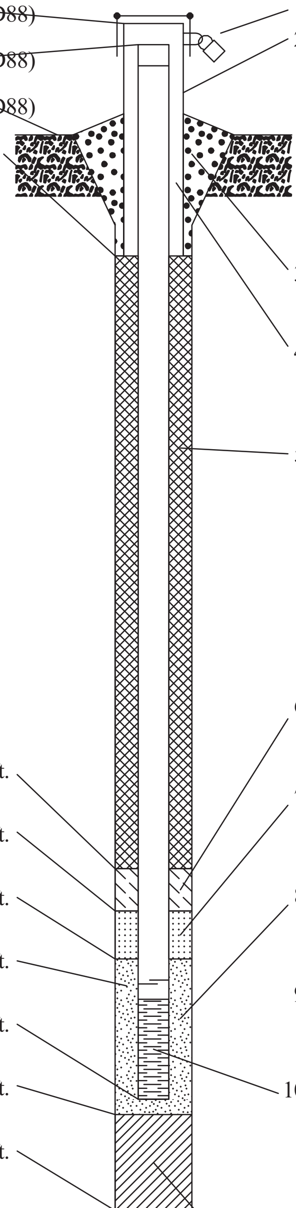
J. Filter pack, bottom 441.7 ft. (NAVD88) or 87.5 ft.

K. Borehole, bottom 419.2 ft. (NAVD88) or 110.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.1 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 12.828 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
   Benoite Slurry Grout Other ☒

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

Date Modified: 5/3/2021

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

RAMBØLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station	Local Grid Location of Well: ______ft. ☐ N. ☐ S. ______ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 33.3" Long. -88° 17' 38.1" or	APW17
Facility ID	St. Plane 822,681 ft. N, 995,462 ft. E. Ⓔ/W	Date Well Installed: 01/22/2021
Type of Well: Well Code 72/dp	Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. 26, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Dave Gordon Cascade Drilling
Distance from Waste/Source ____ ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 533.02 ft. (NAVD88)

B. Well casing, top elevation 532.52 ft. (NAVD88)

C. Land surface elevation 529.8 ft. (NAVD88)

D. Surface seal, bottom 527.8 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ________

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 446.8 ft. (NAVD88) or 83.0 ft.

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

G. Filter pack, top 444.8 ft. (NAVD88) or 85.0 ft.

H. Screen joint, top 442.8 ft. (NAVD88) or 87.0 ft.

I. Well bottom 437.8 ft. (NAVD88) or 92.0 ft.

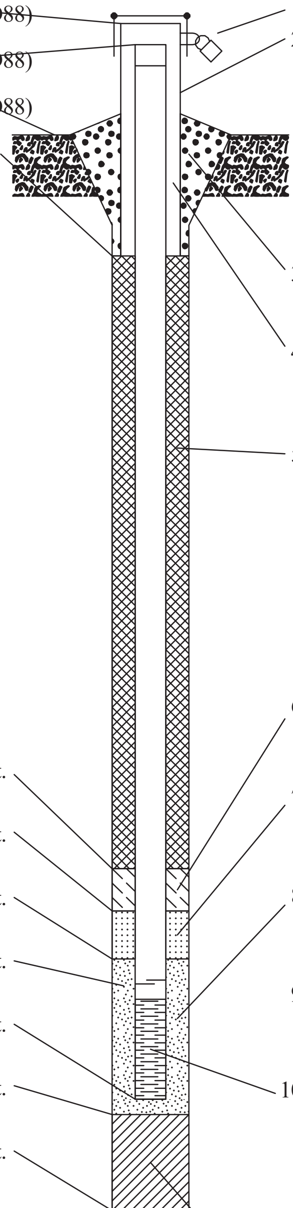
J. Filter pack, bottom 435.8 ft. (NAVD88) or 94.0 ft.

K. Borehole, bottom 429.8 ft. (NAVD88) or 100.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.6 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 14.137 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ________ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
    Bentonite Chips Other ☒

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

Date Modified: 5/3/2021

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

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name Newton Power Station	Local Grid Location of Well _____ ft. ☐ N. ☐ S. _____ ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 51.5" Long. -88° 17' 24.4" or	APW18
Facility ID	St. Plane 824,526 ft. N, 996,544 ft. E. (E)/W	Date Well Installed 01/21/2021
Type of Well Well Code 72/dp	Section Location of Waste/Source _____ 1/4 of _____ 1/4 of Sec. 26 , T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Dave Gordon Cascade Drilling
Distance from Waste/ Source _____ ft. — State IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known — Gov. Lot Number	

A. Protective pipe, top elevation 543.81 ft. (NAVD88)

B. Well casing, top elevation 543.27 ft. (NAVD88)

C. Land surface elevation 540.6 ft. (NAVD88)

D. Surface seal, bottom 538.6 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 469.6 ft. (NAVD88) or 71.0 ft.

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

G. Filter pack, top 467.6 ft. (NAVD88) or 73.0 ft.

H. Screen joint, top 465.6 ft. (NAVD88) or 75.0 ft.

I. Well bottom 460.6 ft. (NAVD88) or 80.0 ft.

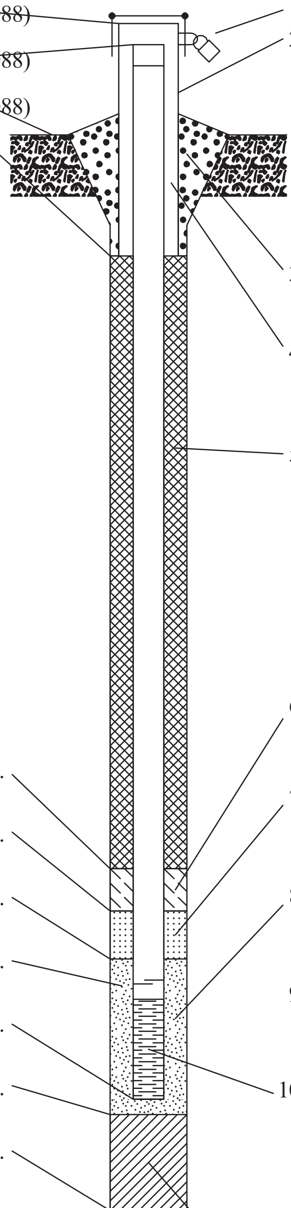
J. Filter pack, bottom 458.6 ft. (NAVD88) or 82.0 ft.

K. Borehole, bottom 433.6 ft. (NAVD88) or 107.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.6 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. _____ % Bentonite . . . Bentonite-cement grout ☐
   e. 12.043 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. _____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
   Bentonite Chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

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

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station	Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.	Well Name: APW5S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 2.2" Long. -88° 16' 51.7" or St. Plane 825,612 ft. N, 999,129 ft. E. Ⓔ/W	
Facility ID		Date Well Installed: 01/19/2021
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 26, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Dave Gordon, Cascade Drilling
Distance from Waste/Source: ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 544.41 ft. (NAVD88)

B. Well casing, top elevation 543.94 ft. (NAVD88)

C. Land surface elevation 541.0 ft. (NAVD88)

D. Surface seal, bottom 540.0 ft. (NAVD88) or 1.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 540.0 ft. (NAVD88) or 1.0 ft.

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

G. Filter pack, top 533.0 ft. (NAVD88) or 8.0 ft.

H. Screen joint, top 531.0 ft. (NAVD88) or 10.0 ft.

I. Well bottom 521.0 ft. (NAVD88) or 20.0 ft.

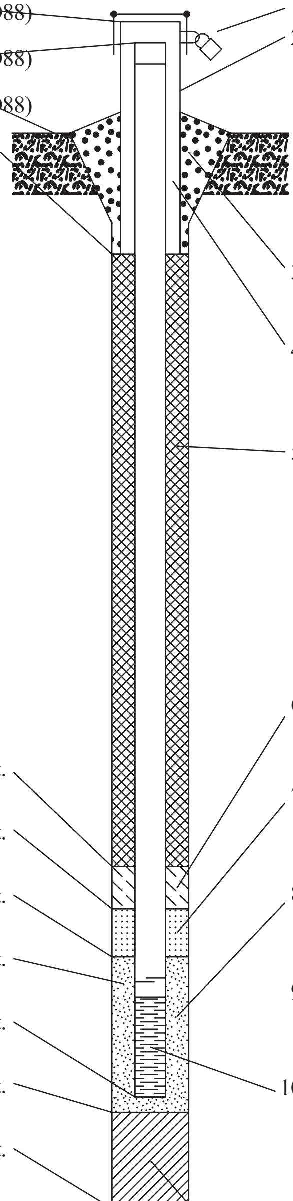
J. Filter pack, bottom 518.0 ft. (NAVD88) or 23.0 ft.

K. Borehole, bottom 518.0 ft. (NAVD88) or 23.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 1.222 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 2.683 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

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

Date Modified: 5/3/2021

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

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name: XPW01
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 55.9" Long. -88° 17' 7.9" or St. Plane 824,975 ft. N, 997,852 ft. E. Ⓔ/W	
Facility ID		Date Well Installed: 01/20/2021
Type of Well: Well Code 99/ot	Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. 26, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Russ Gordon, Cascade Drilling
Distance from Waste/Source ____ ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 552.11 ft. (NAVD88)

B. Well casing, top elevation 551.76 ft. (NAVD88)

C. Land surface elevation 548.6 ft. (NAVD88)

D. Surface seal, bottom 547.6 ft. (NAVD88) or 1.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 547.6 ft. (NAVD88) or 1.0 ft.

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

G. Filter pack, top 543.6 ft. (NAVD88) or 5.0 ft.

H. Screen joint, top 541.6 ft. (NAVD88) or 7.0 ft.

I. Well bottom 531.6 ft. (NAVD88) or 17.0 ft.

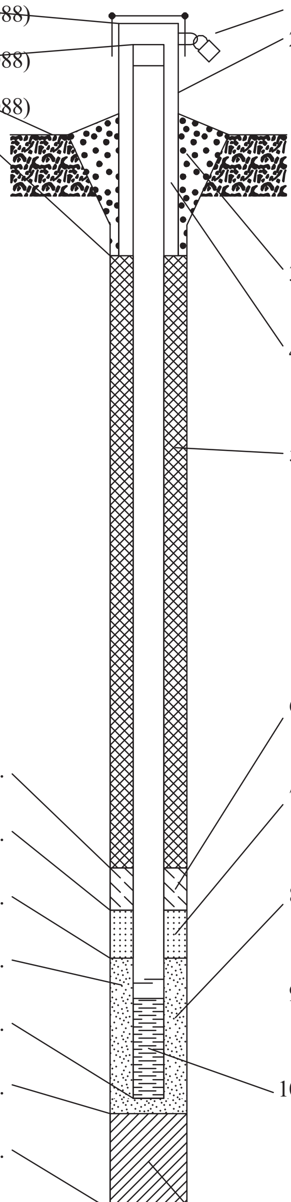
J. Filter pack, bottom 530.6 ft. (NAVD88) or 18.0 ft.

K. Borehole, bottom 528.6 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 5.0 ft.
c. Material: Steel ☒ Other ☐
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
d. ____% Bentonite . . . Bentonite-cement grout ☐
e. 0.698 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. Not Applicable
b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. Filter Sil, Industrial Quartz
b. Volume added 2.291 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
Flush threaded PVC schedule 80 ☐
Other ☐
10. Screen material: Schedule 40 PVC
a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
b. Manufacturer Johnson Screens
c. Slot size: 0.010 in.
d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐
Bentonite Chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

Signature	Firm	
S.A. Wb	Ramboll, 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

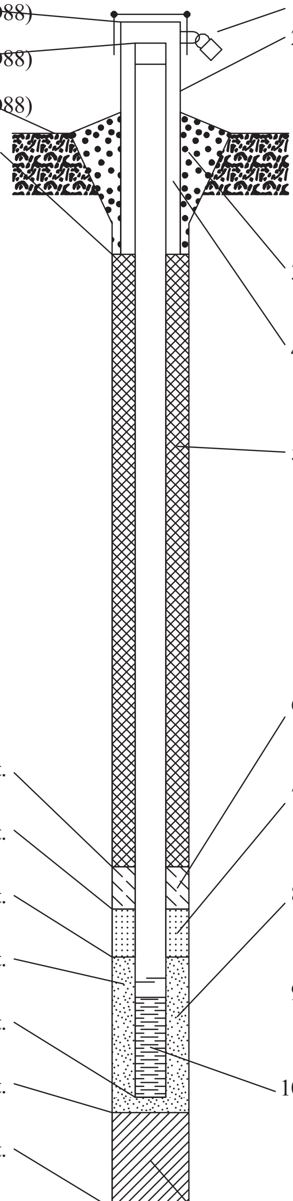
Facility/Project Name: Newton Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name: XPW02
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 56.4" Long. -88° 16' 58.4" or St. Plane 825,024 ft. N, 998,601 ft. E. (E)/W	
Facility ID	Section Location of Waste/Source	Date Well Installed: 01/19/2021
Type of Well: Well Code 99/ot	____1/4 of ____1/4 of Sec. 26, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Russ Gordon Cascade Drilling
Distance from Waste/Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 554.83 ft. (NAVD88)

B. Well casing, top elevation 554.43 ft. (NAVD88)

C. Land surface elevation 552.0 ft. (NAVD88)

D. Surface seal, bottom 550.0 ft. (NAVD88) or 2.0 ft.



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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 550.0 ft. (NAVD88) or 2.0 ft.

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

G. Filter pack, top 548.0 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 546.0 ft. (NAVD88) or 6.0 ft.

I. Well bottom 536.0 ft. (NAVD88) or 16.0 ft.

J. Filter pack, bottom 535.0 ft. (NAVD88) or 17.0 ft.

K. Borehole, bottom 532.0 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 5.0 ft.
c. Material: Steel ☒
Other ☐
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Bollards
3. Surface seal: Bentonite ☐
Concrete ☒
Other ☐
4. Material between well casing and protective pipe:
Bentonite ☐
Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
d. ____% Bentonite . . . Bentonite-cement grout ☐
e. 0.349 Ft^3 volume added for any of the above
f. How installed: Tremie ☐
Tremie pumped ☐
Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. Not Applicable
b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. Filter Sil, Industrial Quartz
b. Volume added 2.291 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
Flush threaded PVC schedule 80 ☐
Other ☐
10. Screen material: Schedule 40 PVC
a. Screen Type: Factory cut ☒
Continuous slot ☐
Other ☐
b. Manufacturer Johnson Screens
c. Slot size: 0.010 in.
d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☐
Bentonite Chips Other ☒

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

Date Modified: 5/3/2021

Signature: [signature]

Firm: Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Newton Power Station	______ft. ☐ N. ☐ S. ______ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒	XPW03
	Lat. 38° 55' 51.8" Long. -88° 16' 35.1" or	
Facility ID	St. Plane 824,558 ft. N, 1,000,445 ft. E. Ⓔ/W	Date Well Installed
	Section Location of Waste/Source	01/19/2021
Type of Well	____1/4 of ____ 1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm)
Well Code 99/ot		Russ Gordon
Distance from Waste/ Source ft. / State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	Cascade Drilling

A. Protective pipe, top elevation 553.95 ft. (NAVD88)

B. Well casing, top elevation 553.65 ft. (NAVD88)

C. Land surface elevation 550.8 ft. (NAVD88)

D. Surface seal, bottom 548.8 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____________

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 548.8 ft. (NAVD88) or 2.0 ft.

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

G. Filter pack, top 542.8 ft. (NAVD88) or 8.0 ft.

H. Screen joint, top 540.8 ft. (NAVD88) or 10.0 ft.

I. Well bottom 530.8 ft. (NAVD88) or 20.0 ft.

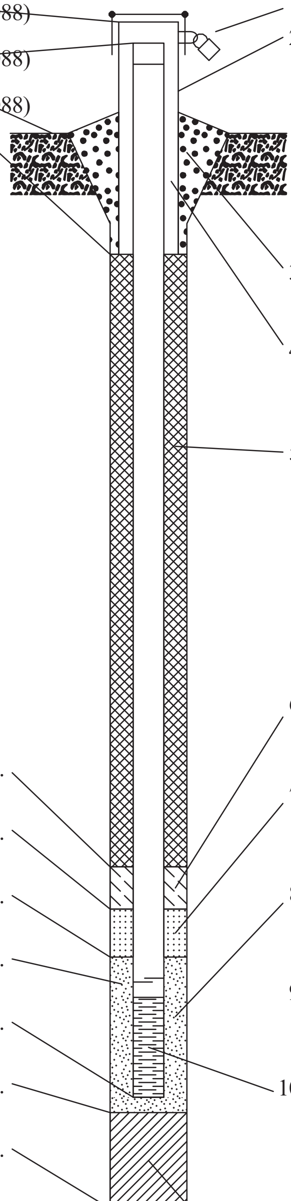
J. Filter pack, bottom 530.8 ft. (NAVD88) or 20.0 ft.

K. Borehole, bottom 530.8 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ______Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ______Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ______% Bentonite . . . Bentonite-cement grout ☐
   e. 1.047 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. Not Applicable
   b. Volume added 0 ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 2.094 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

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

Date Modified: 5/3/2021

Signature	Firm	
Sd Wb	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Newton Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 38° 55' 47.6" Long. -88° 16' 26.6" or	XPW04
Facility ID	St. Plane 824,131 ft. N, 1,001,110 ft. E. Ⓔ/W	Date Well Installed: 01/19/2021
Type of Well: Well Code 99/ot	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. 25, T. 6 N, R. 8 ☒ E ☐ W	Well Installed By: (Person's Name and Firm) Russ Gordon Cascade Drilling
Distance from Waste/ Source ____ ft. / State: IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 554.74 ft. (NAVD88)

B. Well casing, top elevation 554.51 ft. (NAVD88)

C. Land surface elevation 551.9 ft. (NAVD88)

D. Surface seal, bottom 549.9 ft. (NAVD88) or 2.0 ft.

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

13. Sieve analysis attached? ☐ Yes ☐ No

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

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

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Potable Plant Water

E. Bentonite seal, top 549.9 ft. (NAVD88) or 2.0 ft.

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

G. Filter pack, top 543.9 ft. (NAVD88) or 8.0 ft.

H. Screen joint, top 541.9 ft. (NAVD88) or 10.0 ft.

I. Well bottom 531.9 ft. (NAVD88) or 20.0 ft.

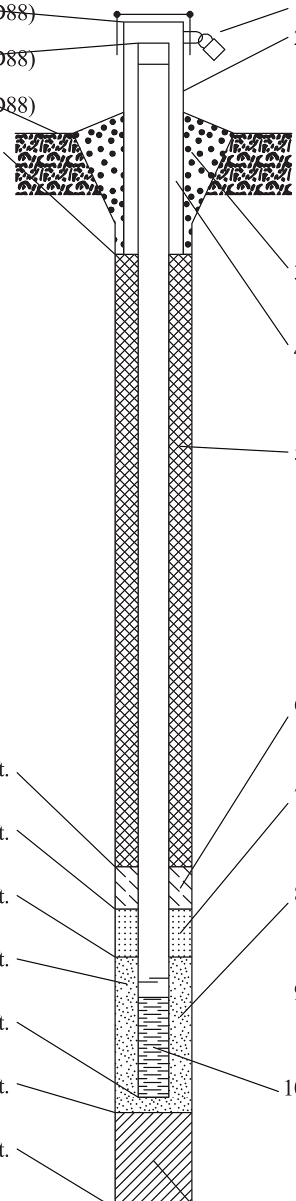
J. Filter pack, bottom 531.9 ft. (NAVD88) or 20.0 ft.

K. Borehole, bottom 531.9 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 4.0 in.
b. Length: 5.0 ft.
c. Material: Steel ☒
Other ☐
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Bollards

3. Surface seal: Bentonite ☐
Concrete ☒
Other ☐

4. Material between well casing and protective pipe:
Bentonite ☐
Sand Other ☒

5. Annular space seal: a. Granular/Chipped Bentonite ☒
b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
d. ____% Bentonite . . . Bentonite-cement grout ☐
e. 1.047 Ft^3 volume added for any of the above
f. How installed: Tremie ☐
Tremie pumped ☐
Gravity ☒

6. Bentonite seal: a. Bentonite granules ☐
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
c. ____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
a. Not Applicable
b. Volume added 0 ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Filter Sil, Industrial Quartz
b. Volume added 2.094 ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒
Flush threaded PVC schedule 80 ☐
Other ☐

10. Screen material: Schedule 40 PVC
a. Screen Type: Factory cut ☒
Continuous slot ☐
Other ☐
b. Manufacturer Johnson Screens
c. Slot size: 0.010 in.
d. Slotted length: 10.0 ft.

11. Backfill material (below filter pack): None ☒
Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

Signature: SA Wb

Firm: Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Surface Elevation: 529.93

Datum: msl

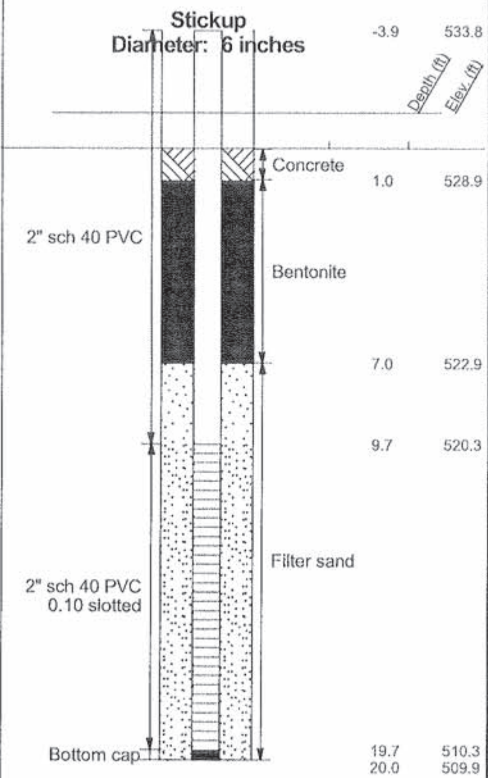
Completion Date: 6/19/10

Northing: 822688.04

Easting: 995465.25

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
5	Stiff, brown, sandy CLAY - CL			
	Hard, brown, sandy CLAY with gravel - CL ▽			
10				
	Hard, dark gray CLAY and glacial till - CH			
15				
20	Boring terminated at 20 feet.			
25				
30				
35				

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT 8.5 FEET ▽

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RBP	App'vd. by: DTK
Date: 6/29/10	Date: 2-7-11	Date: 2-7-11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-2

Project No. J017150.01

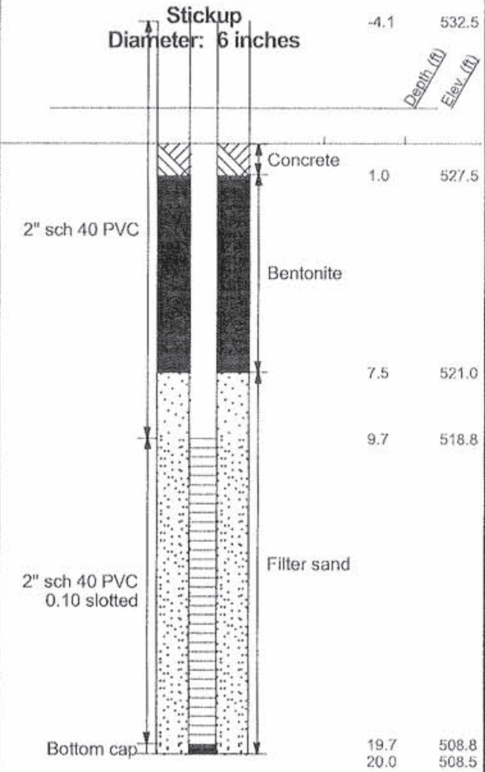
LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0638301.GPJ 12/22/10

Surface Elevation: 528.47 | Datum: msl

Completion Date: 6/18/10 | Northing: 821379.76 | Easting: 998975.74

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
6	Soft, brown, sandy CLAY with gravel - CL			
9	Hard, brown, sandy CLAY with gravel - CL			
13	Hard, brownish-gray, sandy CLAY with gravel - CL			
20	Boring terminated at 20 feet.			

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RBJ	App'vd. by: DTK
Date: 6/29/10	Date: 2/7/11	Date: 2-7-11

GEOTECHNOLOGY INC FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-3

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0538301.GPJ 2/22/11

Surface Elevation: 521.56

Datum msl

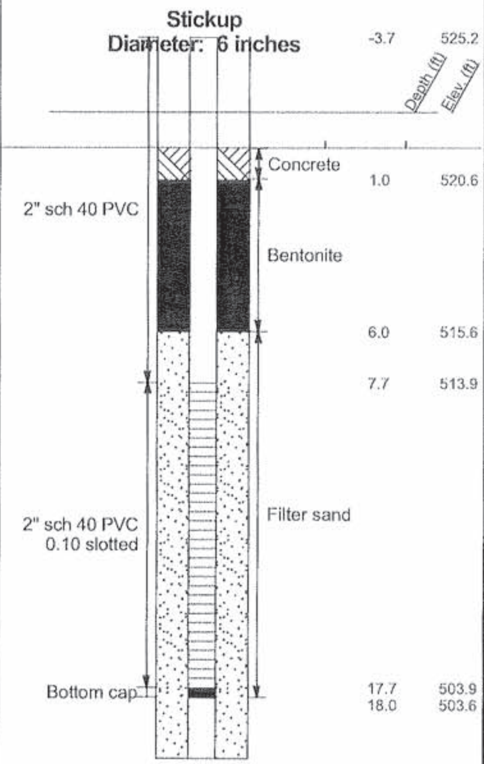
Completion Date: 6/19/10

Northing: 823246.45

Easting: 1001379.56

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Soft, brown, silty CLAY - CL			
7	Soft, brown, sandy CLAY - CL ▽			
12	Stiff, brown, sandy CLAY with gravel - CL			
18	Boring terminated at 18 feet.			

WELL DIAGRAM



NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 WL J017150.01ENV - AMEREN-NEWTON.GPJ GTINC 0638301.GPJ 2/7/11

GROUNDWATER DATA

ENCOUNTERED AT 8 FEET ▽

DRILLING DATA

4 1/4" AUGER __ HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER KCR LOGGER

CME 750X DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KA	Checked by: RJB	App'vd. by: DRK
Date: 6/29/10	Date: 2-7-11	Date: 2-7-11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren Power Plant
Newton, Illinois

LOG OF BORING: APW-4

Project No. J017150.01

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW5

Site Name: Newton Energy Center Borehole #: APW5

~~State~~ Plant ~~Plane~~ Coordinate: X 9,318.2 Y 7,758.0 (or) Latitude: 38° 56' 2.270" Longitude: -88° 16' 51.560"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: C. Dutton

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Suzanna L. Keim Date Started: 10/22/2015 Date Finished: 10/22/2015

Report Form Completed By: Suzanna L. Keim Date: 11/6/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — selected: Pellet

Installation Method: Gravity

Setting Time: 45 minutes

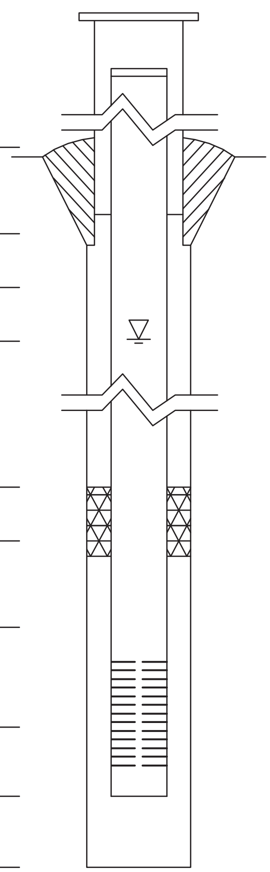
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
545.00	-3.43	Top of Protective Casing
544.56	-2.99	Top of Riser Pipe
541.57	0.00	Ground Surface
539.57	2.00	Top of Annular Sealant
527.06	14.51	Static Water Level (After Completion) 12/15/2015
484.39	57.18	Top of Seal
480.62	60.95	Top of Sand Pack
478.93	62.64	Top of Screen
474.13	67.44	Bottom of Screen
473.73	67.84	Bottom of Well
473.57	68.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	65.63
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	70.83
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (selected)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (selected)	OTHER:
Screen	SS304	SS316	PTFE	PVC (selected)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW6

Site Name: Newton Energy Center Borehole #: APW6

~~State~~ Plant ~~Plane~~ Coordinate: X 7,811.9 Y 7,688.5 (or) Latitude: 38° 56' 1.510" Longitude: -88° 17' 10.610"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: C. Dutton

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Suzanna L. Keim Date Started: 10/20/2015 Date Finished: 10/21/2015

Report Form Completed By: Suzanna L. Keim Date: 11/6/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular **Pellet** Slurry (choose one)

Installation Method: Gravity

Setting Time: 30 minutes

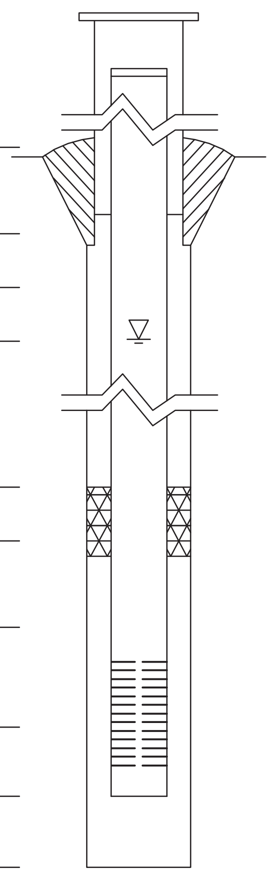
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz Sand (if applicable)

Installation Method: gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
546.88	-3.50	Top of Protective Casing
546.56	-3.18	Top of Riser Pipe
543.38	0.00	Ground Surface
541.38	2.00	Top of Annular Sealant
523.45	19.93	Static Water Level (After Completion) 12/15/2015
478.48	64.90	Top of Seal
477.28	66.10	Top of Sand Pack
475.71	67.67	Top of Screen
470.90	72.48	Bottom of Screen
470.50	72.88	Bottom of Well
469.38	74.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	70.85
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	76.06
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Screen	SS304	SS316	PTFE	**PVC**	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW7

Site Name: Newton Energy Center Borehole #: APW7a

~~State~~ Plant ~~Plane~~ Coordinate: X 6,151.6 Y 5,688.8 (or) Latitude: 38° 55' 41.660" Longitude: -88° 17' 31.490"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Gates

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Rhonald W. Hasenyager Date Started: 11/3/2015 Date Finished: 11/5/2015

Report Form Completed By: Suzanna L. Keim Date: 11/9/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 120 minutes

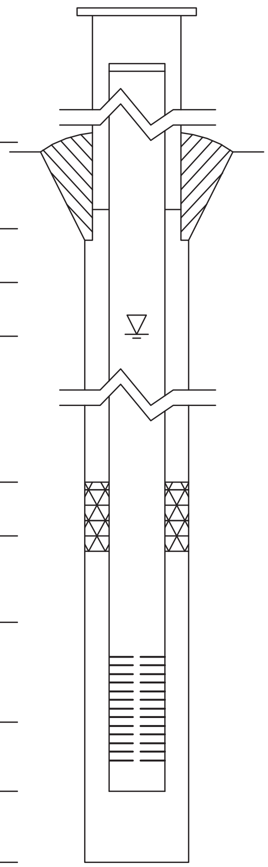
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz Sand (if applicable)

Installation Method: gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
539.24	-3.03	Top of Protective Casing
538.86	-2.65	Top of Riser Pipe
536.21	0.00	Ground Surface
534.21	2.00	Top of Annular Sealant
490.68	45.53	Static Water Level (After Completion) 12/15/2015
462.06	74.15	Top of Seal
460.21	76.00	Top of Sand Pack
458.32	77.89	Top of Screen
453.51	82.70	Bottom of Screen
453.11	83.10	Bottom of Well
453.11	83.10	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	80.54
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	85.75
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC	OTHER:
Screen	SS304	SS316	PTFE	PVC	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW8

Site Name: Newton Energy Center Borehole #: APW8

~~State~~ Plant ~~Plane~~ Coordinate: X 6,082.4 Y 3,839.6 (or) Latitude: 38° 55' 23.380" Longitude: -88° 17' 32.250"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: C. Dutton

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Suzanna L. Keim Date Started: 10/27/2015 Date Finished: 10/28/2015

Report Form Completed By: Suzanna L. Keim Date: 11/6/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 55 minutes

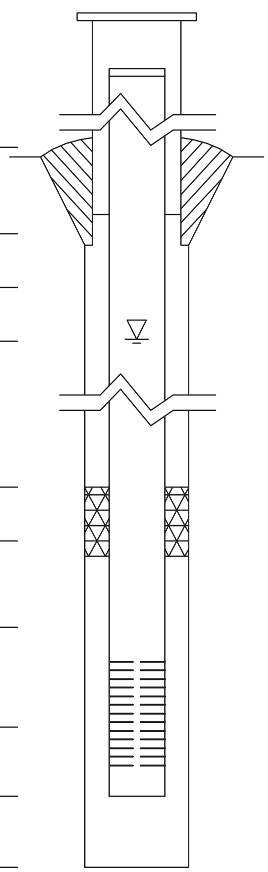
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
529.86	-3.11	Top of Protective Casing
529.46	-2.71	Top of Riser Pipe
526.75	0.00	Ground Surface
524.75	2.00	Top of Annular Sealant
490.50	36.25	Static Water Level (After Completion) 12/15/2015
462.45	64.30	Top of Seal
458.70	68.05	Top of Sand Pack
455.35	71.40	Top of Screen
445.69	81.06	Bottom of Screen
445.22	81.53	Bottom of Well
444.75	82.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	74.11
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	9.66
Total Length of Casing	(feet)	84.24
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC	OTHER:
Screen	SS304	SS316	PTFE	PVC	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW9

Site Name: Newton Energy Center Borehole #: APW9

~~State~~ ~~Plane~~ Plant Coordinate: X 9,125.3 Y 3,519.6 (or) Latitude: 38° 55' 20.370" Longitude: -88° 16' 53.730"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Gates

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Rhonald W. Hasenyager Date Started: 11/2/2015 Date Finished: 11/3/2015

Report Form Completed By: Suzanna L. Keim Date: 11/9/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 65 minutes

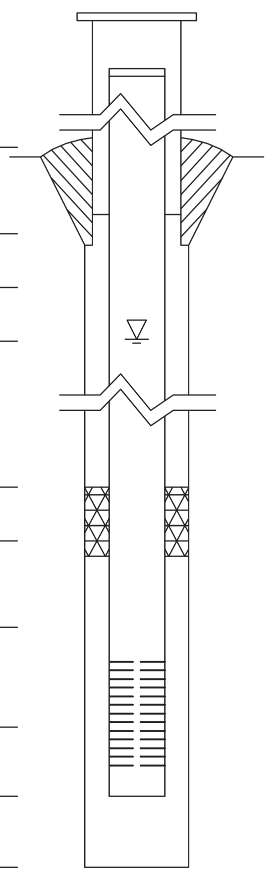
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
532.43	-3.61	Top of Protective Casing
532.01	-3.19	Top of Riser Pipe
528.82	0.00	Ground Surface
526.82	2.00	Top of Annular Sealant
502.18	26.64	Static Water Level (After Completion) 12/15/2015
475.91	52.91	Top of Seal
474.20	54.62	Top of Sand Pack
472.16	56.66	Top of Screen
467.36	61.46	Bottom of Screen
466.97	61.85	Bottom of Well
466.82	62.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	59.85
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	65.04
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC	OTHER:
Screen	SS304	SS316	PTFE	PVC	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: APW10

Site Name: Newton Energy Center Borehole #: APW10a

~~State~~ Plant ~~Plane~~ Coordinate: X 11,541.2 Y 5,371.3 (or) Latitude: 38° 55' 38.790" Longitude: -88° 16' 23.280"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: C. Dutton

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Suzanna L. Keim Date Started: 10/27/2015 Date Finished: 10/27/2015

Report Form Completed By: Suzanna L. Keim Date: 11/6/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular **Pellet** Slurry (choose one)

Installation Method: Gravity

Setting Time: 50 minutes

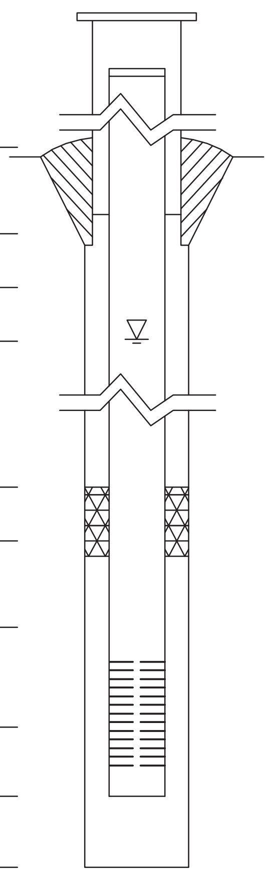
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
525.12	-3.14	Top of Protective Casing
524.74	-2.76	Top of Riser Pipe
521.98	0.00	Ground Surface
519.98	2.00	Top of Annular Sealant
504.12	17.86	Static Water Level (After Completion) 12/15/2015
484.66	37.32	Top of Seal
483.22	38.76	Top of Sand Pack
481.24	40.74	Top of Screen
476.44	45.54	Bottom of Screen
476.04	45.94	Bottom of Well
476.04	45.94	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	43.50
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	48.70
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: **Steel**
Riser Pipe Above W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Screen	SS304	SS316	PTFE	**PVC**	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Jasper County Well #: G06D

Site Name: Newton Energy Center Borehole #: G06D

~~State~~ Plant ~~Plane~~ Coordinate: X 4,926.0 Y 5,328.8 (or) Latitude: 38° 55' 38.040" Longitude: -88° 17' 46.980"

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Gates

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): Water

Logged By: Rhonald W. Hasenyager Date Started: 11/9/2015 Date Finished: 11/10/2015

Report Form Completed By: Suzanna L. Keim Date: 11/16/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hours

Type of Bentonite Seal -- Granular **Pellet** Slurry (choose one)

Installation Method: Gravity

Setting Time: 45 minutes

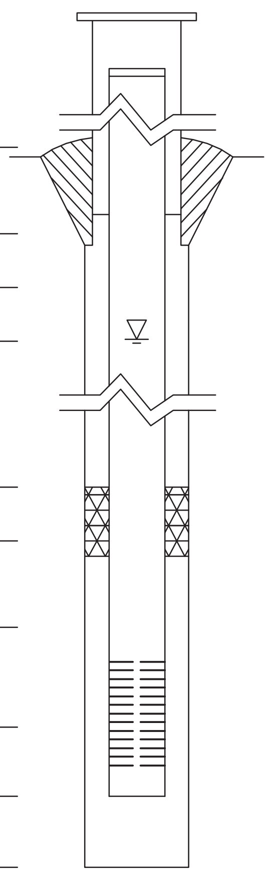
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz Sand (if applicable)

Installation Method: gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
532.59	-2.90	Top of Protective Casing
532.18	-2.49	Top of Riser Pipe
529.69	0.00	Ground Surface
527.69	2.00	Top of Annular Sealant
439.57	90.12	Static Water Level (After Completion) 12/16/2016
459.39	70.30	Top of Seal
457.58	72.11	Top of Sand Pack
455.46	74.23	Top of Screen
435.80	93.89	Bottom of Screen
435.36	94.33	Bottom of Well
433.69	96.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	76.72
Bottom of Screen to End Cap	(feet)	0.44
Screen Length (1st slot to last slot)	(feet)	19.66
Total Length of Casing	(feet)	96.82
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: **Steel**
Riser Pipe Above W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	**PVC**	OTHER:
Screen	SS304	SS316	PTFE	**PVC**	OTHER:

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/19/2015
Finish: 10/20/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: G48MG
Well ID: G48MG
Surface Elev: 543.17 ft. MSL
Completion: 77.06 ft. BGS
Station: 9,706.71N
5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0–0.5	Grayish brown (10YR5/2), moist, very soft, silty CLAY, trace roots.			
							0.5–2.7	Grayish brown (10YR5/2) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY, slight trace roots.		542	
							2.7–6.8	Brown (10YR5/3) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		540, 538	
							6.8–8	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		536	
							8–10	Gray (10YR5/1) with 40% dark yellowish brown (10YR4/6) mottles, very moist, soft, silty CLAY with trace sand and slight trace gravel.		534	
							10–10.9	Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, soft, wet, sandy CLAY with slight trace gravel.			
							10.9–12	Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		532	
							12–13.7	Dark gray (10YR4/1) with 30% brown (10YR4/3) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		530	
							13.7–15.2	Dark gray (10YR4/1) with 20% dark grayish brown (10YR4/2) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		528	
							15.2–20	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		526, 524	

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT:	Natural Resource Technology, Inc.	**CONTRACTOR:**	Bulldog Drilling, Inc.		
Site:	Newton Energy Center	**Rig mfg/model:**	CME-550X ATV Drill	**BOREHOLE ID:**	G48MG
Location:	Newton, Illinois	**Drilling Method:**	4¼" HSA	**Well ID:**	G48MG
Project:	15E0030			**Surface Elev:**	543.17 ft. MSL
DATES: Start:	10/19/2015	**FIELD STAFF: Driller:**	C. Dutton	**Completion:**	77.06 ft. BGS
Finish:	10/20/2015	**Helper:**	C. Jones	**Station:**	9,706.71N
WEATHER:	Sunny, breezy, warm, lo-80s	**Eng/Geo:**	S. Keim		5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							22	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel. *[Continued from previous page]*		522	
							24			520	
							26	Dark gray (10YR4/1), moist, firm, silty CLAY with slight trace sand and gravel.		518	
								Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		516	
							28	Dark gray (10YR4/1), slightly moist, firm, clayey SILT with trace sand and slight trace gravel.		514	
							30			512	
							32			510	
							34	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.		508	
							36			506	
							38	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.		504	
							40				

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.	**CONTRACTOR:** Bulldog Drilling, Inc.	**BOREHOLE ID:** G48MG
Site: Newton Energy Center	**Rig mfg/model:** CME-550X ATV Drill	**Well ID:** G48MG
Location: Newton, Illinois	**Drilling Method:** 4¼" HSA	**Surface Elev:** 543.17 ft. MSL
Project: 15E0030		
DATES: Start: 10/19/2015	**FIELD STAFF: Driller:** C. Dutton	**Completion:** 77.06 ft. BGS
Finish: 10/20/2015	**Helper:** C. Jones	**Station:** 9,706.71N
WEATHER: Sunny, breezy, warm, lo-80s	**Eng/Geo:** S. Keim	5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							42	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*		502, 500	
							44	Dark gray (10YR4/1), slightly moist, firm, SILT with slight trace sand.			
							46, 48, 50	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.		498, 496, 494, 492	
							52	Olive gray (5Y4/2), slightly moist, firm, silty CLAY with slight trace sand and gravel.			
							54	Dark greenish gray (10Y4/1) with 20% greenish gray (10Y6/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.		490	
							56	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, hard, silty CLAY with slight trace sand and gravel.		488	
							58, 60	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.		486, 484	

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Newton Energy Center
Location: Newton, Illinois
Project: 15E0030
DATES: Start: 10/19/2015
Finish: 10/20/2015
WEATHER: Sunny, breezy, warm, lo-80s

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-550X ATV Drill
Drilling Method: 4¼" HSA

FIELD STAFF: Driller: C. Dutton
Helper: C. Jones
Eng/Geo: S. Keim

BOREHOLE ID: G48MG
Well ID: G48MG
Surface Elev: 543.17 ft. MSL
Completion: 77.06 ft. BGS
Station: 9,706.71N
5,052.58E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = Dry - During Drilling
▼ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*		482	
							62	Light olive gray (5Y5/2), very moist, very soft, sandy CLAY with slight trace gravel.			
							64	Light olive gray (5Y5/2) with 10% greenish gray (5GY5/1) mottles, slightly moist, firm, silty CLAY with trace sand and slight trace gravel.		480	
							66, 68	Greenish gray (10Y5/1) with 10% olive gray (5Y4/2) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.		478, 476	
							70	Greenish gray (10G5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, dense, SILT with slight trace sand.		474	
							72	Dark greenish gray (10GY4/1), slightly moist, very hard, clayey SILT with trace sand and slight trace gravel.		472	
							74	Dark greenish gray (10GY4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.		470	
								Dark greenish gray (10GY4/1), wet, very dense, silty, coarse-grained SAND and gravel.		468	
							76	Dark gray (10YR4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.			

End of boring = 77.06 feet

NOTE(S): G48MG installed in borehole.
Sample and testing data can be found on B-48 Field Boring Log.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
1A	13/18 72%	SS	woh-2 3 N=5	25.8		
2A	17/18 94%	SS	2-3 4 N=7	22.0		3.88 Sh
3A	17/18 94%	SS	2-4 4 N=8	15.7		1.90 Sh
4A	24/24 100%	SS	woh-1 2-3 N=3	20.5		1.78 BSh
5A	18/18 100%	SS	1-1 2 N=3	22.7		1.40 Sh
6A	24/24 100%	SS	1-2 3-3 N=5	18.3		1.27 Sh
7-1	23/24 96%	SH				
7-2				19.9		
7-3				15.0		
7-4				19.5		
8A	18/18 100%	SS	8-13 17 N=30	10.2		8.92 Sh
9A	18/18 100%	SS	6-12 17 N=29	9.7		5.62 Sh
10A	24/24 100%	SS	7-14 20-20 N=34	9.0		7.18 Sh
11A	18/18 100%	SS	6-14 15 N=29	8.5		9.89 Sh
12A	18/18 100%	SS	5-12 14 N=26	10.2		11.25 Sh

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–0.3	Grayish brown (10YR5/2), moist, very soft, silty CLAY, trace roots.	542
0.3–2.7	Grayish brown (10YR5/2) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY, slight trace roots.	540
2.7–6.8	Brown (10YR5/3) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.	538, 536
6.8–8	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.	
8–10	Gray (10YR5/1) with 40% dark yellowish brown (10YR4/6) mottles, very moist, soft, silty CLAY with trace sand and slight trace gravel.	534
10–10.9	Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, soft, wet, sandy CLAY with slight trace gravel.	532
10.9–12	Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.	
12–13.7	Dark gray (10YR4/1) with 30% brown (10YR4/3) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.	530
13.7–15.2	Dark gray (10YR4/1) with 20% dark grayish brown (10YR4/2) mottles, slightly moist, hard, clayey SILT with trace sand and slight trace gravel.	528
15.2–20	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.	526, 524

Remarks:

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
13A	24/24 100%	SS	8-13 17-17 N=30	10.1		12.36 Sh
14A	18/18 100%	SS	7-11 14 N=25	10.1		10.47 Sh
15A	18/18 100%	SS	7-11 13 N=24	9.9		9.31 Sh
16A	24/24 100%	SS	5-7 12-14 N=19	11.4		11.06 Sh
16B				16.3		2.13 BSh
17A	18/18 100%	SS	4-6 11 N=17	11.2		6.79 Sh
18A	18/18 100%	SS	5-9 16 N=25	11.4		9.70 Sh
19A	24/24 100%	SS	4-8 14-19 N=22	10.4		10.47 Sh
20A	18/18 100%	SS	6-13 17 N=30	11.4		
21A	18/18 100%	SS	7-13 19 N=32	11.3		10.28 Sh
22A	24/24 100%	SS	7-12 19-22 N=31	10.3		11.44 Sh
23A	18/18 100%	SS	6-12 19 N=31	11.5		10.86 Sh
24A	18/18 100%	SS	7-11 19 N=30	12.7		5.24 Sh

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
22, 24	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel. *[Continued from previous page]*	522, 520, 518	
26	Dark gray (10YR4/1), moist, firm, silty CLAY with slight trace sand and gravel.		
	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.	516	
28, 30	Dark gray (10YR4/1), slightly moist, firm, clayey SILT with trace sand and slight trace gravel.	514	
32, 34, 36	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and slight trace gravel.	512, 510, 508, 506	
38, 40	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.	504	

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
25A	24/24 100%	SS	8-12 22-26 N=34	11.5		10.47 Sh	42	Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*	502	
26A	18/18 100%	SS	7-12 18 N=30	11.7		7.76 Sh			500	
27A	18/18 100%	SS	7-15 18 N=33	13.1			44	Dark gray (10YR4/1), slightly moist, firm, SILT with slight trace sand.		
27B				10.9		11.64 Sh		Dark gray (10YR4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.	498	
28A	24/24 100%	SS	8-10 16-21 N=26	13.7			46		496	
29A	18/18 100%	SS	7-10 16 N=26	14.5		5.82 Sh	48		494	
30A	18/18 100%	SS	4-9 13 N=22	14.1		2.52 B	50			
31-1										
31-2	19/24 79%	SH		14.0					492	
31-3										
31-4							52			
32A	18/18 100%	SS	7-13 19 N=32	12.9		10.28 Sh		Olive gray (5Y4/2), slightly moist, firm, silty CLAY with slight trace sand and gravel.		
32B				12.5		8.92 Sh		Dark greenish gray (10Y4/1) with 20% greenish gray (10Y6/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.	490	
33A	18/18 100%	SS	5-10 16 N=26	14.9		2.13 BSh	54			
33B				14.6		6.59 Sh		Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, hard, silty CLAY with slight trace sand and gravel.	488	
34A	24/24 100%	SS	6-10 16-19 N=26	15.5		3.88 Sh	56		486	
35A	18/18 100%	SS	2-7 14 N=21	18.2		1.94 BSh	58	Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.	484	
36A	18/18 100%	SS	3-7 14 N=21	13.8		5.04 BSh	60			

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
37-1				16.5		1.75 BSh		Olive gray (5Y4/2) with 15% dark gray (N4/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*		
37-2	19/24 79%	SH		12.7		3.50 None		Light olive gray (5Y5/2), very moist, very soft, sandy CLAY with slight trace gravel.	482	
37-3				15.0						
37-4							62			
38A	18/18 100%	SS	8-13 15 N=28	14.5		3.10 B		Light olive gray (5Y5/2) with 10% greenish gray (5GY5/1) mottles, slightly moist, firm, silty CLAY with trace sand and slight trace gravel.	480	
39A	18/18 100%	SS	6-9 15 N=24	12.8		5.04 BSh	64		478	
40A	24/24 100%	SS	4-9 13-15 N=22	13.6		5.43 Sh	66	Greenish gray (10Y5/1) with 10% olive gray (5Y4/2) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.	476	
41A	18/18 100%	SS	12-13 14 N=27	13.2		4.07 BSh	68		474	
42A	16/17 94%	SS	6-32 28/5"	15.2				Greenish gray (10G5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, dense, SILT with slight trace sand.		
43A	3/3 100%	SS	60/3"	15.4			70	Dark greenish gray (10GY4/1), slightly moist, very hard, clayey SILT with trace sand and slight trace gravel.	472	
44A	13/14 93%	SS	28-47 15/2"	16.7			72	Dark greenish gray (10GY4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.	470	
45A	16/17 94%	SS	31-33 27/5"	13.6			74	Dark greenish gray (10GY4/1), wet, very dense, silty, coarse-grained SAND and gravel.	468	
46A	12/15 80%	SS	20-38 22/3"	15.3			76	Dark gray (10YR4/1), wet, very dense, silty, medium- to coarse-grained SAND with slight trace gravel.	466	
47A	18/18 100%	SS	3-11 17 N=28	13.9		5.62 B	78	Dark gray (N4/1), moist, firm, silty CLAY with slight trace sand and gravel.	464	
48A	17/18 94%	SS	5-10 14 N=24	14.9		5.24 BSh	80	Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.		

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station
Site: Gypsum Management Facility
Location: Newton, Jasper Co., IL
Project: 07E0150A 3000
DATES: Start: 5/12/2009
Finish: 5/14/2009
WEATHER: Sunny, warm, windy, (mid-60's)

CONTRACTOR: Skinner Limited
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: T. Skinner
Helper: T. Skinner/J. Austin
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: B48
Well ID: n/a
Surface Elev: 542.9 ft. MSL
Completion: 103.5 ft. BGS
Station: 9,703.88N
5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
49A	24/24 *100%*	SS	*5-7 12-14* N=19	15.5		5.04 BSh
50A	18/18 *100%*	SS	*4-8 10* N=18	15.4		5.24 BSh
51A	18/18 *100%*	SS	*4-9 10* N=19	15.7		5.04 B
52-1, 52-2, 52-3	18/18 *100%*	SH		14.3		
53A	24/24 *100%*	SS	*9-12 21-26* N=33	13.9		6.21 B
54A	18/18 *100%*	SS	*6-11 17* N=28	13.8		6.79 Sh
55A	24/24 *100%*	SS	*6-12 15-24* N=27	13.6		7.37 Sh
56A	18/18 *100%*	SS	*5-8 12* N=20	13.9		3.88 Sh
57A	18/18 *100%*	SS	*5-12 19* N=31	13.4		6.21 Sh
58A	24/24 *100%*	SS	*4-18 20-22* N=38	12.5		
58B				13.4		5.82 BSh
59A	16/16 *100%*	SS	*16-33 27/4"*	16.0		
59B				15.7		3.69 Sh
60A	18/18 *100%*	SS	*16-21 15* N=36	12.6		
60B						

Depth ft. BGS	Lithologic Description
to ~87.5	Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel. *[Continued from previous page]*
~87.5–88.5	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
~88.5–95.5	Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.
~95.5–96	Dark gray (N4/1), very moist, dense, silty, fine- to coarse-grained SAND with slight trace gravel.
~96–97.3	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
~97.3–97.8	Dark gray (N4/1), wet, dense, silty, fine- to medium-grained SAND with slight trace gravel.
~97.8–98.4	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.
~98.4–99.4	Dark gray (N4/1), wet, dense, silty, very fine- to medium-grained SAND with slight trace gravel.
~99.4–100	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.

Depth scale: 82, 84, 86, 88, 90, 92, 94, 96, 98, 100 ft. BGS
Elevation scale: 462, 460, 458, 456, 454, 452, 450, 448, 446, 444 ft. MSL

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: AEG Newton Power Station	**CONTRACTOR:** Skinner Limited		
Site: Gypsum Management Facility	**Rig mfg/model:** CME-550 ATV Drill	**BOREHOLE ID:**	B48
Location: Newton, Jasper Co., IL	**Drilling Method:** 4¼" hollow stem auger w/split spoon sampler	**Well ID:**	n/a
Project: 07E0150A 3000		**Surface Elev:**	542.9 ft. MSL
DATES: Start: 5/12/2009	**FIELD STAFF: Driller:** T. Skinner	**Completion:**	103.5 ft. BGS
Finish: 5/14/2009	**Helper:** T. Skinner/J. Austin	**Station:**	9,703.88N
WEATHER: Sunny, warm, windy, (mid-60's)	**Eng/Geo:** S. Suzanna Simpson		5,042.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Latona
Township: North Muddy
Section 23, **Tier** 6N; **Range** 8E

WATER LEVEL INFORMATION:
▼ = 10.00 - during drilling
▼ =
▽ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
61A	24/24 *100%*	SS	*7-12 18-25* N=30	13.4		6.59 Sh		Dark gray (N4/1), slightly moist, firm, silty CLAY with slight trace sand and gravel.		442	
							102	Dark gray (N4/1), slightly moist, hard, silty CLAY with slight trace sand and gravel.			
62A	17/18 *94%*	SS	*12-18 22* N=40	15.3		3.88 BSh				440	

EOB = 103.5 feet bgs

NOTE(S): Borehole abandoned using bentonite grout.

Illinois Environmental Protection Agency

Well Completion Report

Site # ILD 079808002 County Jasper Well # G106

Site Name: Scrubber Sludge Landfill PLANT Grid Coordinate Northing 983.42 N Easting 7065.61 W

Drilling Contractor Broecke Engineering Date Drilled Start 8/1/90

Driller Mike Fappy Geologist Rich Bauer CHEI Date Completed 8/1/90

Drilling Method 4¼" ID, 8" OD Hollow Stem Augers Drilling Fluids (type) None

Annular Space Details

Type of Surface Seal: Cement/Bentonite Grout

Type of Annular Sealant Cement/Bentonite Grout

Amount of cement: # of bags 3 lbs. per bag 94

Amount of bentonite: # of bags 0.28 lbs. per bag 50

Type of Bentonite Seal (Granular, Pellet): ¼" pellets

Amount of bentonite # of Bags 2 lbs. per bag 50

Type of Sand Pack Silica Sand

Source of Sand Meramec WB-35

Amount of Sand # of bags 3 lbs. per bag 94

Well Construction Materials

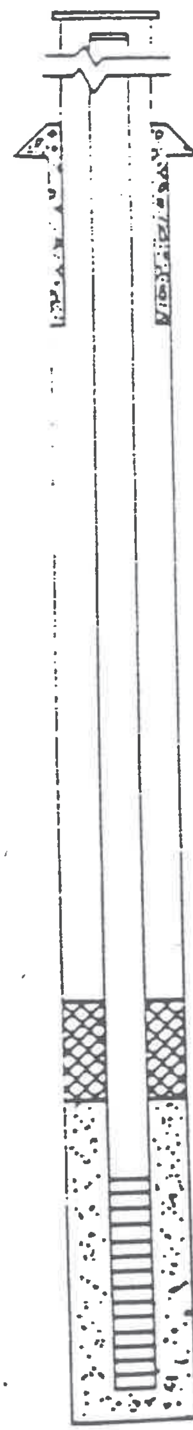
	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type Schedule 40	Other Specify Type
Riser coupling joint			X	
Riser pipe above w.t.			2" ID	
Riser pipe below w.t.			2" ID	
Screen			0.01"	
Coupling joint screen to riser			X	
Protective casing				Steel

Measurements

to .01 ft. (where applicable)

Riser pipe length	21.5
Protective casing length	5.0
Screen length	14.9
Bottom of screen to end cap	0
Top of screen to first joint	10
Total length of casing	36.4
Screen slot size	0.01"
# of openings in screen	0.125" spacing
Diameter of borehole (in)	8
ID of riser pipe (in)	2

Elevations – .01 ft.



530.87 MSL Top of Protective Casing
530.86 MSL Top of Riser Pipe
1.86 ft. Casing Stickup
529.00 MSL Ground Surface
529.00 ft. Top of annular sealant
515.76 ft. Top of Seal
3.20 ft. Total Seal Interval
512.56 ft. Top of Sand
509.36 ft. Top of Screen
14.90 ft. Total Screen Interval
494.46 ft. Bottom of Screen
492.56 ft. Bottom of Borehole

Completed by Robert Cowles (HEI) Surveyed by Herb Williams (HEI) Ill. registration # 035-002385

Illinois Environmental Protection Agency

Well Completion Report

Site #: ______ County: Jasper Well #: G202

Site Name: Newton Power Station Landfill Grid Coordinate: Northing 6649.68 Easting 6587.20

Drilling Contractor: Professional Service Industries, Inc. Date Drilled Start: 10/16/96

Driller: ______ Geologist: Mike Summers Date Completed: 10/16/96

Drilling Method: 4¼" I.D. HSA Drilling Fluids (type): N/A

Annular Space Details

Type of Surface Seal: Portland Cement

Type of Annular Sealant: Cement/Bentonite Grout (20:1)

Amount of cement: # of bags 14 lbs. per bag 94

Amount of bentonite: # of bags 1.5 lbs. per bag 50

Type of Bentonite Seal (Granular, Pellet): Pellet

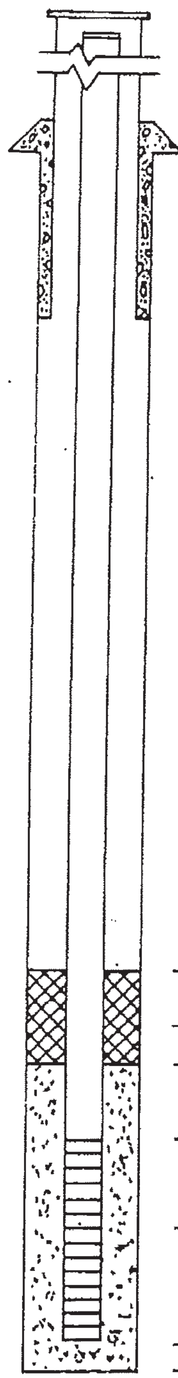
Amount of bentonite: # of Bags 1 lbs. per bag 50

Type of Sand Pack: Silica

Source of Sand: ______

Amount of Sand: # of bags 12.5 lbs. per bag 100

Elevations — .01 ft.



		MSL Top of Protective Casing
540	02	MSL Top of Riser Pipe
2	78	ft. Casing Stickup
537	24	MSL Ground Surface
		ft. Top of annular sealant
479	24	ft. Top of Seal
2	50	ft. Total Seal Interval
476	74	ft. Top of Sand
473	24	ft. Top of Screen
10	00	ft. Total Screen Interval
463	24	ft. Bottom of Screen
463	24	ft. Bottom of Borehole

Well Construction Materials

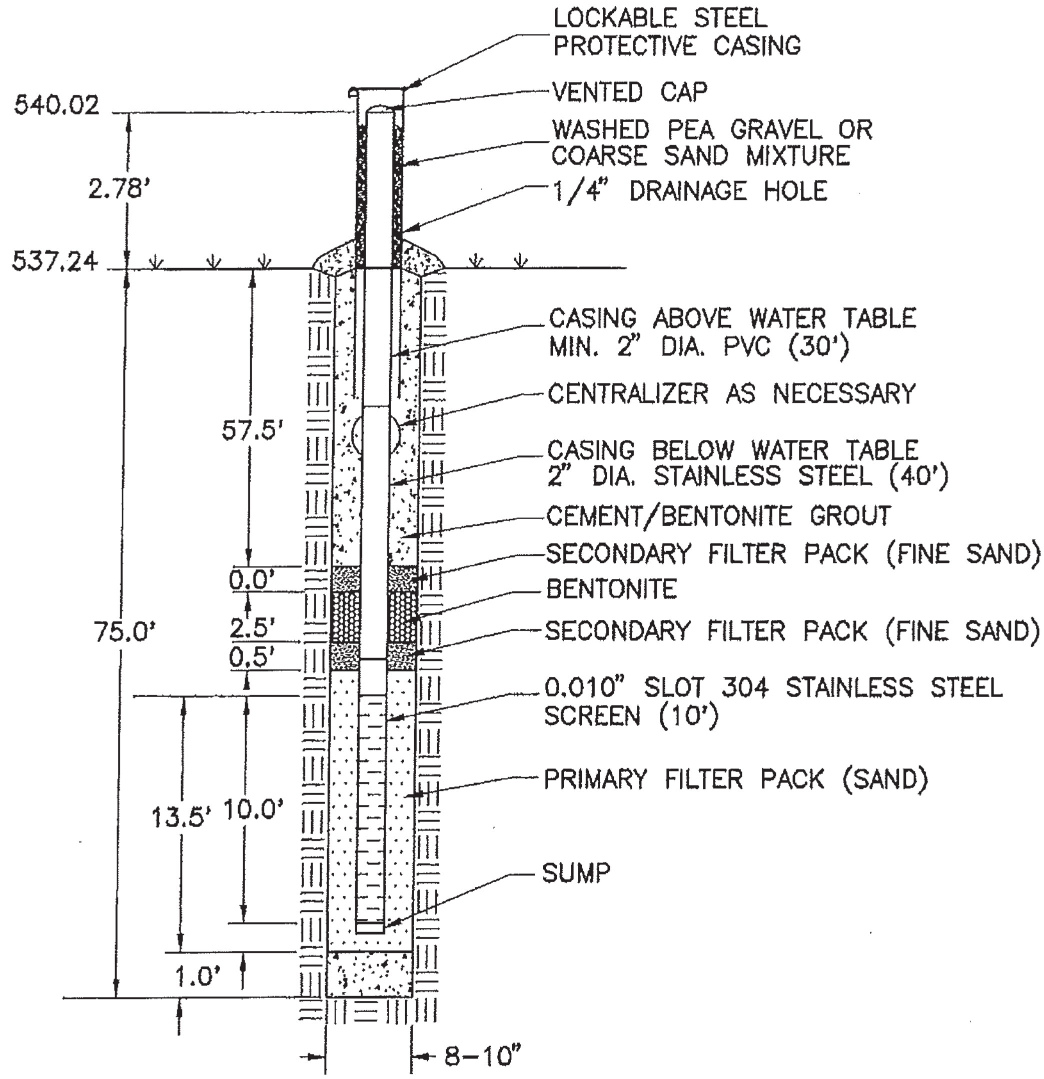
	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint				
Riser pipe above w.t.				
Riser pipe below w.t.				
Screen				
Coupling joint screen to riser				
Protective casing				

Measurements

to .01 ft. (where applicable)

Riser pipe length	66.78 ft.
Protective casing length	
Screen length	10.0 ft.
Bottom of screen to end cap	
Top of screen to first joint	
Total length of casing	
Screen slot size	.010 in.
% of openings in screen	
Diameter of borehole (in)	8
ID of riser pipe (in)	2

Completed by: ______ Surveyed by: ______ Ill. registration #: ______



N: 6649.68 / E: 6587.20

RAPPS

ENGINEERING & APPLIED SCIENCE

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G202
MONITORING WELL AS-BUILT DIAGRAM

CIPS-NEWTON LANDFILL
JASPER COUNTY, ILLINOIS

Illinois Environmental Protection Agency

Well Completion Report

Site #: ______ County: Jasper Well #: G203

Site Name: Newton Power Station Landfill Grid Coordinate: Northing 5821.29 Easting 6113.10

Drilling Contractor: Professional Service Industries, Inc. Date Drilled Start: 10/15/96

Driller: ______ Geologist: Mike Summers Date Completed: 10/15/96

Drilling Method: 4¼" I.D. HSA Drilling Fluids (type): N/A

Annular Space Details

Type of Surface Seal: Portland Cement

Type of Annular Sealant: Cement/Bentonite Grout (20:1)

Amount of cement: # of bags 10 lbs. per bag 94

Amount of bentonite: # of bags 1 lbs. per bag 50

Type of Bentonite Seal (Granular, Pellet): Pellet

Amount of bentonite: # of Bags 8 lbs. per bag 50

Type of Sand Pack: Silica

Source of Sand: ______

Amount of Sand: # of bags 13.5 lbs. per bag 100

Well Construction Materials

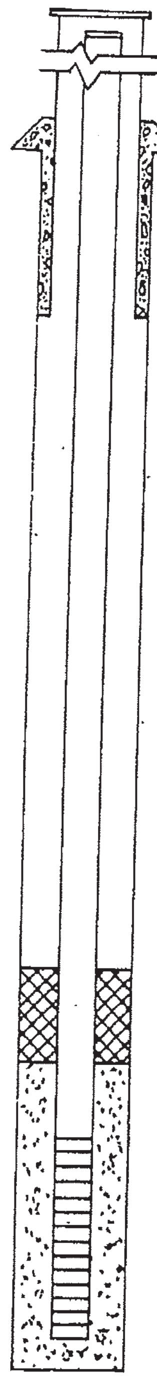
	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint				
Riser pipe above w.t.			Sch 40	
Riser pipe below w.t.	Type304			
Screen	Type304			
Coupling joint screen to riser				
Protective casing				Steel

Measurements

to .01 ft. (where applicable)

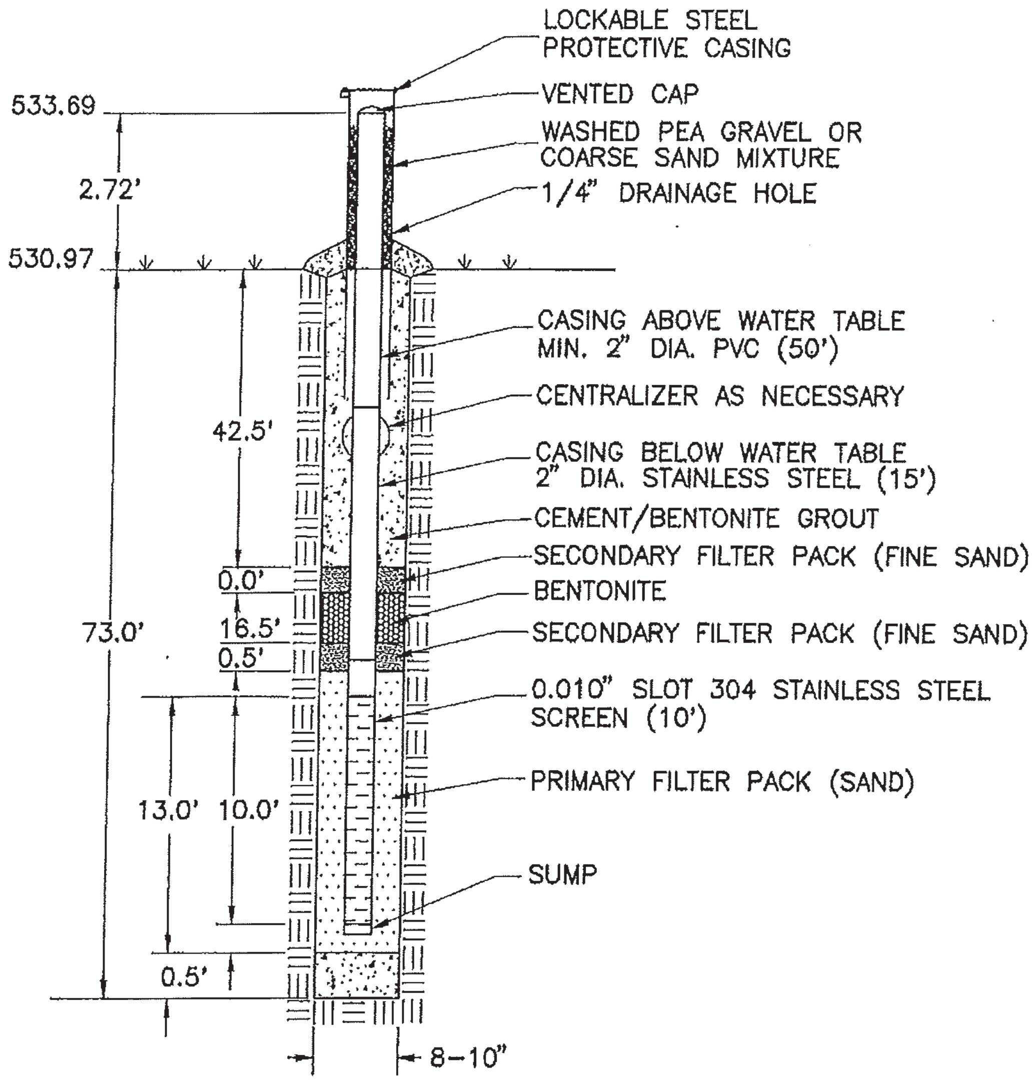
Riser pipe length	65.22 ft.
Protective casing length	
Screen length	10.0 ft.
Bottom of screen to end cap	
Top of screen to first joint	
Total length of casing	
Screen slot size	.010 in.
% of openings in screen	
Diameter of borehole (in)	8
ID of riser pipe (in)	2

Elevations – .01 ft.



533	69	MSL Top of Protective Casing
		MSL Top of Riser Pipe
2	72	ft. Casing Stickup
530	97	MSL Ground Surface
		ft. Top of annular sealant
487	97	ft. Top of Seal
16	50	ft. Total Seal Interval
471	47	ft. Top of Sand
468	47	ft. Top of Screen
10	00	ft. Total Screen Interval
458	47	ft. Bottom of Screen
458	47	ft. Bottom of Borehole

Completed by: ______ Surveyed by: ______ Ill. registration # ______



N: 5821.29 / E: 6113.10

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1601 BROADWAY • MT. VERNON, IL 62864 • (618) 244-2611

G203

MONITORING WELL AS-BUILT DIAGRAM

CIPS-NEWTON LANDFILL

JASPER COUNTY, LANDFILL

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0798085001 County: Jasper

Site Name: Newton Power Station Landfill Phase II Well #: G208

State Plane Coordinate: X ____ Y ____ (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___" Borehole #: B208

Plant Coordinates: Northing 6208.18 Easting 4417.18

Surveyed by: Ken Miller IL Registration #: 196-001263

Drilling Contractor: Skinner Ltd. Driller: Todd Skinner

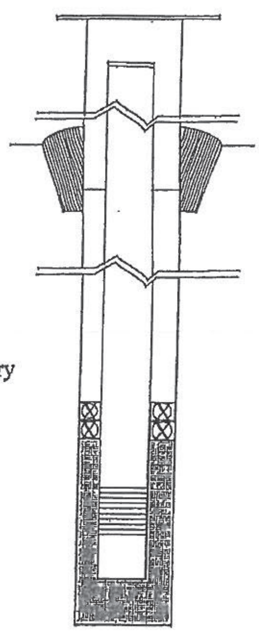
Consulting Firm: Rapps Engineering Geologist: Ken Miller

Drilling Method: HSA Drilling Fluid (Type): None

Logged By: Ken Miller Date Started: 10/11/11 Date Finished: 10/13/11

Report Form Completed By: Ken Miller Date: 11/30/11

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(.01ft.)
535.89	-2.83	Top of Protective Casing
535.52	-2.46	Top of Riser Pipe
533.06	0.00	Ground Surface
530.06	3.00	Top of Annular Sealant
		Static Water Level (After Completion)
463.13	69.93	Top of Seal
460.13	72.93	Top of Sand Pack
458.13	74.93	Top of Screen
438.35	94.71	Bottom of Screen
438.29	94.77	Bottom of Well
438.06	95.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Slurry

Installation Method: Tremi

Setting Time: ____

Type of Bentonite Seal -- Granular, Pellet, Slurry (Choose One)

Installation Method: Poured

Setting Time: ____

Type of Sand Pack: Silica Sand

Grain Size: 20/40 (Sieve Size)

Installation Method: Poured

Type of Backfill Material: NA (if applicable)

Installation Method: ____

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	9
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	77.39
Bottom of Screen to End Cap (feet)	0.06
Screen Length (1st slot to last slot) (feet)	19.78
Total Length of Casing (feet)	97.23
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Well Completion Form (revised 02/06/02)

Illinois Environmental Protection Agency — **Well Completion Report**

Site #: 0798085001 County: Jasper Well #: G217

Site Name: Newton Power Station Landfill Grid Coordinate: Northing 7121.09 Easting 6736.33

Drilling Contractor: PSI Environmental Services Date Drilled Start: 8/26/97

Driller: A. Shawgo Geologist: M. Summers Date Completed: 8/26/97

Drilling Method: 4¼ ID HSA Drilling Fluids (type): None

Annular Space Details

Type of Surface Seal: Concrete

Type of Annular Sealant: 5% Bentonite in Cement

Amount of cement: # of bags ____ lbs. per bag ____

Amount of bentonite: # of bags ____ lbs. per bag ____

Type of Bentonite Seal (Granular, Pellet): Slurry

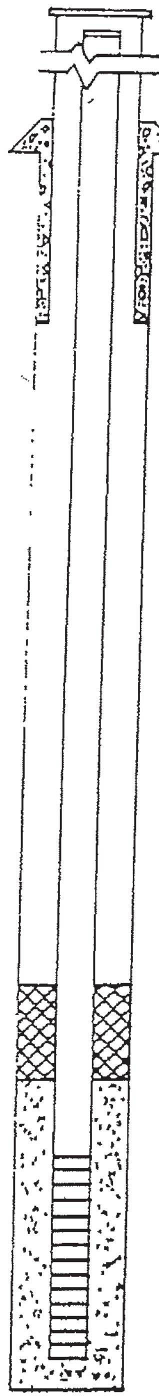
Amount of bentonite: # of Bags ____ lbs. per bag ____

Type of Sand Pack: Silica Sand #7

Source of Sand: Moble Drilling Supply

Amount of Sand: # of bags ____ lbs. per bag ____

Elevations — .01 ft.



____	MSL Top of Protective Casing
538.16	MSL Top of Riser Pipe
____	ft. Casing Stickup
535.67	MSL Ground Surface
____	ft. Top of annular sealant
530.67	ft. Top of Seal
2.0	ft. Total Seal Interval
528.67	ft. Top of Sand
526.67	ft. Top of Screen
10.0	ft. Total Screen Interval
516.67	ft. Bottom of Screen
510.67	ft. Bottom of Borehole

Well Construction Materials

	Stainless Steel Specify Type	Teflon Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			Sch 40	
Riser pipe above w.t.			Sch 40	
Riser pipe below w.t.	304			
Screen	304			
Coupling joint screen to riser	304			
Protective casing				Steel

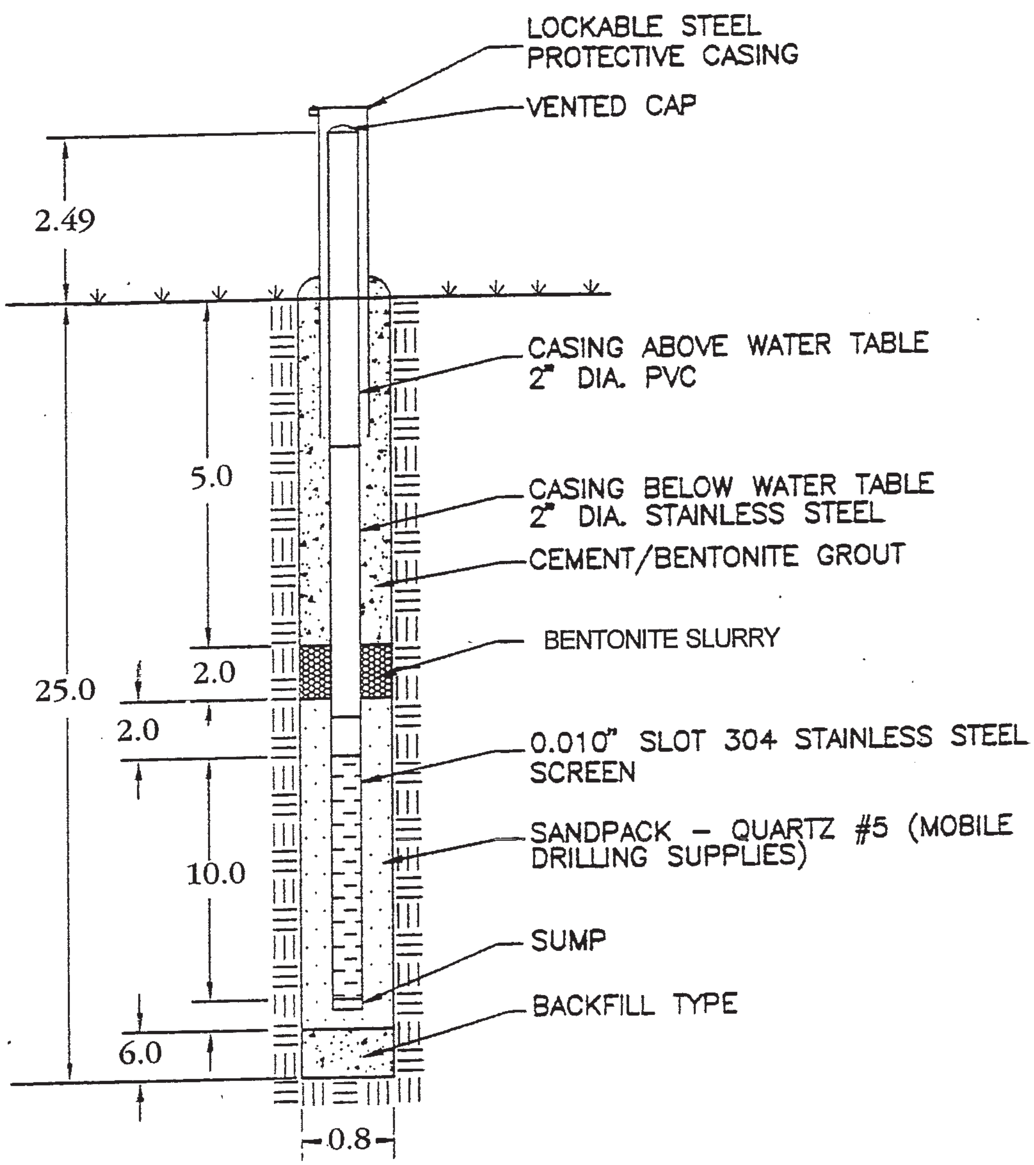
Measurements

to .01 ft. (where applicable)

Riser pipe length	10.0
Protective casing length	
Screen length	10.0
Bottom of screen to end cap	0.1
Top of screen to first joint	0.1
Total length of casing	5.0
Screen slot size	10 slot (0.01")
% of openings in screen	Continuous
Diameter of borehole (in)	8½"
ID of riser pipe (in)	2.0

Completed by: M. Summers Surveyed by: R. Whaley Ill. registration #: ____

MONITORING WELL CONSTRUCTION DIAGRAM



RAPPS

ENGINEERING & APPLIED SCIENCE

821 S. DURKIN DR. • SPRINGFIELD, IL 62704 • (217) 787-2118

1601 BROADWAY • MT. VERNON, IL 62864 • (618) 244-2611

G217

MONITORING WELL CONSTRUCTION DETAIL

Newton Power Station Landfill

Jasper County

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: 0798085001 County: Jasper

Well #: G222

Site Name: Newton Power Station Landfill Phase II

Borehole #: B222

State Plane Coordinate: X ____ Y ____ (or) Latitude: ° ' " Longitude: ° ' "

Plant Coordinates: Northing 5322.24 Easting 3989.08

Surveyed by: Ken Miller IL Registration #: 196-001263

Drilling Contractor: Skinner Ltd. Driller: Todd Skinner

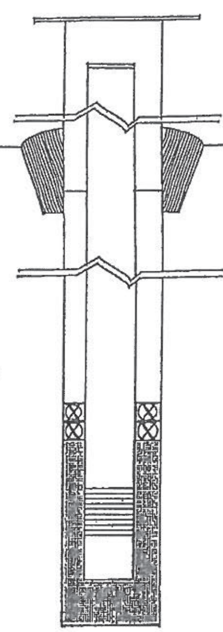
Consulting Firm: Rapps Engineering Geologist: Ken Miller

Drilling Method: HSA Drilling Fluid (Type): None

Logged By: Ken Miller Date Started: 10/24/11 Date Finished: 10/25/11

Report Form Completed By: Ken Miller Date: 11/30/11

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Slurry

Installation Method: Tremi

Setting Time: ____

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: Poured

Setting Time: ____

Type of Sand Pack: Silica Sand

Grain Size: 20/40 (Sieve Size)

Installation Method: Poured

Type of Backfill Material: NA (if applicable)

Installation Method: ____

Elevations (MSL)*	Depths (BGS)	(.01ft.)
535.16	-3.04	Top of Protective Casing
534.78	-2.66	Top of Riser Pipe
532.12	0.00	Ground Surface
529.12	3.00	Top of Annular Sealant
		Static Water Level (After Completion)
472.55	59.57	Top of Seal
469.55	62.57	Top of Sand Pack
467.55	64.57	Top of Screen
452.88	79.24	Bottom of Screen
452.81	79.31	Bottom of Well
452.12	80.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASURMENTS

Diameter of Borehole (inches)	9
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	67.27
Bottom of Screen to End Cap (feet)	0.07
Screen Length (1st slot to last slot) (feet)	14.63
Total Length of Casing (feet)	81.97
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

Well Completion Form (revised 02/06/02)

Illinois Environmental Protection Agency — Well Completion Report

Site Number: 0798085001 County: Jasper

Well #: G224

Site Name: Newton Power Station Landfill Phase II

State Plane Coordinate: X ____ Y ____ (or) Latitude: __° __' __" Longitude: __° __' __"

Borehole #: B224

Plant Coordinates: Northing 6976.66 Easting 6067.30

Surveyed by: Ken Miller IL Registration #: 196-001263

Drilling Contractor: Whitney & Associates Driller: Tim Fuhl

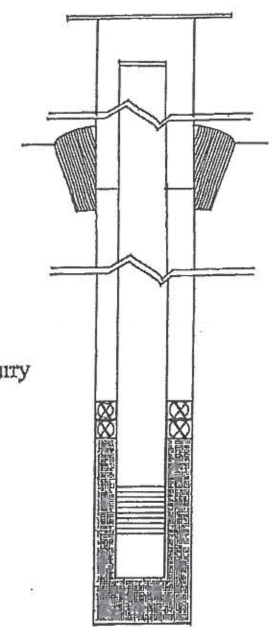
Consulting Firm: Rapps Engineering Geologist: Ken Miller

Drilling Method: HSA Drilling Fluid (Type): None

Logged By: Ken Miller Date Started: 10/4/11 Date Finished: 10/5/11

Report Form Completed By: Ken Miller Date: 11/30/11

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Poured

Setting Time: ____

Type of Bentonite Seal -- Granular, Pellet, Slurry (Choose One)

Installation Method: Poured

Setting Time: ____

Type of Sand Pack: Silica Sand

Grain Size: 50 (Sieve Size)

Installation Method: Poured

Type of Backfill Material: NA (if applicable)

Installation Method: ____

Elevations (MSL)*	Depths (BGS)	(.01ft.)
535.19	-2.93	Top of Protective Casing
534.78	-2.52	Top of Riser Pipe
532.26	0.00	Ground Surface
529.26	3.00	Top of Annular Sealant
		Static Water Level (After Completion)
473.75	58.51	Top of Seal
470.75	61.51	Top of Sand Pack
468.75	63.51	Top of Screen
459.09	73.17	Bottom of Screen
458.75	73.51	Bottom of Well
458.26	74.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL

(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	9
ID of Riser Pipe (inches)	2
Protective Casing Length (feet)	5
Riser Pipe Length (feet)	66.03
Bottom of Screen to End Cap (feet)	0.34
Screen Length (1st slot to last slot) (feet)	9.66
Total Length of Casing (feet)	76.03
Screen Slot Size **	0.010

**Hand-Slotted Well Screens are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: 0798085001 County: Jasper Well #: R217D

Site Name: Newton Power Station Borehole #: R217D

~~State-~~ ~~Plane~~ Plant Coordinate: X 6,712.2 Y 7,126.9 (or) Latitude: 38° 55' 55.889" Longitude: -88° 17' 24.426"

Surveyed By: Matthew H. Schrader IL Registration #: 035-003487

Drilling Contractor: Bulldog Drilling Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Mud Rotary Drilling Fluid (Type): Bentonite mud

Logged By: Rhonald W. Hasenyager Date Started: 9/25/2017 Date Finished: 9/26/2017

Report Form Completed By: Suzanna L. Keim Date: 10/16/2017

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: high-solids bentonite

Installation Method: Tremie

Setting Time: +24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 minutes

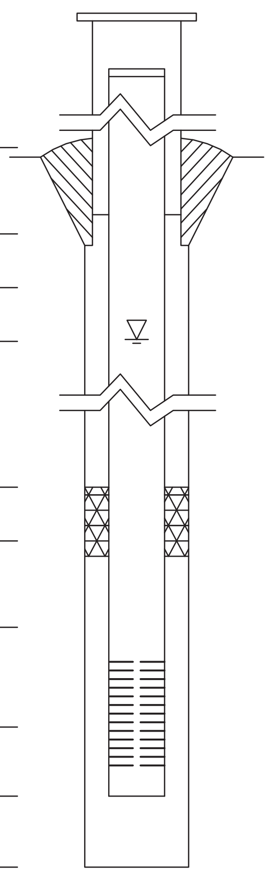
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: none (if applicable)

Installation Method:



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
538.85	-2.94	Top of Protective Casing
538.55	-2.64	Top of Riser Pipe
535.91	0.00	Ground Surface
533.41	2.50	Top of Annular Sealant
		Static Water Level (After Completion)
479.39	56.52	Top of Seal
478.01	57.90	Top of Sand Pack
475.81	60.10	Top of Screen
470.88	65.03	Bottom of Screen
470.67	65.24	Bottom of Well
470.67	65.24	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	8.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	62.64
Bottom of Screen to End Cap	(feet)	0.31
Screen Length (1st slot to last slot)	(feet)	4.93
Total Length of Casing	(feet)	67.88
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC	OTHER:
Screen	SS304	SS316	PTFE	PVC	OTHER:

APPENDIX D
GEOTECHNICAL LABORATORY REPORT

April 13, 2021
Revised: May 10, 2021

Mr. Scott Woods
Ramboll Environ U.S. Corporation
333 West Wacker Drive, Ste 2700
Chicago, IL 60606-2872

RE: Laboratory Testing Program for the Newton Power Station Project – Terracon Project No. 11215019

Dear Mr. Woods,

We are pleased to submit our report pertaining to geotechnical laboratory testing of thirty-one (31) soil samples in reference to the Newton Power Station Project. Per your instructions, Terracon performed the following tests on each of the samples:

- Specific Gravity of Soils – ASTM D854
- Water Content of Soil and Rock – ASTM D2216
- Liquid Limit, Plastic Limit and Plasticity Index of Soils – ASTM D4318
- Permeability of Granular Soils (Constant Head) – ASTM D 2434 *
- Hydraulic Conductivity of Saturated Porous Materials Using a Flexible-Wall Permeameter – ASTM D5084
- Laboratory Determination of Density (Unit Weight) of Soil Specimens – ASTM D7263
- Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis – ASTM D6913
- Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis – ASTM D7928

Three samples originally scheduled for hydraulic conductivity tests following ASTM D5084 did not meet the flow criteria for the standard because of the granular matrix of the samples. Instead the tests were run following ASTM D 2434 which allows for greater permeant flow through the specimen.

The test data included in this report, only represent the samples tested and may not reflect actual site materials and/or conditions. The scope of services provided by Terracon did not include interpretation of the laboratory test data, and therefore, we are not liable for any interpretation performed by others. If you wish us to provide you with this service, we would be happy to discuss this matter with you at your convenience. Any reproduction of this report must be done in its entirety.

We are pleased to have the opportunity to provide you with our testing services. Should you have any questions, or require additional assistance, please feel free to contact us at any time.

Sincerely,
Terracon Consultants, Inc.

William P. Quinn
Department Manager – Laboratory Services

Attachments:

LABORATORY TESTING SUMMARY

PROJECT NAME: Newton Power Station | PROJECT NUMBER: 11215019 | CLIENT: Ramboll

Boring Number	Sample Number	Depth	Description	USCS	WC %	Dry Density (pcf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Permeability k (cm/sec)	Specific Gravity
APW-11	0805	10.0'-12.0'	BROWN SANDY LEAN CLAY	CL	17.8	111.7	1.1	45.1	25.2	28.6	28	12	16	8.57E-08	2.645
APW-11	1050	61.0'-61.5'	GRAYISH BROWN LEAN CLAY WITH SAND	CL	17.8	110.5	0.0	21.4	48.4	30.2	27	18	9	1.87E-07	2.686
APW-11	1115	80.0'-82.0'	DARK GRAY LEAN CLAY WITH SAND	CL	16.5	116.1	0.0	21.0	44.4	34.6	32	14	18	2.94E-08	2.705
APW-12	0825	20.0'-22.0'	BROWN AND RUST BROWN CLAYEY SAND - ROOTS NOTED	SC	15.1	118.3	7.4	46.8	24.3	21.5	27	12	15	1.07E-07	2.694
APW-12	0845	25.5'-26.0'	BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	SP-SM	8.4	113.0	24.3	69.5	2.9	3.3	10	13	NP	8.43E-06	2.654
APW-12	1245	85.0'-87.0'	DARK GRAY LEAN CLAY WITH SAND - SILT POCKETS NOTED	CL	14.4	116.4	0.3	19.5	44.4	35.8	29	14	15	2.36E-08	2.711
APW-13	0845	25.0'-27.0'	DARK BROWN AND GRAY POORLY GRADED SAND WITH SILT	SP-SM	21.2	87.1	0.0	88.9	6.8	4.3	9	10	NP	9.63E-05	2.649
APW-13	1345	60.5'-61.0'	BROWN SILTY SAND	SM	14.5	114.3	0.3	75.2	19.4	5.1	8	13	NP	2.18E-04	2.661
APW-14	0955	45.0'-47.0'	BROWN SANDY LEAN CLAY	CL	12.4	119.6	4.4	32.3	36.5	26.8	26	14	12	9.65E-08	2.706
APW-14	1045	55.5'-56.0'	GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND	CL	18.0	104.6	0.0	27.8	44.4	27.8	25	15	10	2.74E-07	2.709
APW-15	1005	20.0'-22.0'	BROWN SANDY LEAN CLAY	CL	18.5	109.8	0.0	40.8	27.4	31.8	33	10	23	3.21E-08	2.686
APW-15	0755	100.5'-101.0'	GRAY SILTY SAND	SM	12.1	116.4	4.4	49.8	39.0	6.8	15	12	3	3.50E-06	2.665
APW-15	0905	105.0'-107.0'	DARK GRAY LEAN CLAY WITH SAND	CL	19.1	107.8	0.0	23.8	47.1	29.1	29	13	16	8.20E-08	2.695
APW-17	0945	40.0'-42.0'	GRAY LEAN CLAY WITH SAND	CL	16.6	108.8	1.3	27.6	44.1	27.0	26	13	13	3.34E-08	2.709
APW-17	1045	71.0'-71.5'	GRAY WELL GRADED SAND WITH SILT	SW-SM	7.8	110.2	14.3	76.8	5.1	3.8	5	9	NP	7.21E-04	2.660
APW-17	1200	90.5'-91.0'	GRAYISH BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	SP-SM	6.1	116.8	28.2	65.1	4.2	2.5	6	8	NP	6.39E-04	2.672
SB-300	0825	50.0'-52.0'	DARK GRAY LEAN CLAY WITH SAND	CL	12.9	122.7	0.8	22.4	44.5	32.3	32	12	20	7.29E-08	2.700
SB-300	0905	61.0'-61.5'	GRAYISH BROWN SILTY SAND	SM	13.6	109.6	4.7	78.2	12.5	4.6	5	9	NP	1.85E-05	2.686
SB-300	0920	62.5'-63.0'	GRAY AND BROWN SANDY SILTY CLAY	CL-ML	11.1	124.6	0.0	42.4	40.8	16.8	20	14	6	4.32E-06	2.659
SB-300	1350	105.0'-107.0'	DARK GRAY SANDY LEAN CLAY	CL	14.1	116.4	0.0	30.7	37.7	31.6	28	13	15	4.28E-08	2.710
SB-301	1330	48.0'-50.0'	BROWN AND GRAY SANDY LEAN CLAY	CL	14.1	117.3	0.4	34.2	35.5	29.9	27	14	13	6.63E-08	2.697
SB-301	1600	68.5'-69.0'	GRAY SANDY LEAN CLAY	CL	13.1	121.3	0.0	31.3	43.2	25.5	23	14	9	4.05E-08	2.723
SB-301	0946	98.0'-100.0'	DARK BROWN TO DARK GRAY LEAN CLAY WITH SAND	CL	15.7	118.2	0.0	17.8	47.0	35.2	37	15	22	6.13E-08	2.720
XPW-01	0820	8.5'-9.0'	DARK GRAY AND BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	SP-SM	18.6	87.7	37.1	51.1	8.2	3.6	47	57	NP	1.71E-04	2.675
XPW-01	0840	15.5'-16.0'	GRAY AND BROWN SANDY LEAN CLAY	CL	12.6	84.4	4.6	34.1	35.1	26.2	35	17	18	1.58E-05	2.741

LABORATORY TESTING SUMMARY

PROJECT NAME: Newton Power Station

PROJECT NUMBER: 11215019

CLIENT: Ramboll

Boring Number	Sample Number	Depth	Description	USCS	WC %	Dry Density (pcf)	% Gravel	% Sand	% Silt	% Clay	LL	PL	PI	Permeability k (cm/sec)	Specific Gravity
XPW-02	1530	8.0'-8.5'	VERY DARK GRAY, GRAY AND BROWN SANDY LEAN CLAY	CL	29.1	92.9	0.3	44.8	28.9	26.0	36	16	20	6.07E-08	2.691
XPW-02	1545	16.5'-17.0'	GRAY AND DARK BROWN LEAN CLAY WITH SAND	CL	21.8	103.7	0.0	19.8	42.5	37.7	36	14	22	7.38E-08	2.694
XPW-03	1255	6.0'-6.5'	DARK BROWNISH GRAY SILTY SAND	SM	17.4	75.3	6.8	71.7	16.0	5.5	33	27	6	1.34E-03	2.663
XPW-03	1315	15.5'-16.0'	BROWNISH GRAY SILTY SAND WITH GRAVEL	SM	16.7	103.6	16.4	67.3	12.3	4.0	12	19	NP	9.70E-05	2.689
XPW-04	1000	6.5'-7.0'	GRAY SILTY SAND	SM	31.1	73.9	1.6	84.5	10.9	3.0	41	38	3	1.61E-04	2.697
XPW-04	1020	15.5'-16.0'	DARK BROWNISH GRAY SILTY SAND WITH GRAVEL	SM	31.1	80.8	15.7	51.0	24.7	8.6	46	42	4	7.83E-05	2.650

Specific Gravity of Soils
ASTM D854

Terracon
Consulting Engineers & Scientists

SPECIFIC GRAVITY OF SOIL SOLIDS
ASTM D-854

Laboratory Services Group **192 Exchange Blvd.** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

Project Number: 11215019
Project Name: Newton Power Station
Test Date: 3/1/2021

Results Summary

Boring / Sample	Sample Number	Depth (ft)		Specific Gravity (Gs)
APW-11	0805	10.0'-12.0'		2.645
APW-11	1050	61.0'-61.5'		2.686
APW-11	1115	80.0'-82.0'		2.705
APW-12	0825	20.0'-22.0'		2.694
APW-12	0845	25.5'-26.0'		2.654
APW-12	1245	85.0'-87.0'		2.711
APW-13	0845	25.0'-27.0'		2.649
APW-13	1345	60.5'-61.0'		2.661
APW-14	0955	45.0'-47.0'		2.706
APW-14	1045	55.5'-56.0'		2.709
APW-15	1005	20.0'-22.0'		2.686
APW-15	0755	100.5'-101.0'		2.665
APW-15	0905	105.0'-107.0'		2.692
APW-17	0945	40.0'-42.0'		2.709
APW-17	1045	71.0'-71.5'		2.660
APW-17	1200	90.5'-91.0'		2.672

Tested By: SJH

Checked By: WPQ

SPECIFIC GRAVITY OF SOIL SOLIDS
ASTM D-854

Laboratory Services Group 192 Exchange Blvd. Glendale Heights, Illinois 60139 Ph. (630) 717-4263

Project Number: 11215019
Project Name: Newton Power Station
Test Date: 3/1/2021

Results Summary

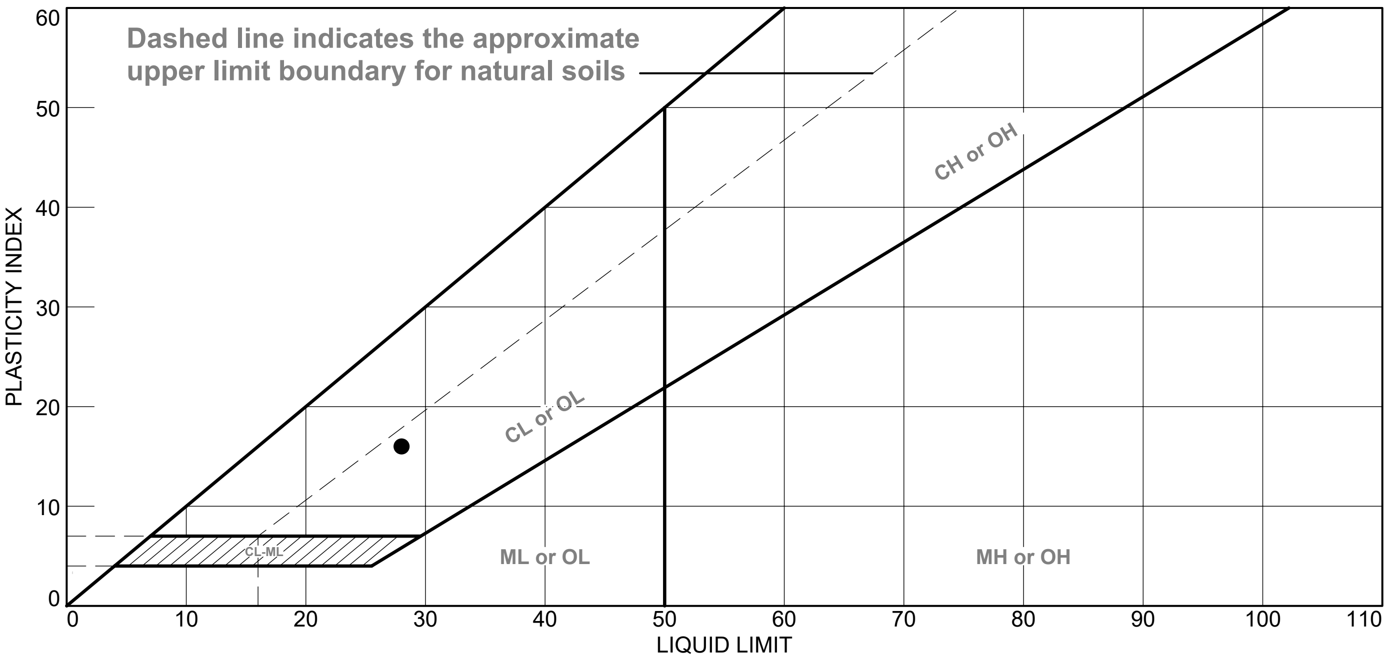
Boring / Sample	Sample Number	Depth (ft)		Specific Gravity (Gs)
SB-300	0825	50.0'-52.0'		2.700
SB-300	0905	61.0'-61.5'		2.686
SB-300	0920	62.5'-63.0'		2.659
SB-300	1350	105.0'-107.0'		2.710
SB-301	1330	48.0'-50.0'		2.697
SB-301	1600	68.5'-69.0'		2.723
SB-301	0946	98.0'-100.0'		2.720
XPW-01	0820	8.5'-9.5'		2.675
XPW-01	0840	15.5'-16.0'		2.741
XPW-02	1530	8.0'-8.5'		2.691
XPW-02	1545	16.5'-17.0'		2.694
XPW-03	1355	6.0'-6.5'		2.663
XPW-03	1315	15.5'-16.0'		2.689
XPW-04	1000	6.5'-7.0'		2.697
XPW-04	1020	15.5'-16.0'		2.650

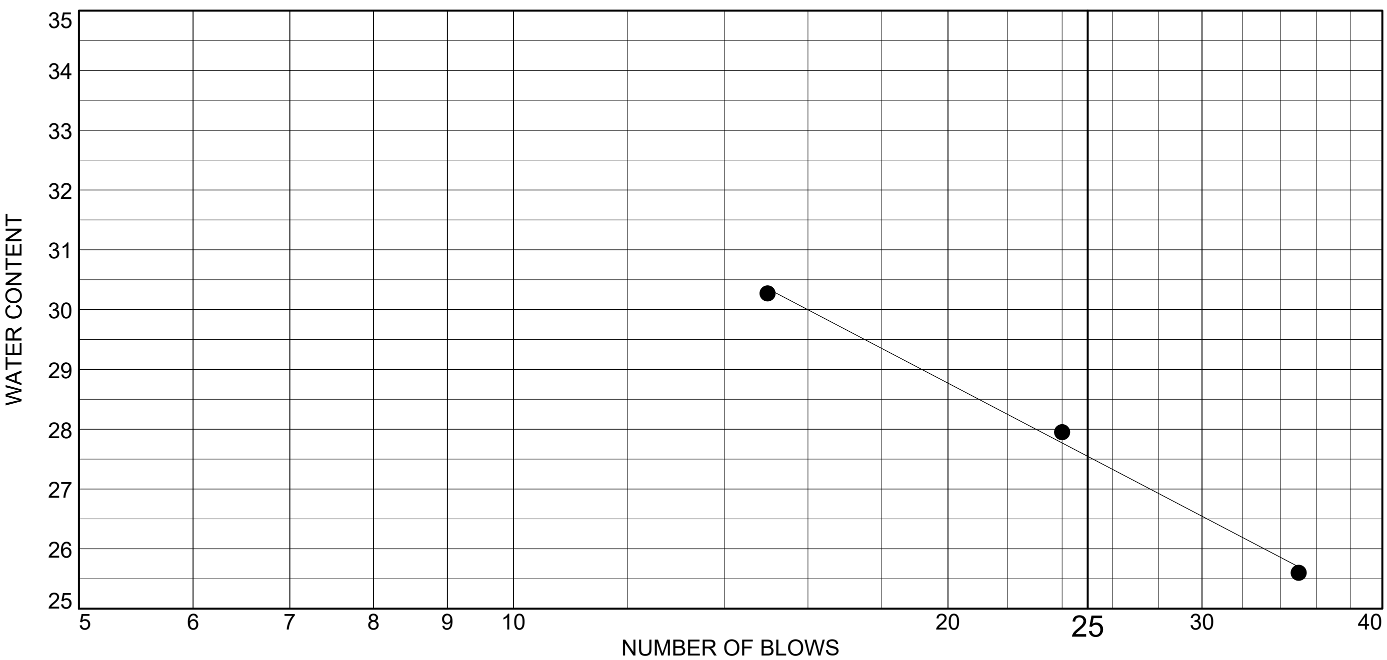
Tested By: SJH Checked By: WPQ

Terracon

Liquid Limit, Plastic Limit and Plasticity Index of Soils
ASTM D4318

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SANDY LEAN CLAY	28	12	16	88.7	53.8	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-11 **Depth:** 10.0'-12.0'
Sample Number: 0805

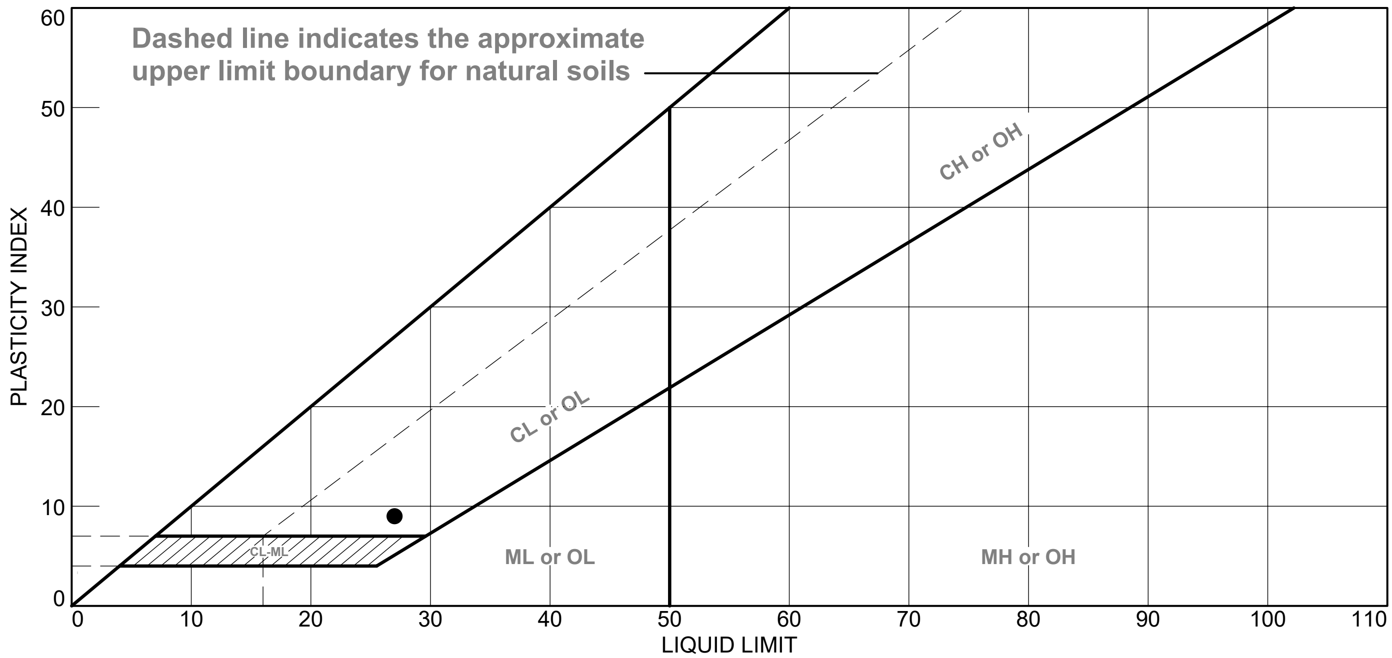
Terracon

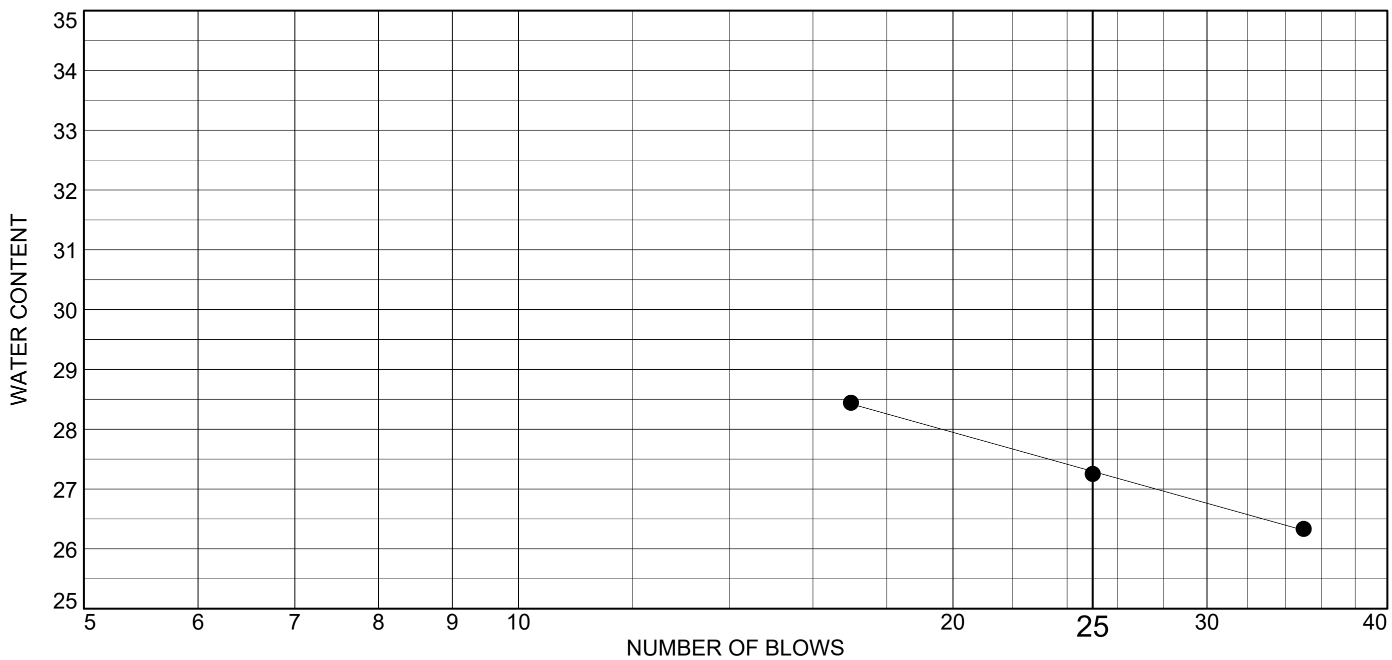
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAYISH BROWN LEAN CLAY WITH SAND	27	18	9	91.9	78.6	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-11 **Depth:** 61.0'-61.5'
Sample Number: 1050

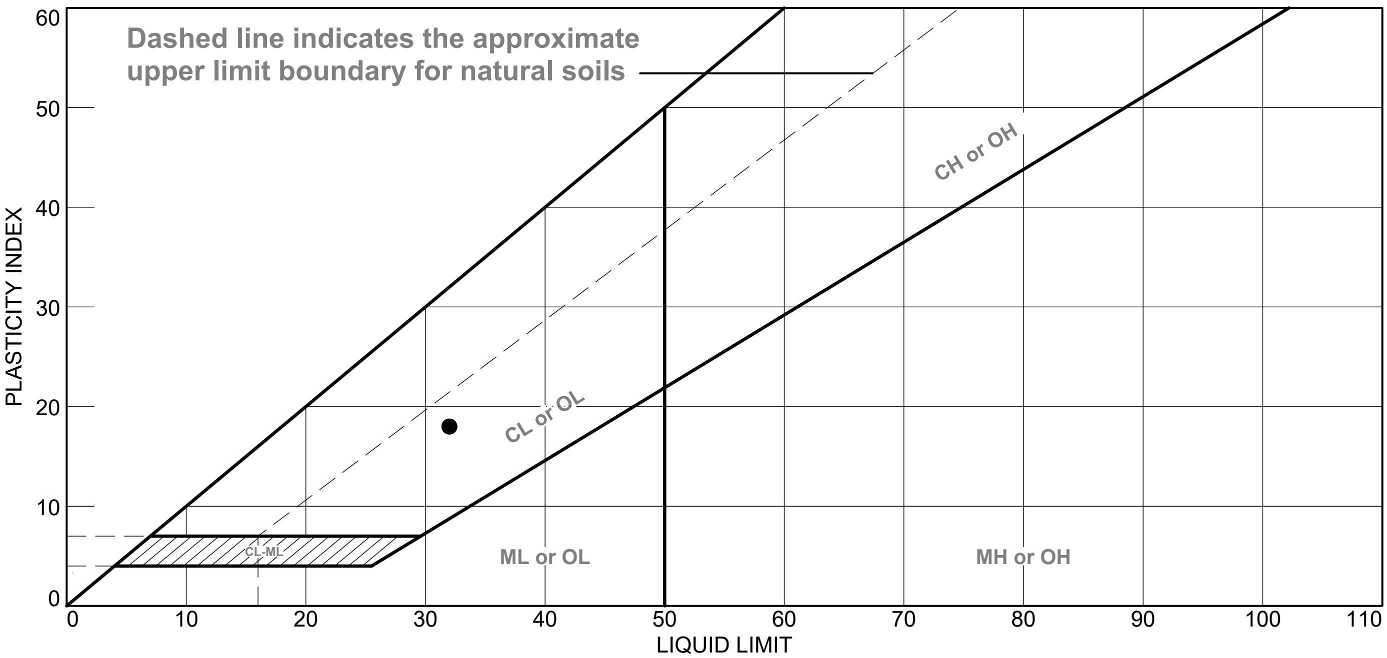
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY LEAN CLAY WITH SAND	32	14	18	95.4	79.0	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-11 **Depth:** 80.0'-82.0'
Sample Number: 1115

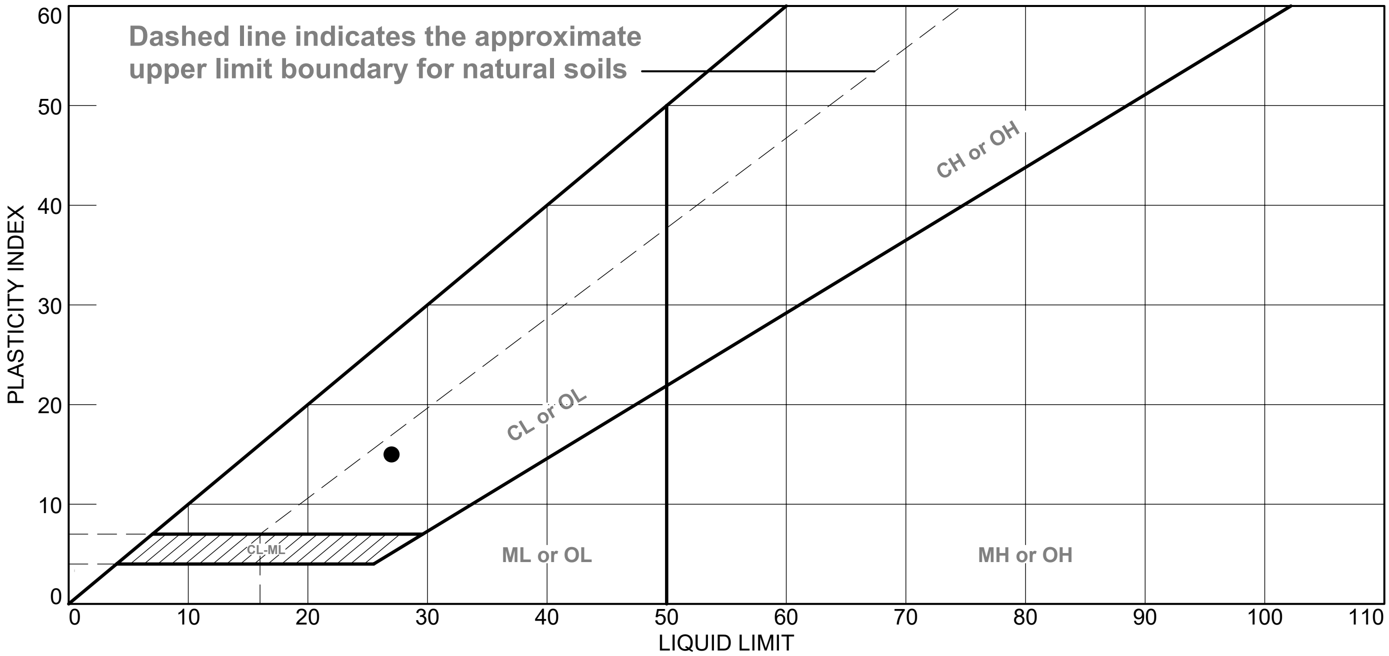
Terracon

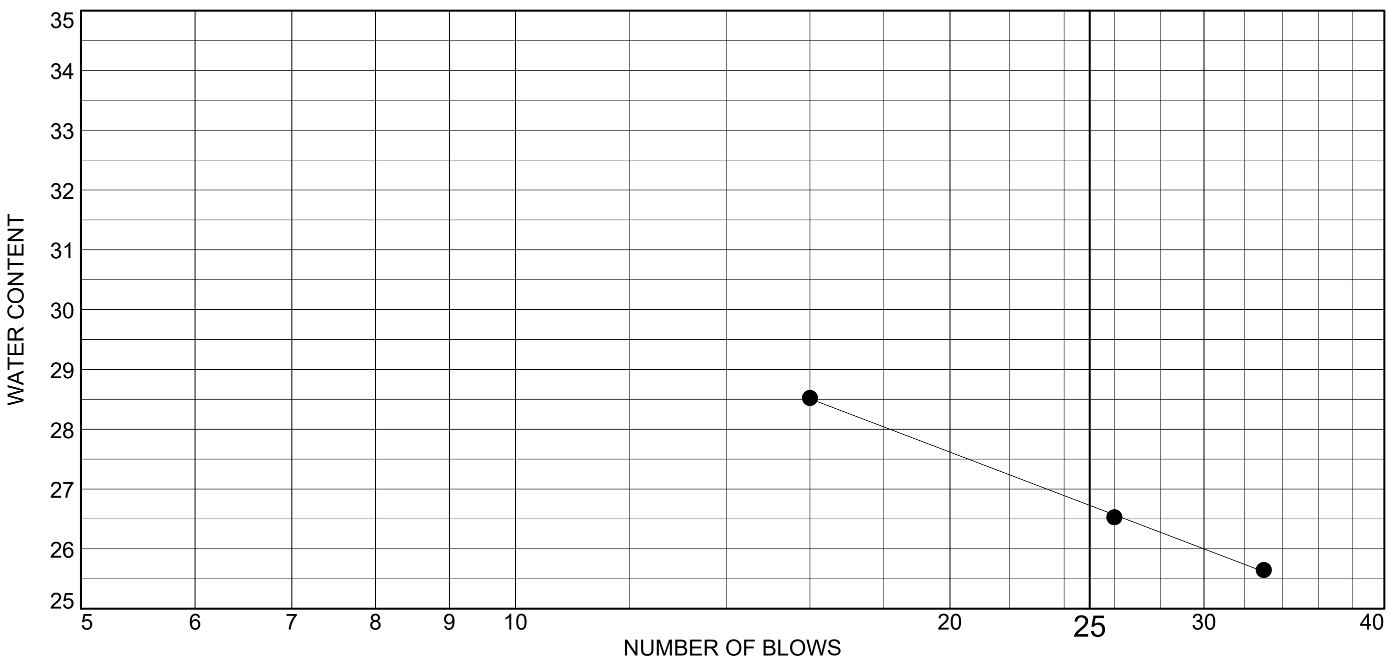
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND RUST BROWN CLAYEY SAND - ROOTS NOTED	27	12	15	82.3	45.8	SC

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-12 **Depth:** 20.0'-22.0'
Sample Number: 0825

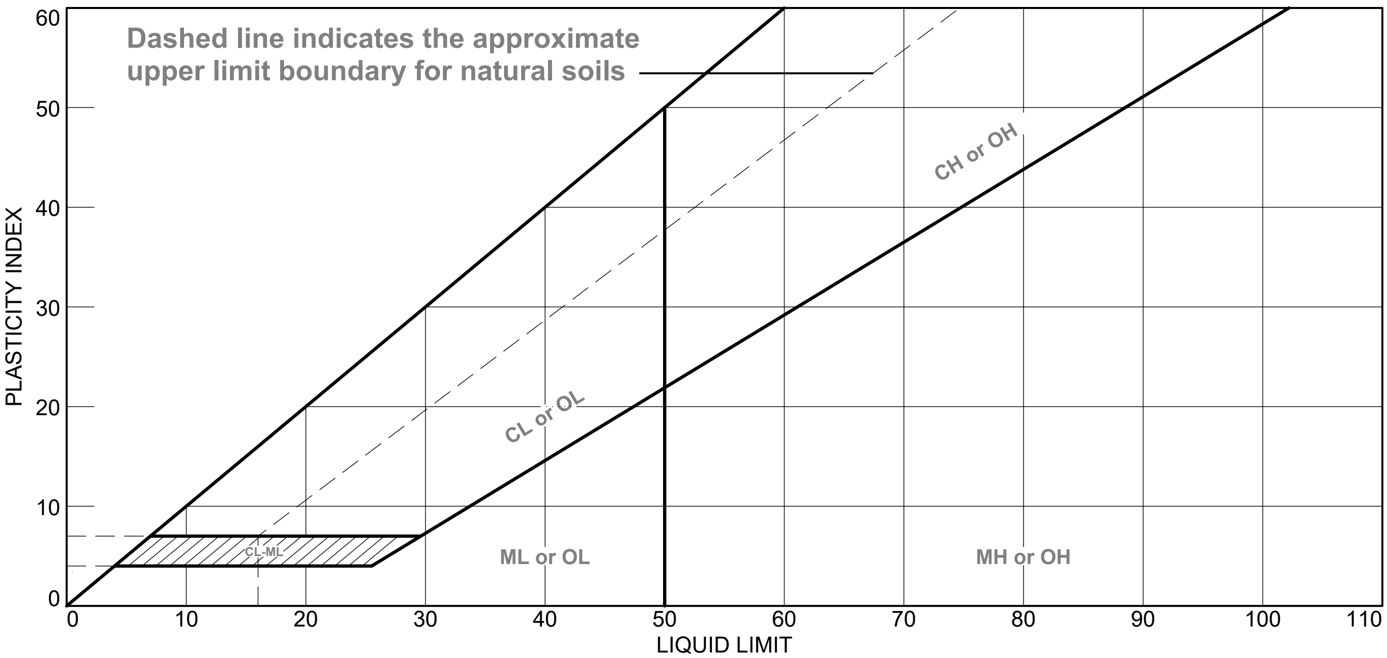
Terracon

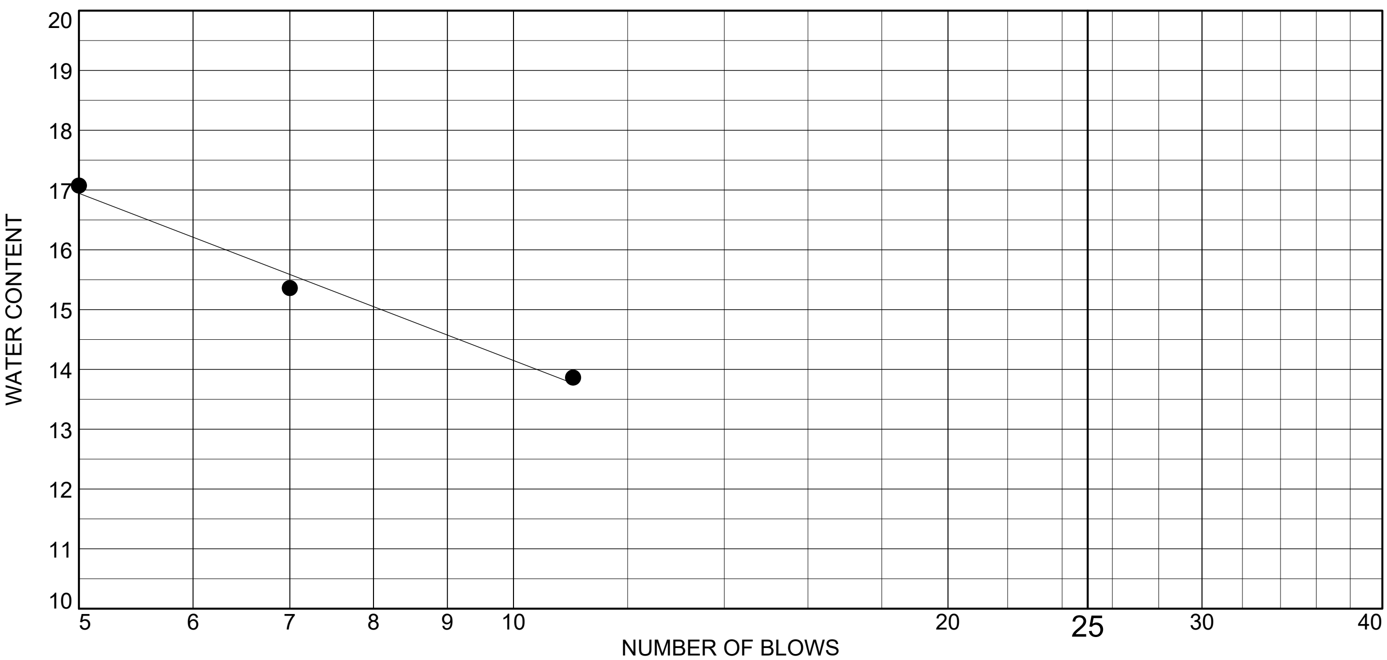
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	10	13	NP	21.4	6.2	SP-SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-12 **Depth:** 25.5'-26.0'
Sample Number: 0845

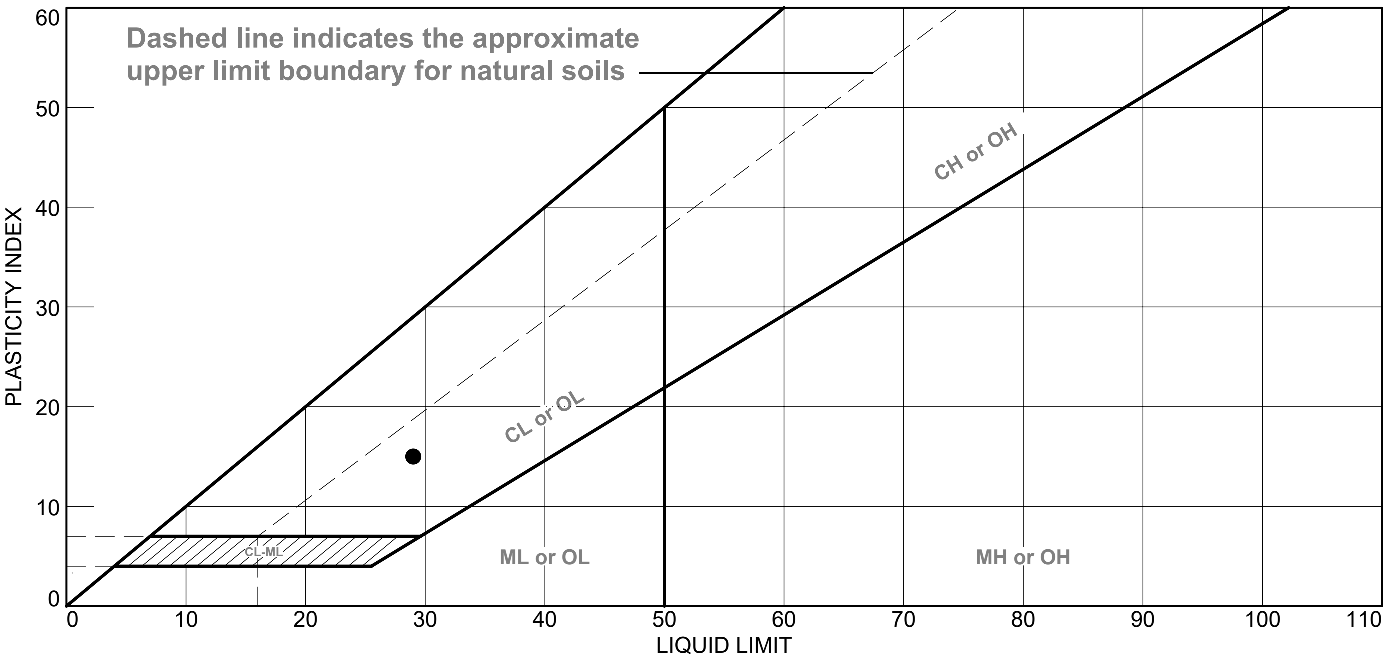
Terracon

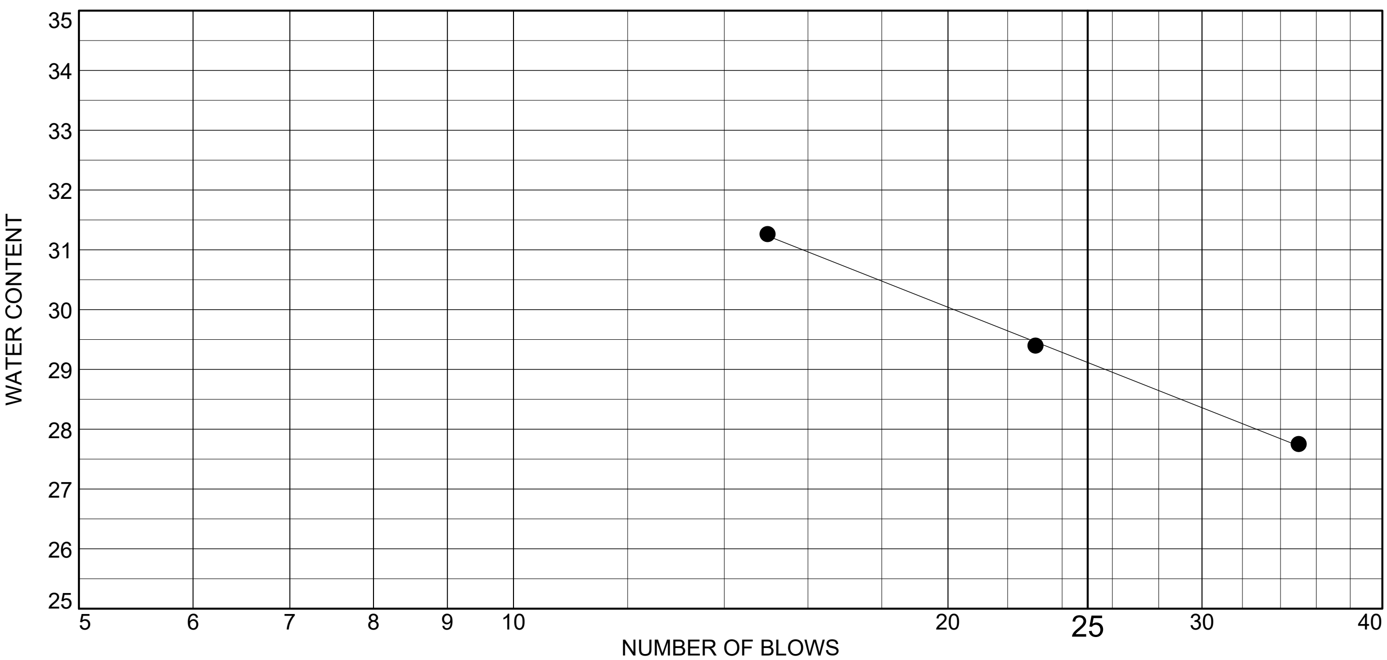
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY LEAN CLAY WITH SAND - SILT POCKETS NOTED	29	14	15	96.1	80.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-12 **Depth:** 85.0'-87.0'
Sample Number: 1245

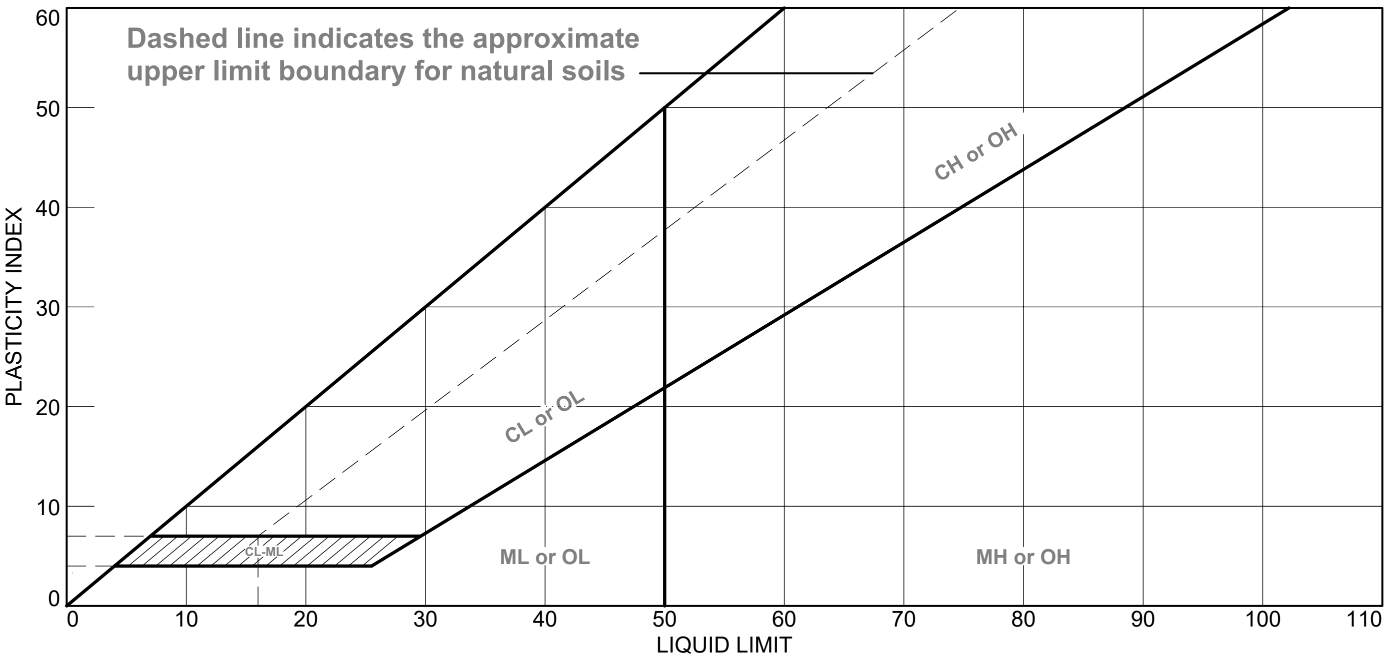
Terracon

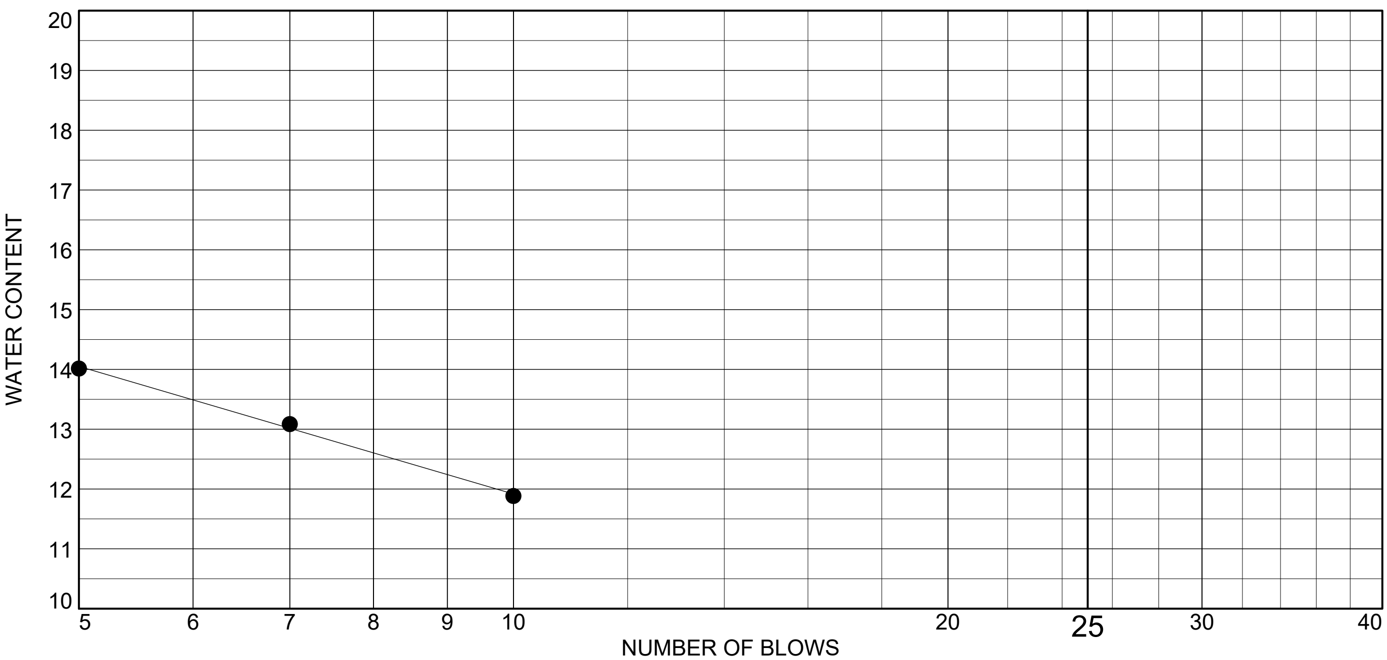
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWN AND GRAY POORLY GRADED SAND WITH SILT	9	10	NP	30.5	11.1	SP-SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-13 **Depth:** 25.0'-27.0'

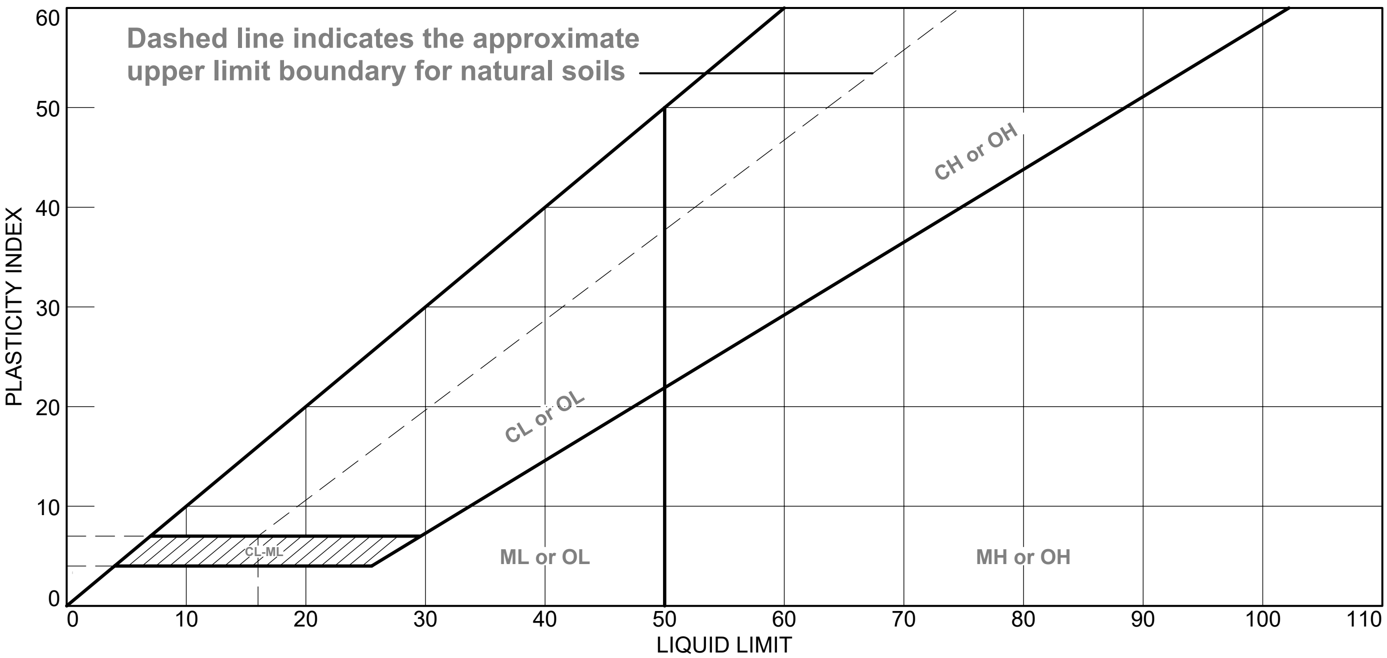
Sample Number: 0845

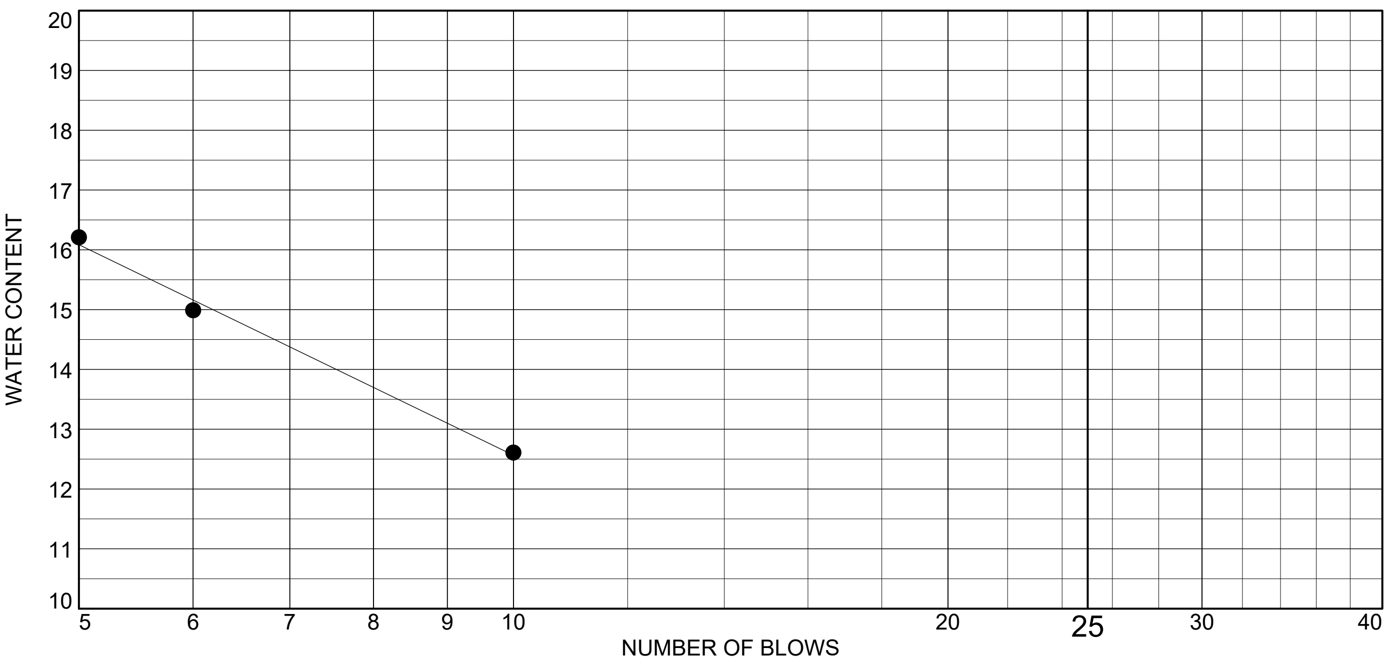
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SILTY SAND	8	13	NP	86.6	24.5	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-13 **Depth:** 60.5'-61.0'
Sample Number: 1345

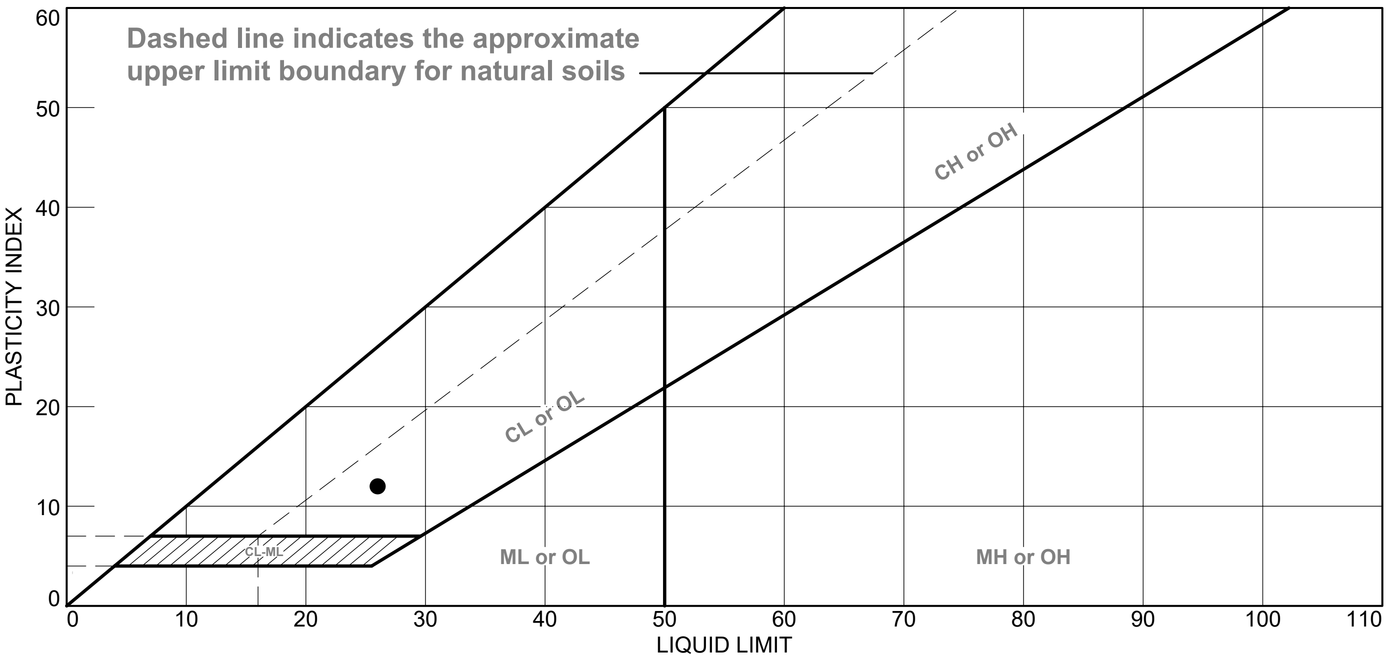
Terracon

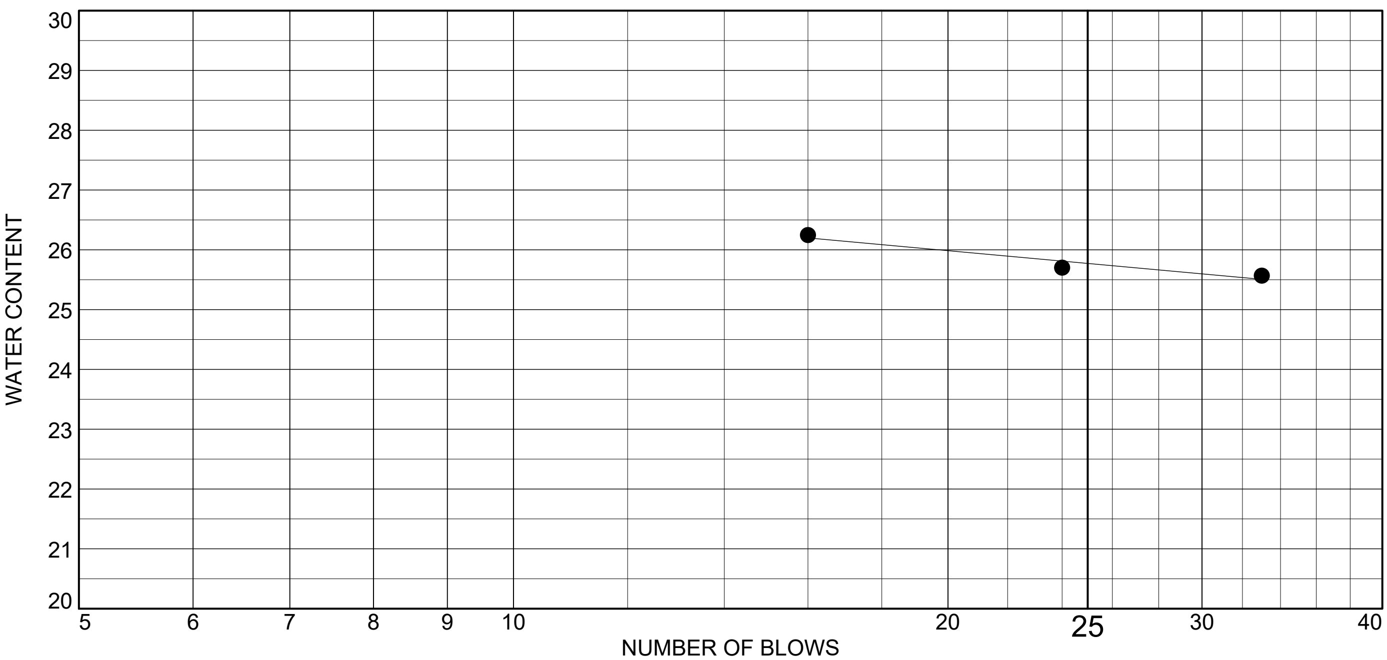
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SANDY LEAN CLAY	26	14	12	84.5	63.3	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-14 **Depth:** 45.0'-47.0'
Sample Number: 0955

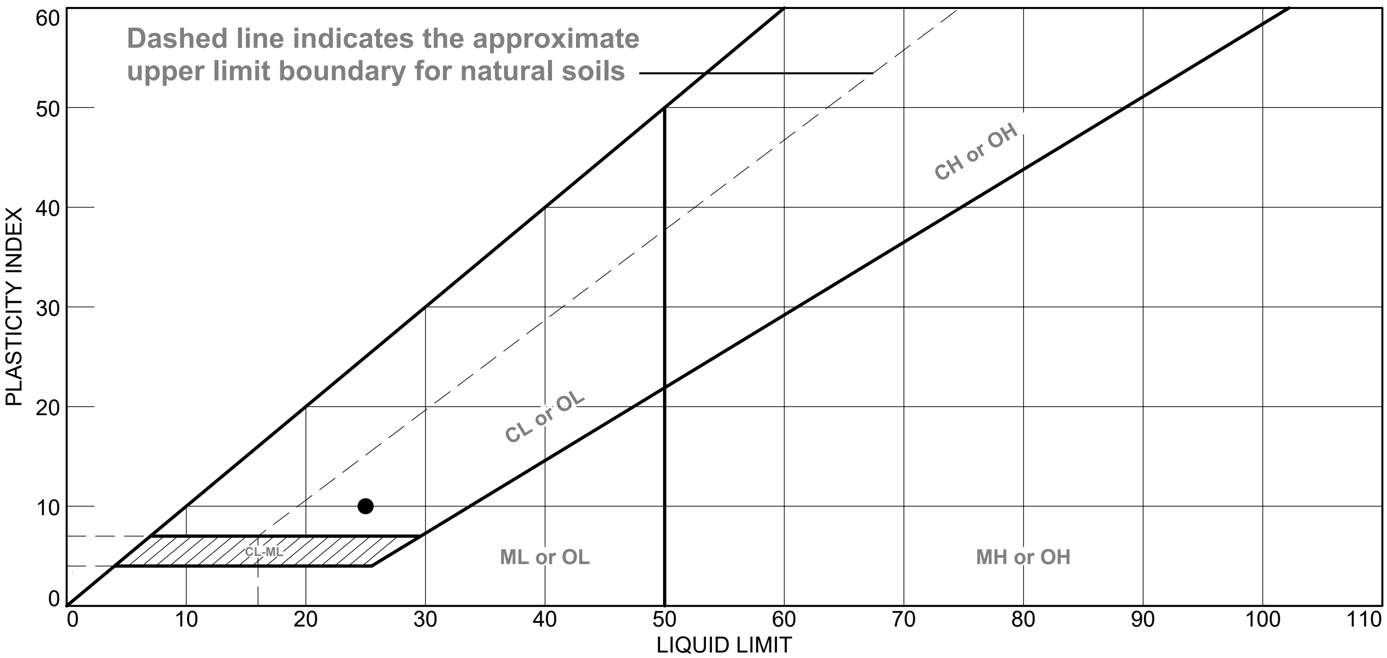
Terracon

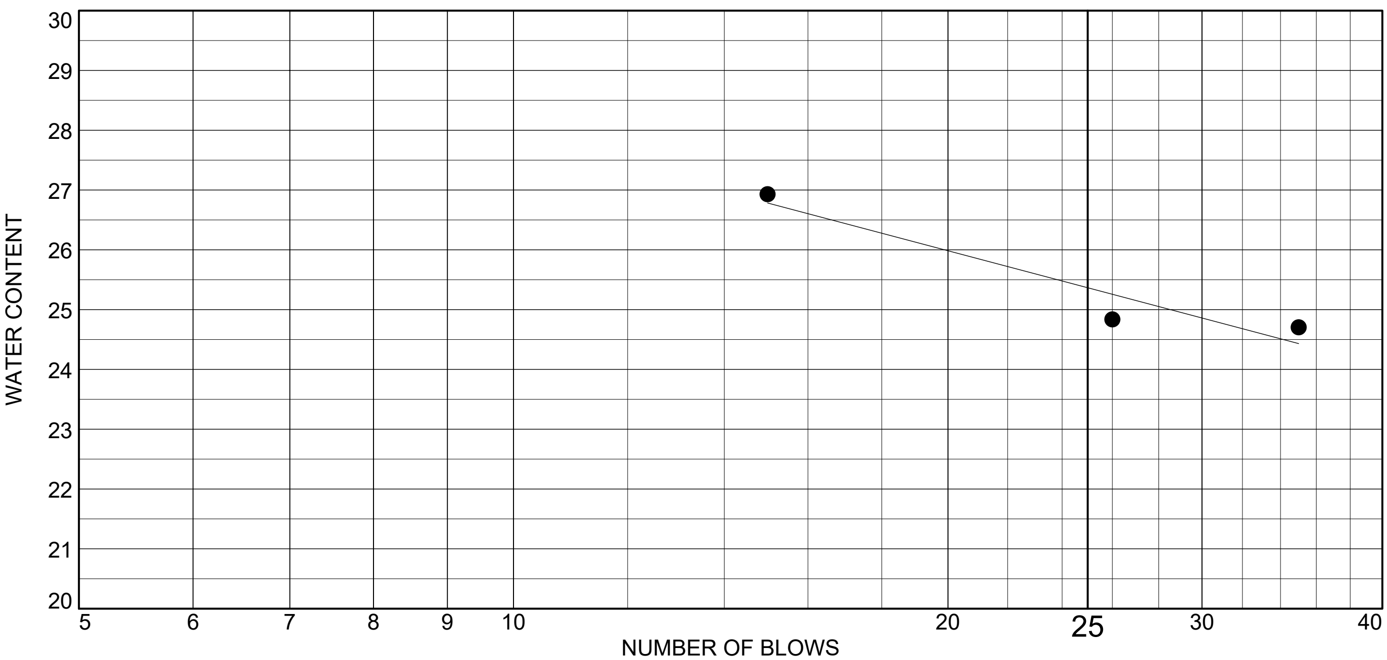
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND	25	15	10	91.1	72.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-14 **Depth:** 55.5'-56.0'
Sample Number: 1045

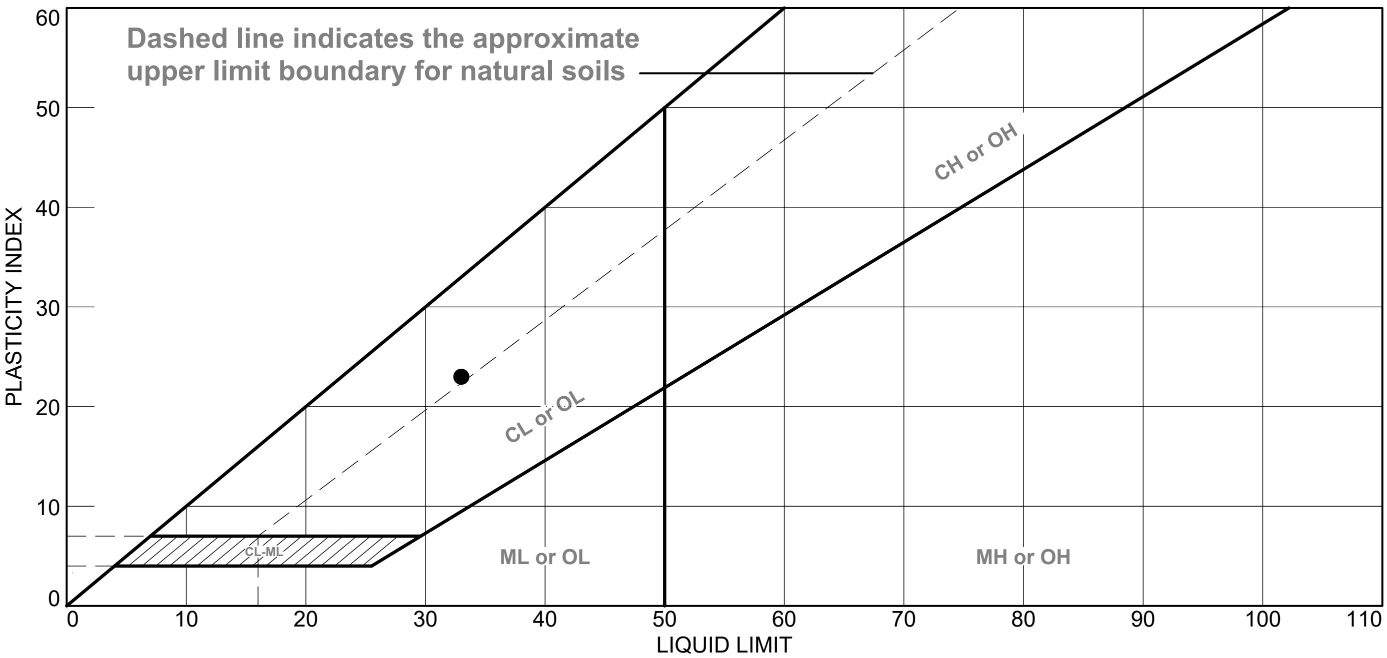
Terracon

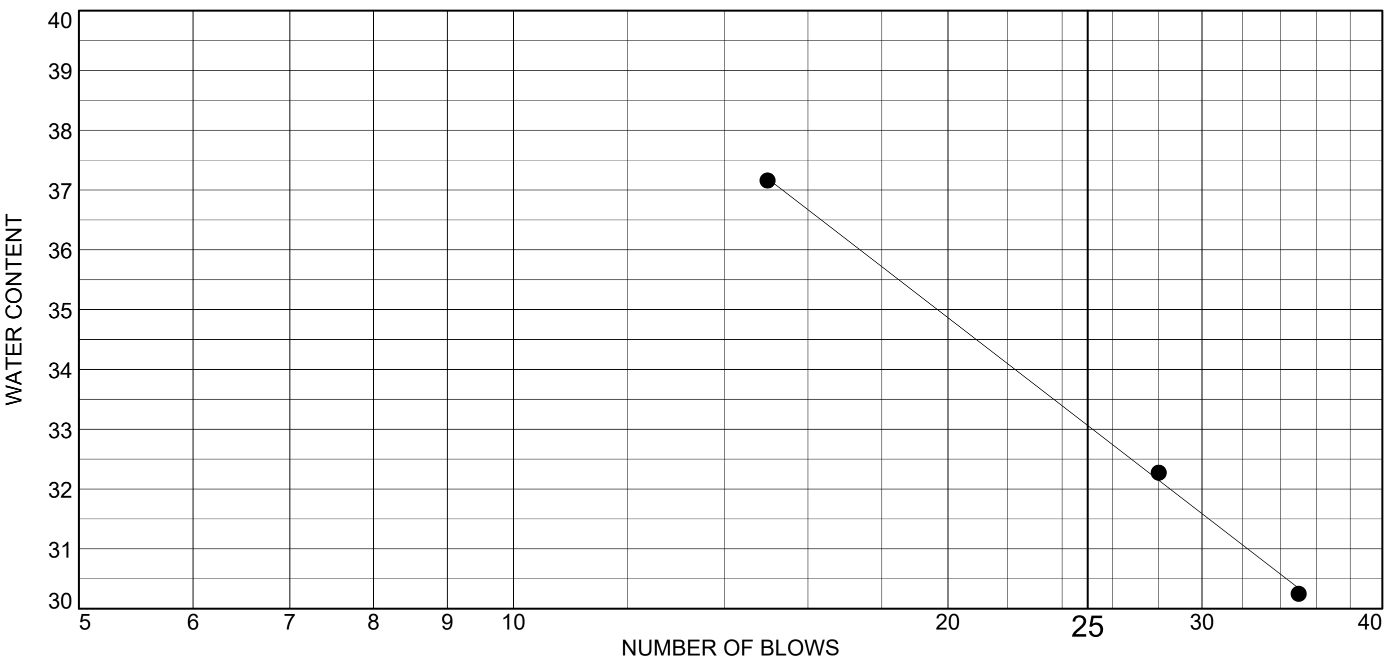
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SANDY LEAN CLAY	33	10	23	95.1	59.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

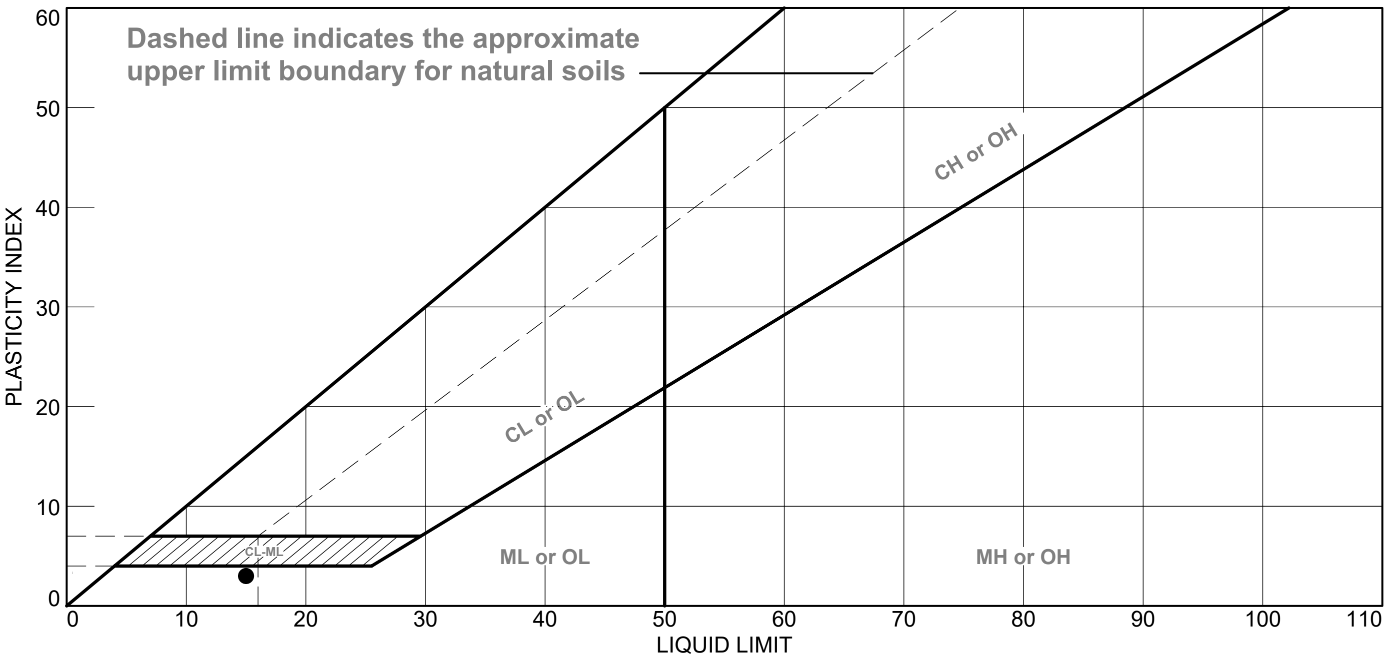
Source of Sample: APW-15 **Depth:** 20.0'-22.0'
Sample Number: 1005

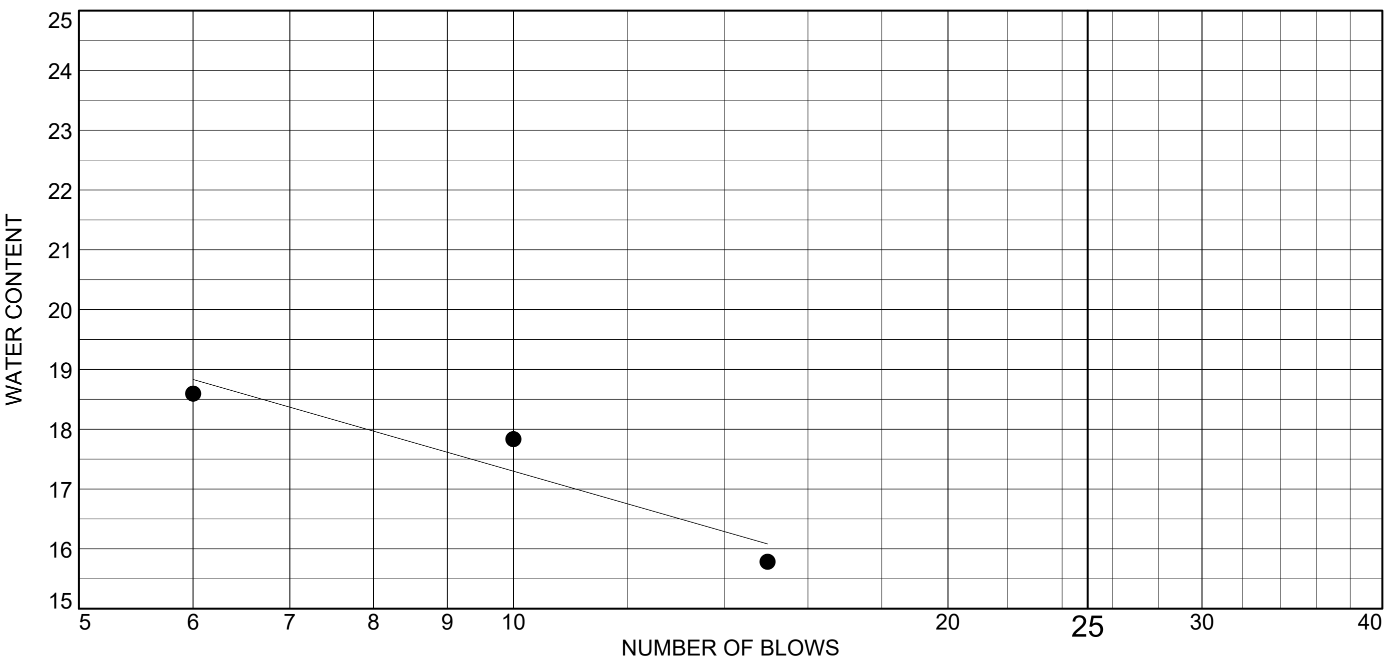
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY SILTY SAND	15	12	3	75.0	45.8	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

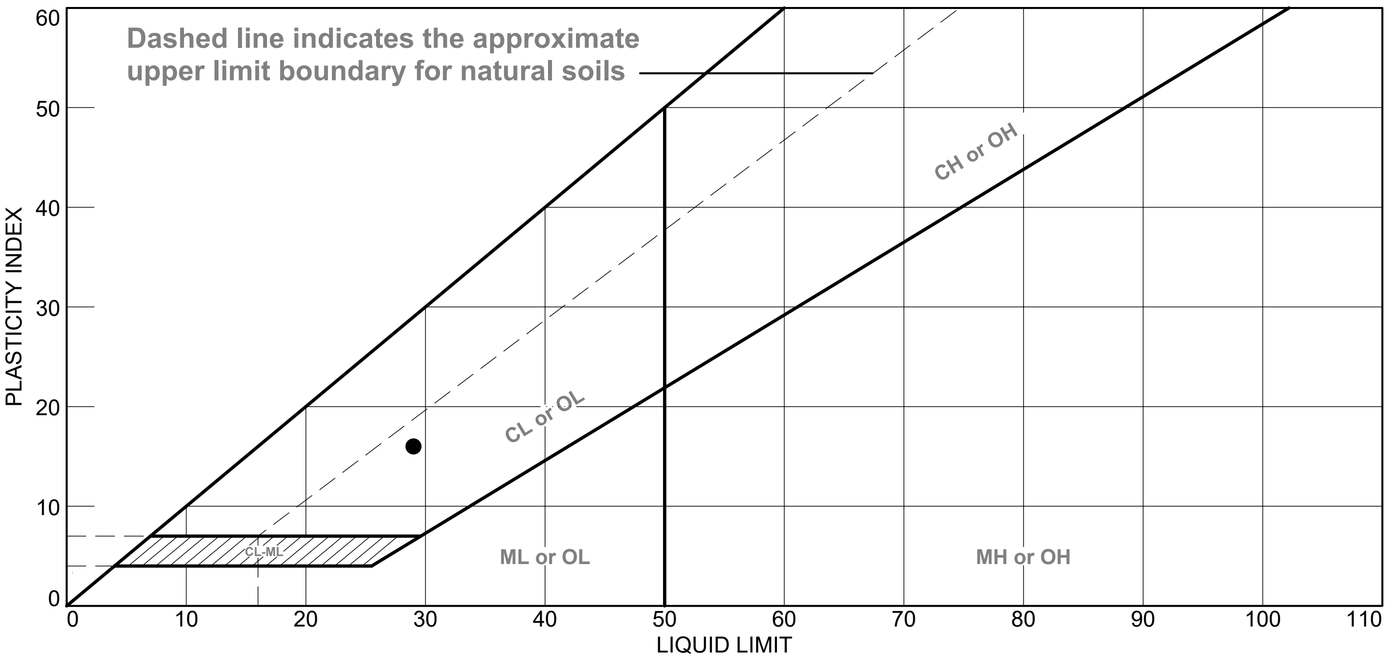
Source of Sample: APW-15 **Depth:** 100.5'-101.0'
Sample Number: 0755

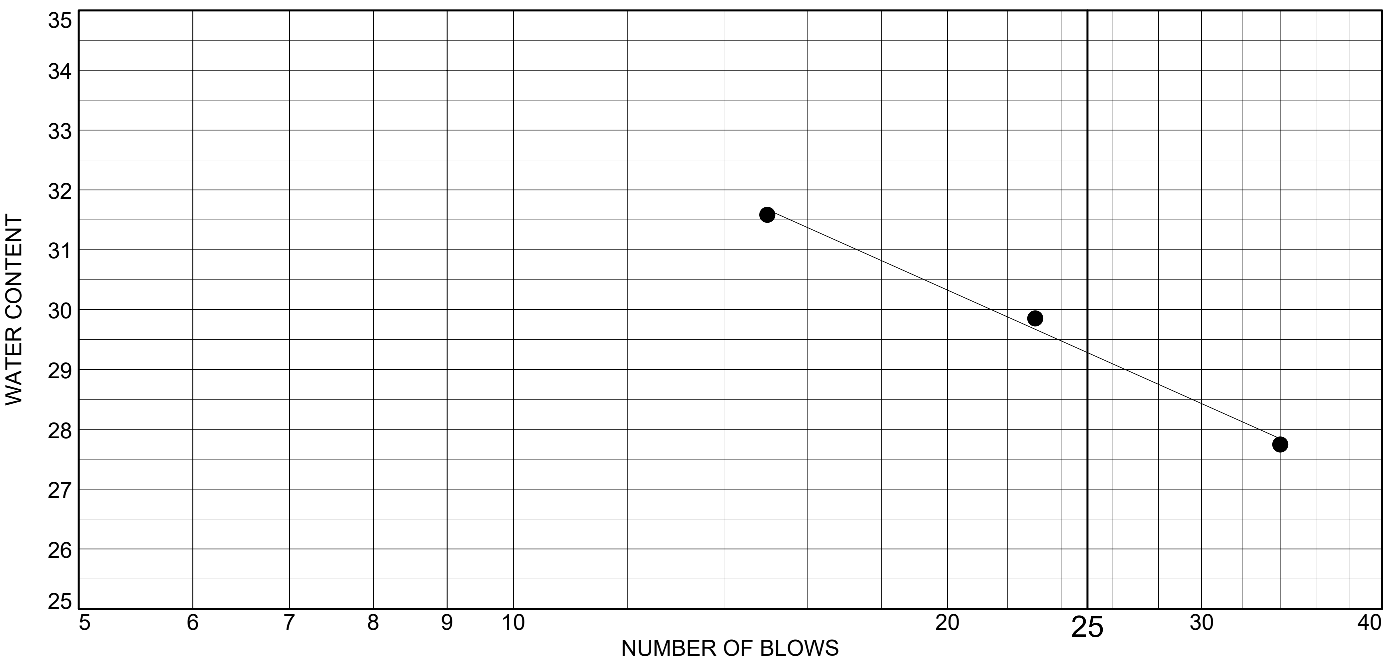
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY LEAN CLAY WITH SAND	29	13	16	94.1	76.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-15 **Depth:** 105.0'-107.0'
Sample Number: 0905

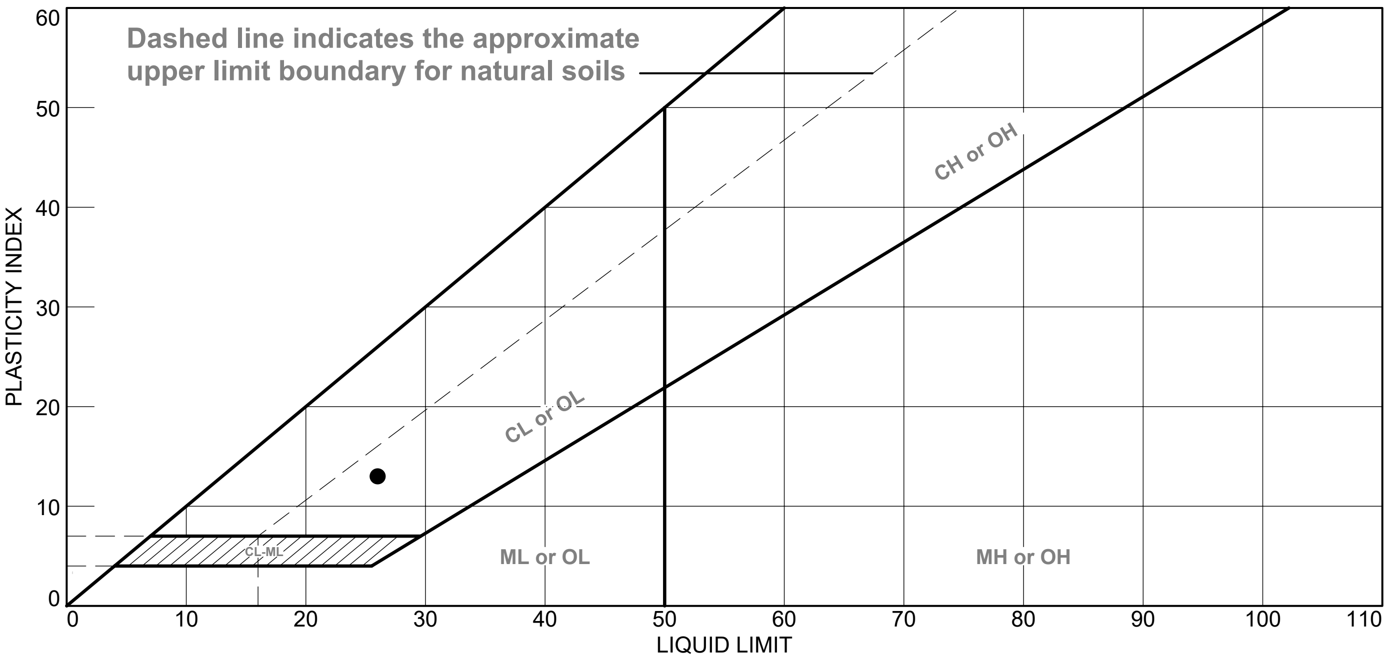
Terracon

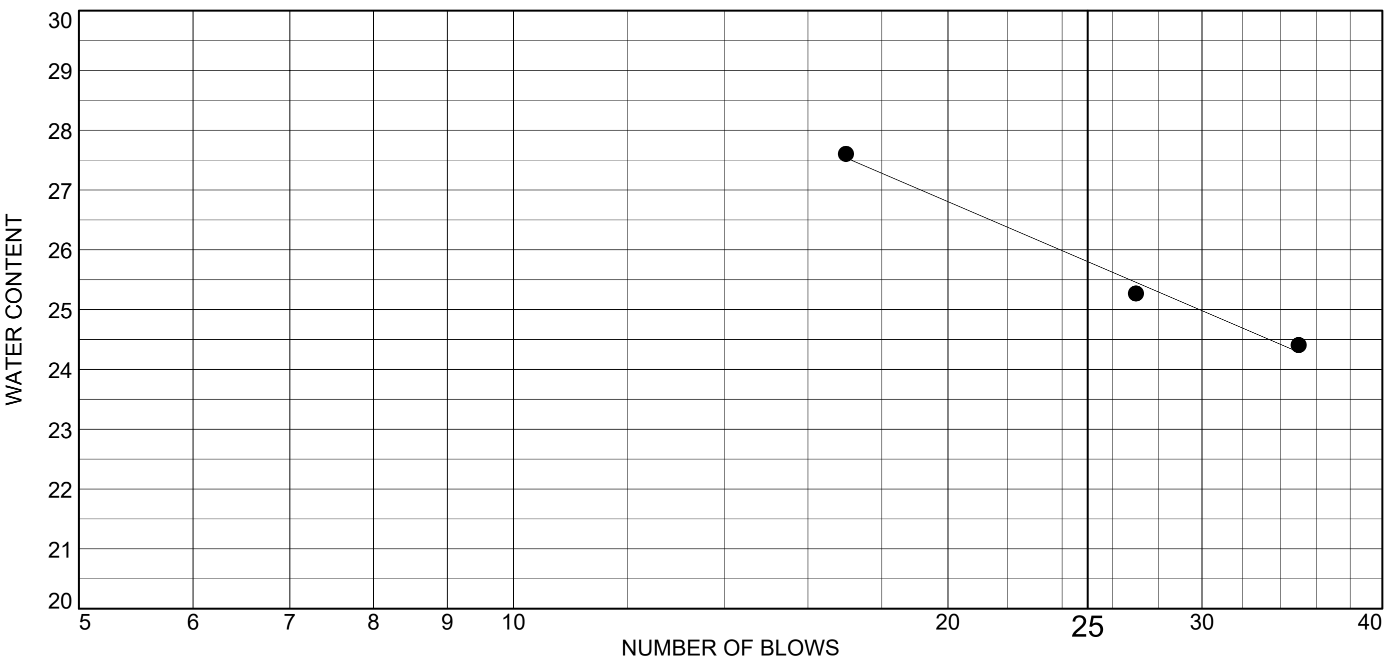
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY LEAN CLAY WITH SAND	26	13	13	90.4	71.1	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-17 **Depth:** 40.0'-42.0'
Sample Number: 0945

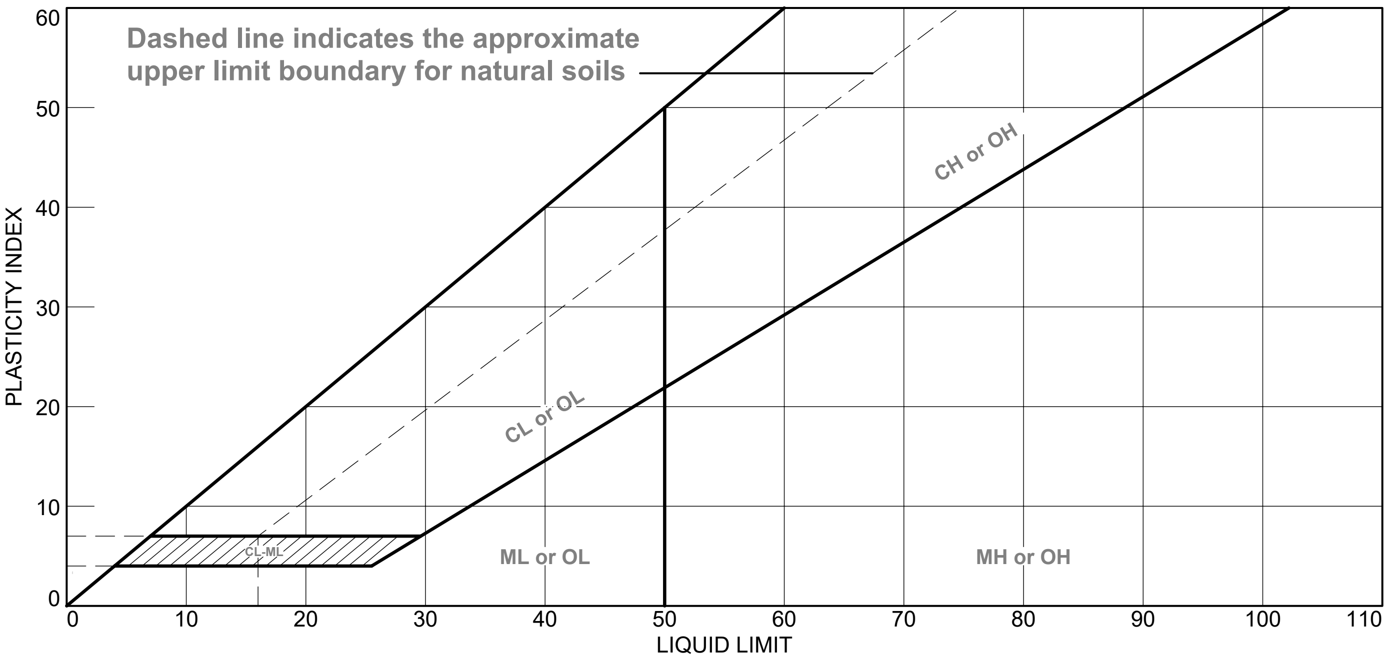
Remarks:

Terracon

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY WELL GRADED SAND WITH SILT	5	9	NP	47.7	8.9	SW-SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-17 **Depth:** 71.0'-71.5'
Sample Number: 1045

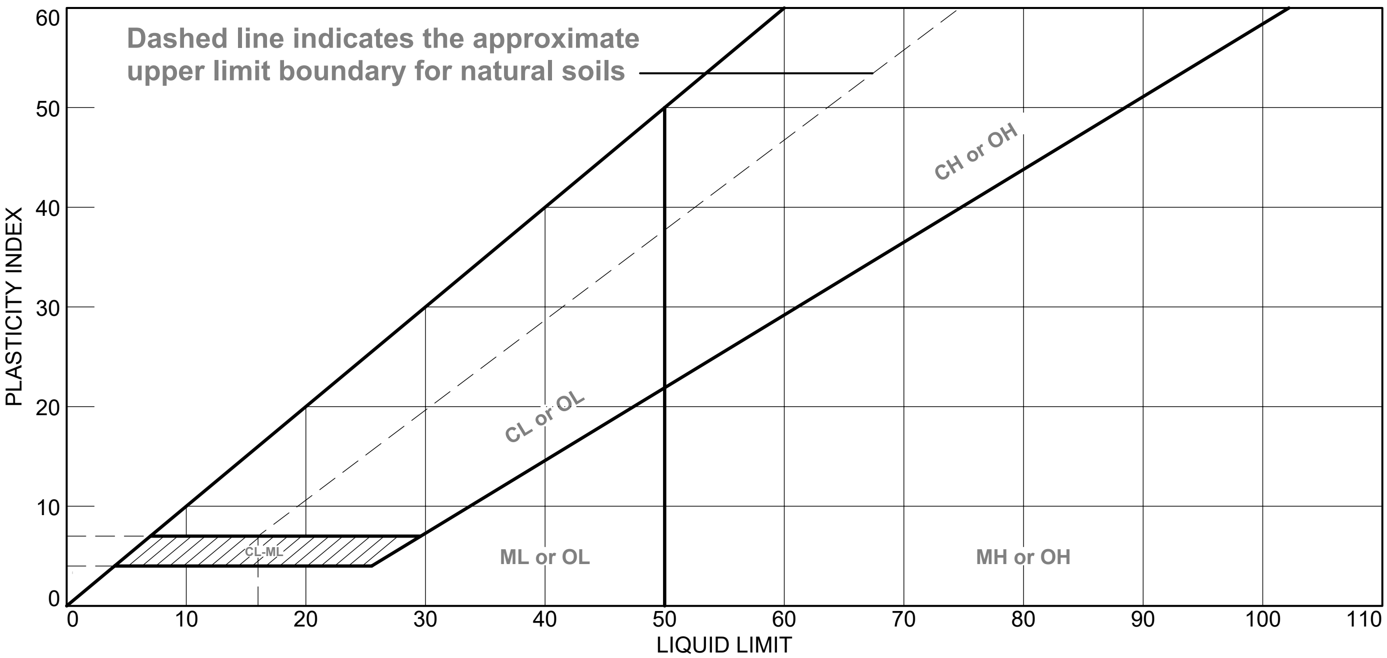
Terracon

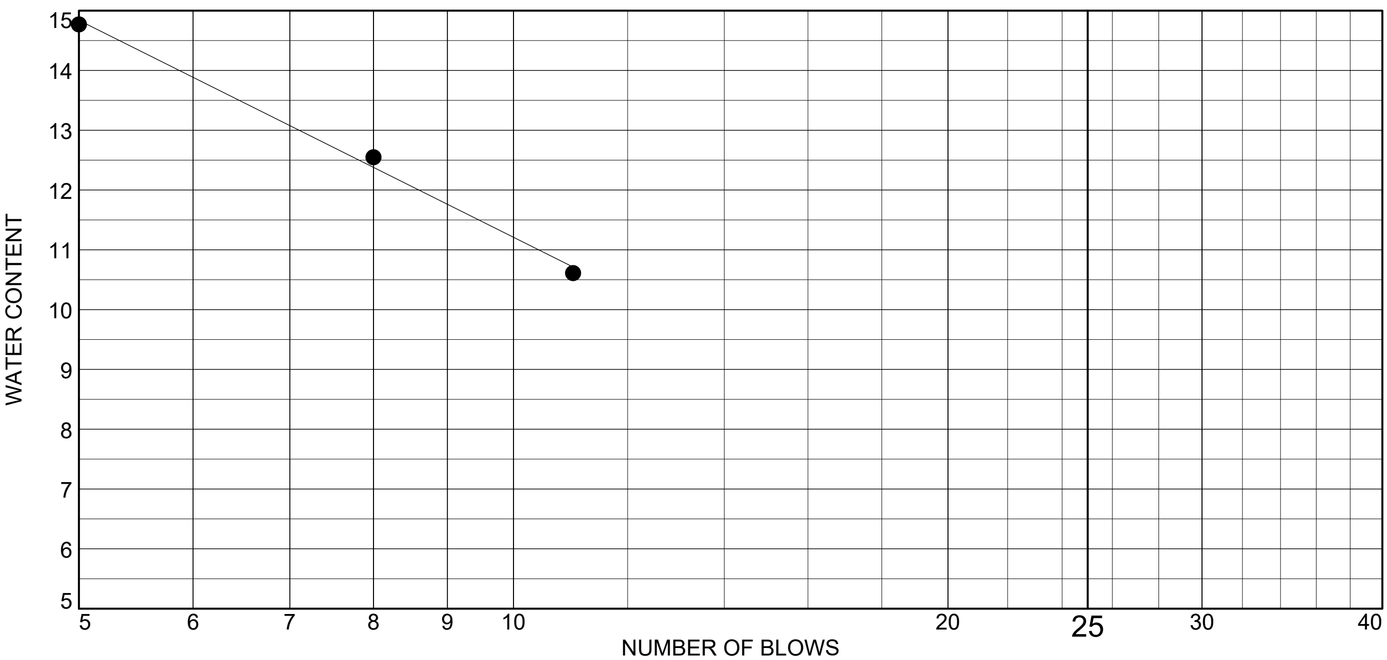
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAYISH BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	6	8	NP	23.8	6.7	SP-SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: APW-17 **Depth:** 90.5'-91.0'

Sample Number: 1200

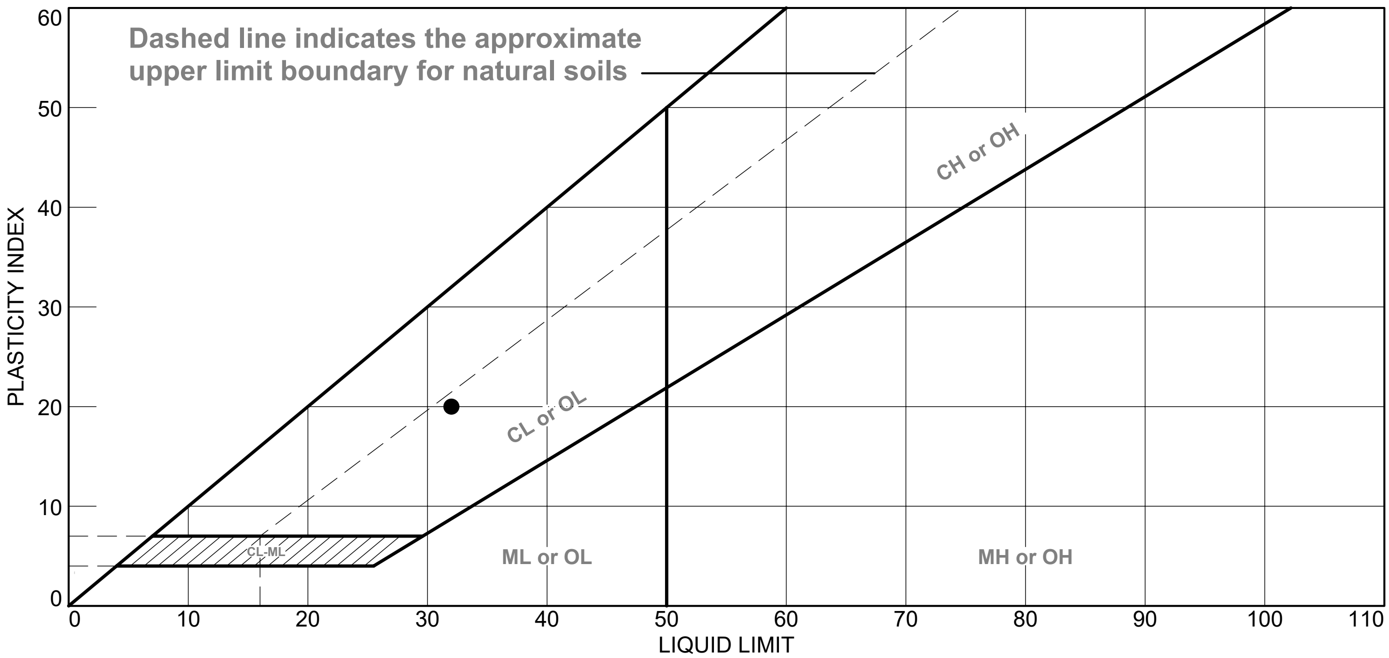
Terracon

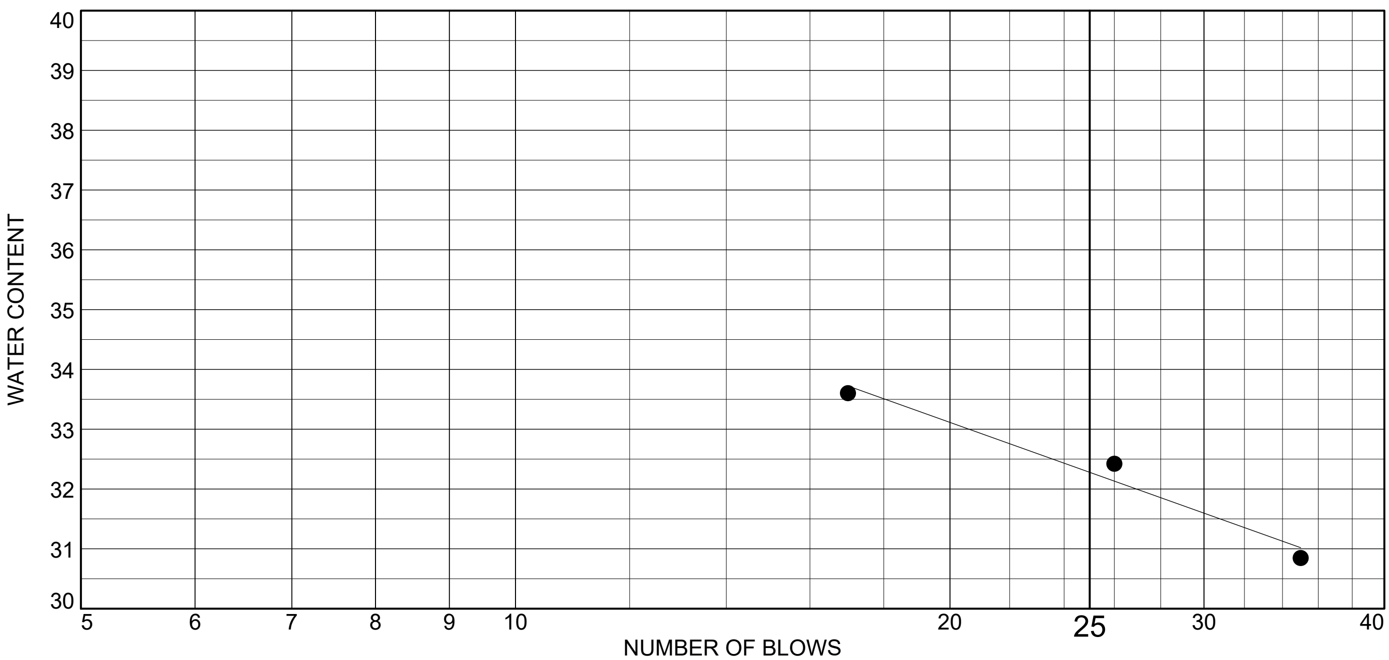
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY LEAN CLAY WITH SAND	32	12	20	93.5	76.8	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: SB-300 **Depth:** 50.0'-52.0'
Sample Number: 0825

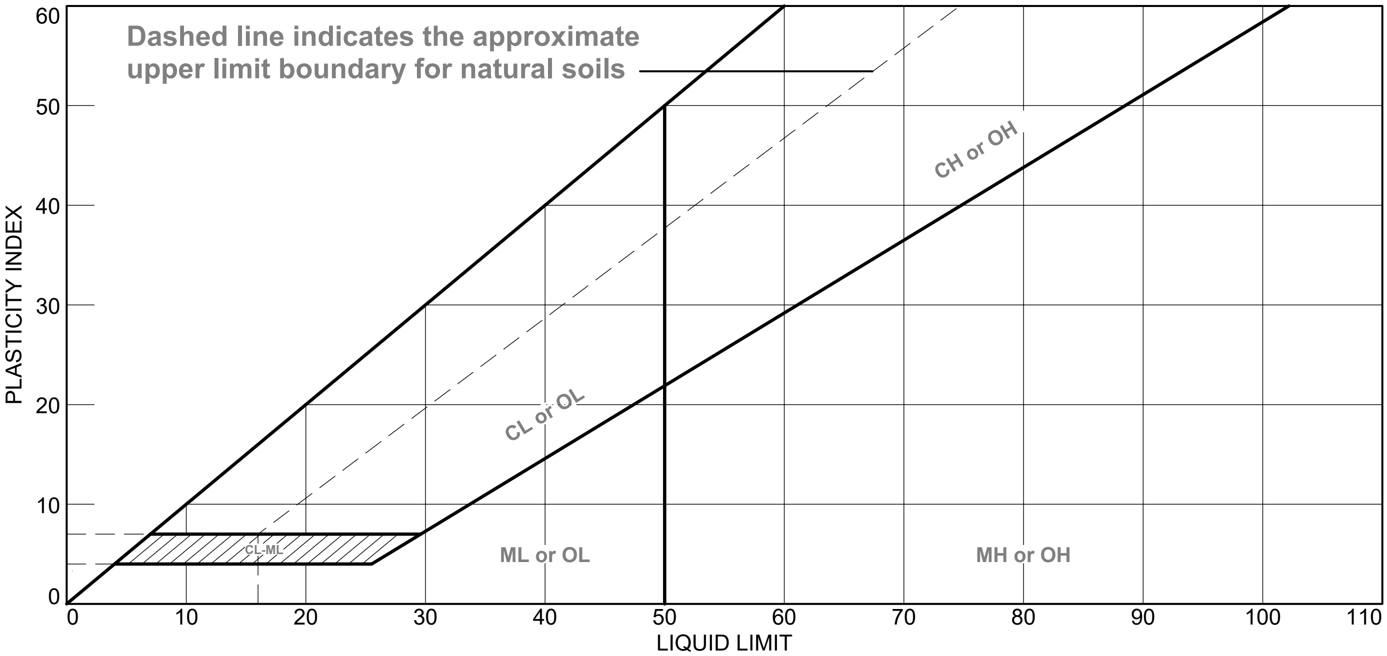
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAYISH BROWN SILTY SAND	5	9	NP	63.4	17.1	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: SB-300 **Depth:** 61.0'-61.5'
Sample Number: 0905

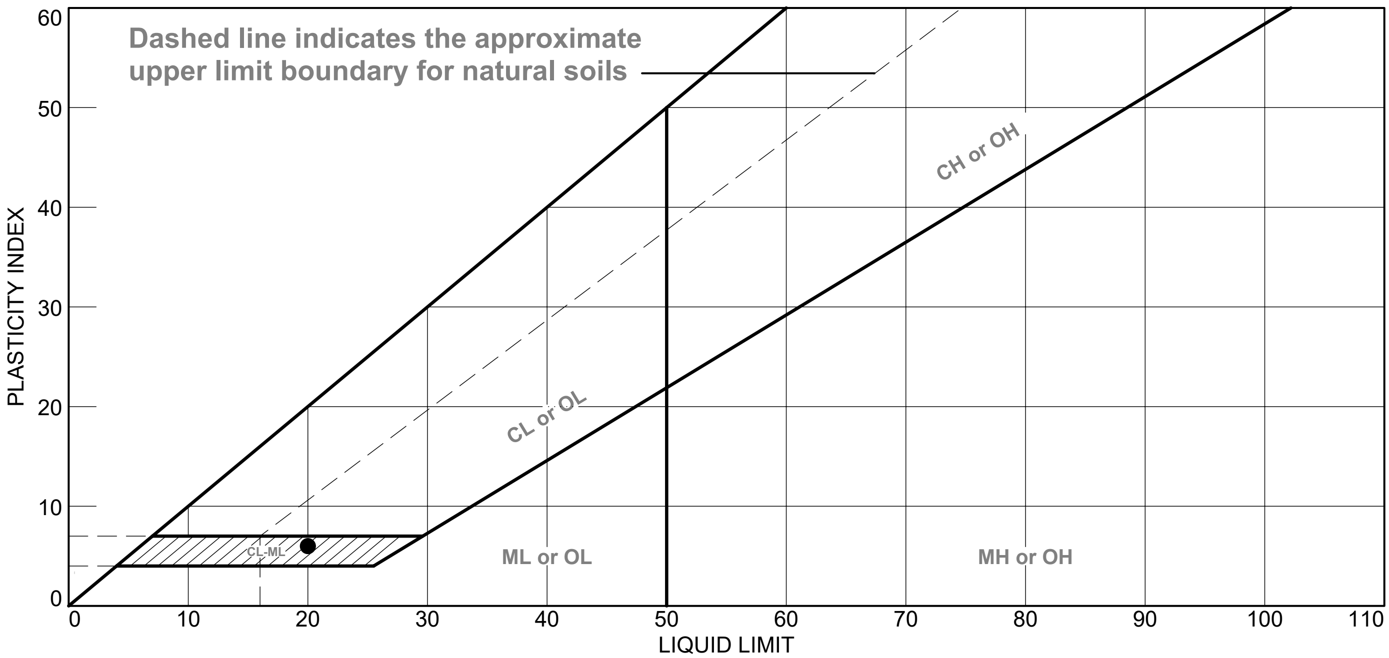
Terracon

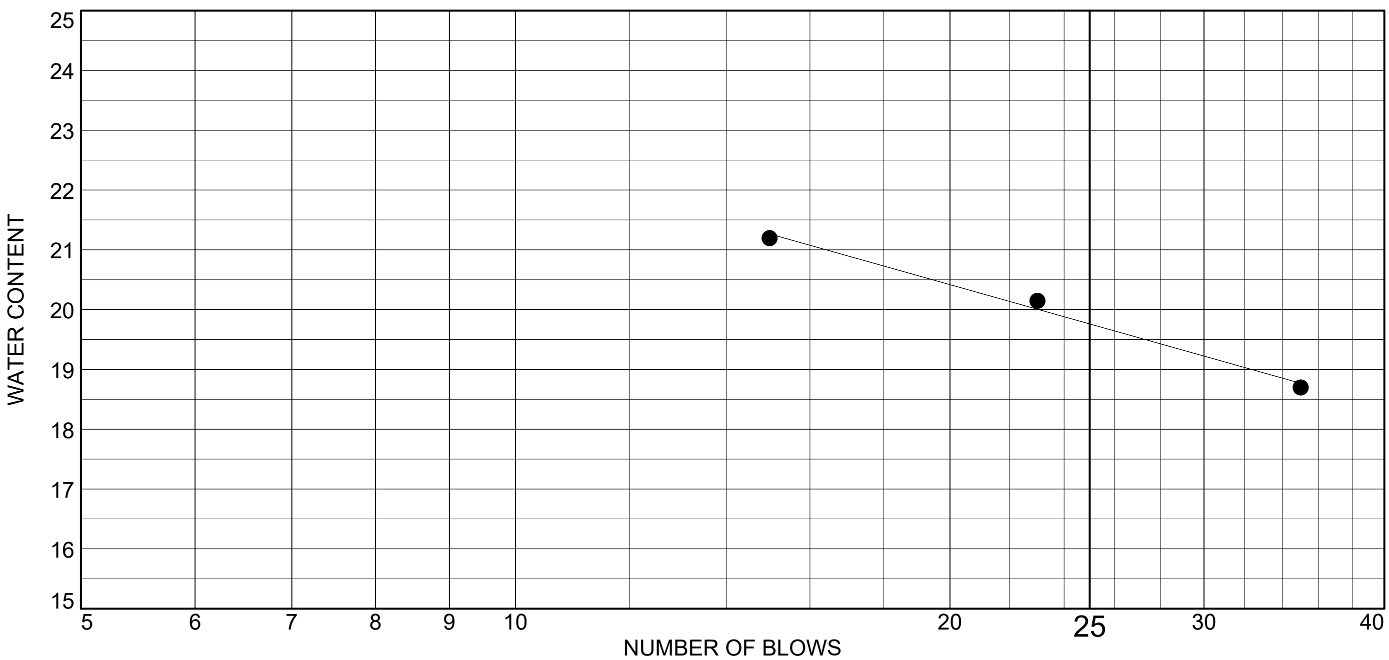
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND BROWN SANDY SILTY CLAY	20	14	6	96.1	57.6	CL-ML

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: SB-300 **Depth:** 62.5'-63.0'
Sample Number: 0920

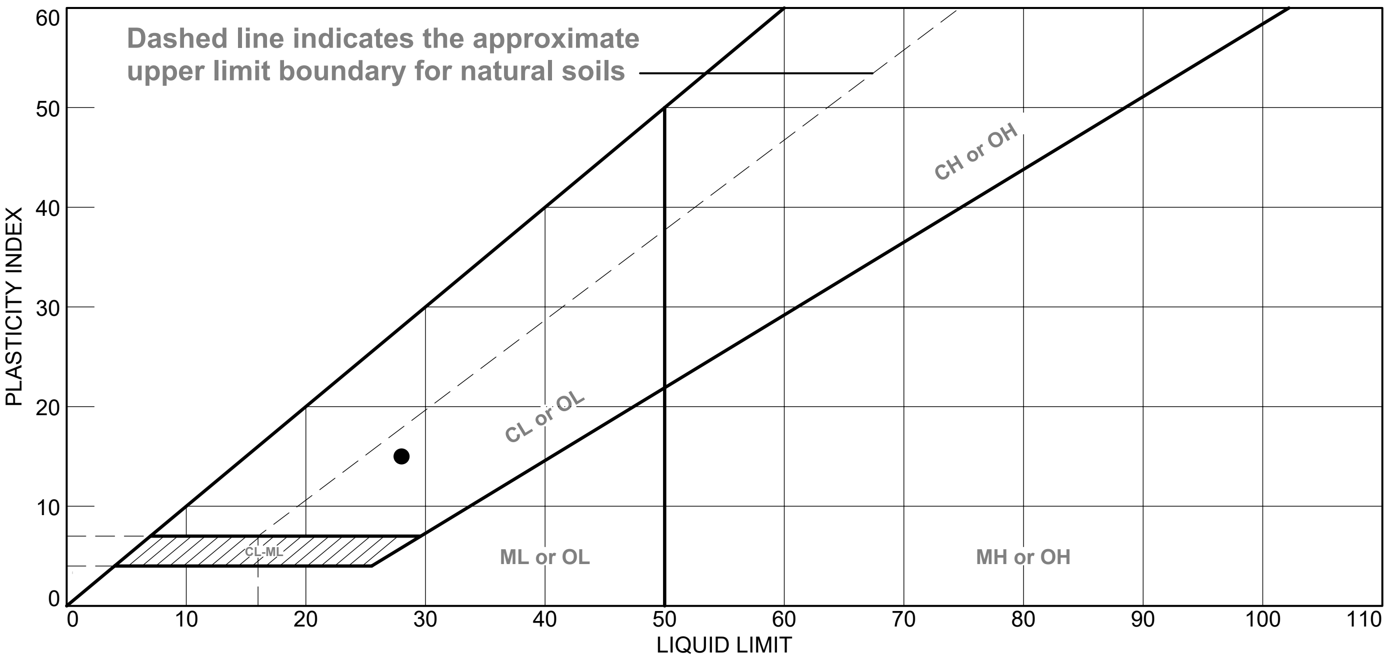
Terracon

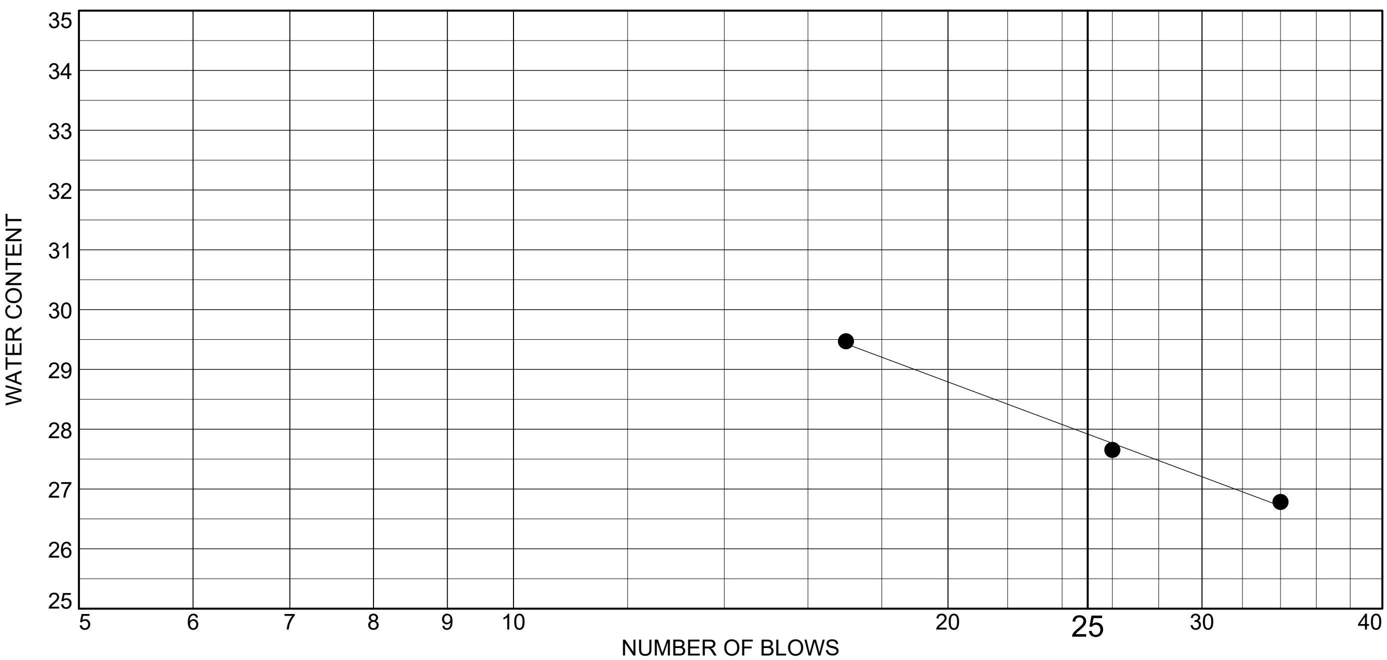
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY SANDY LEAN CLAY	28	13	15	91.6	69.3	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

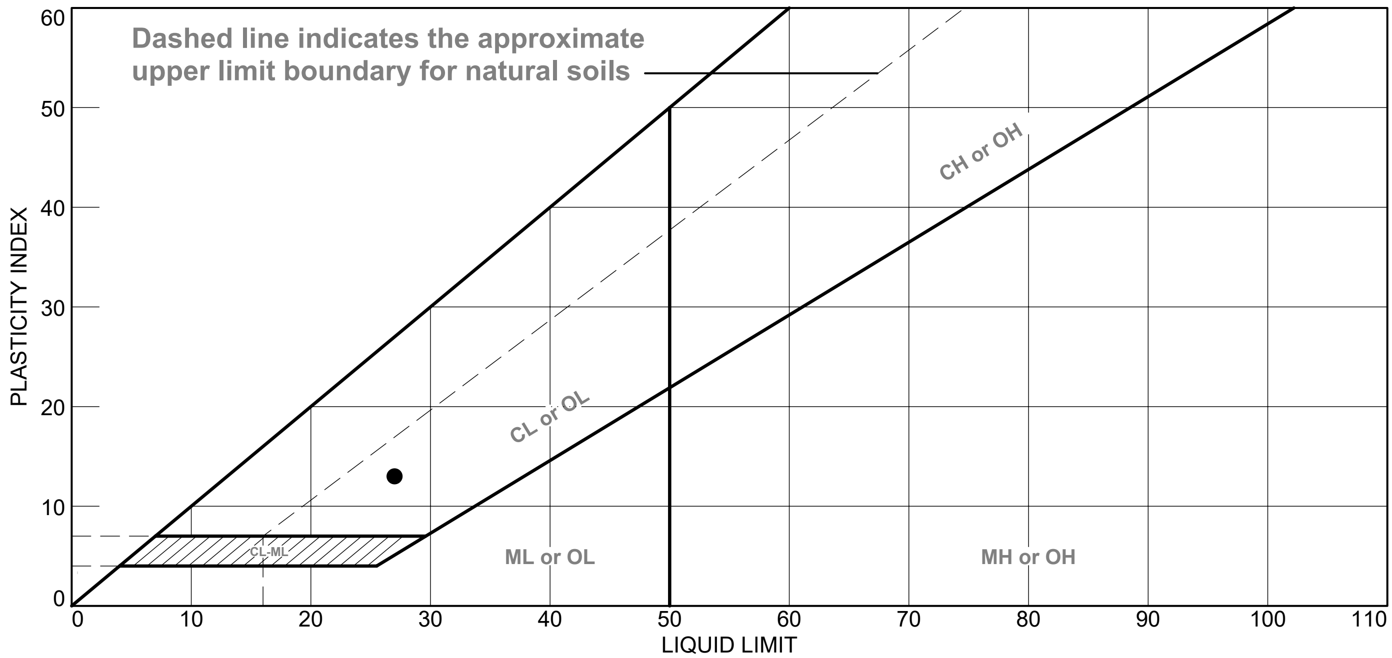
Source of Sample: SB-300 **Depth:** 105.0'-107.0'
Sample Number: 1350

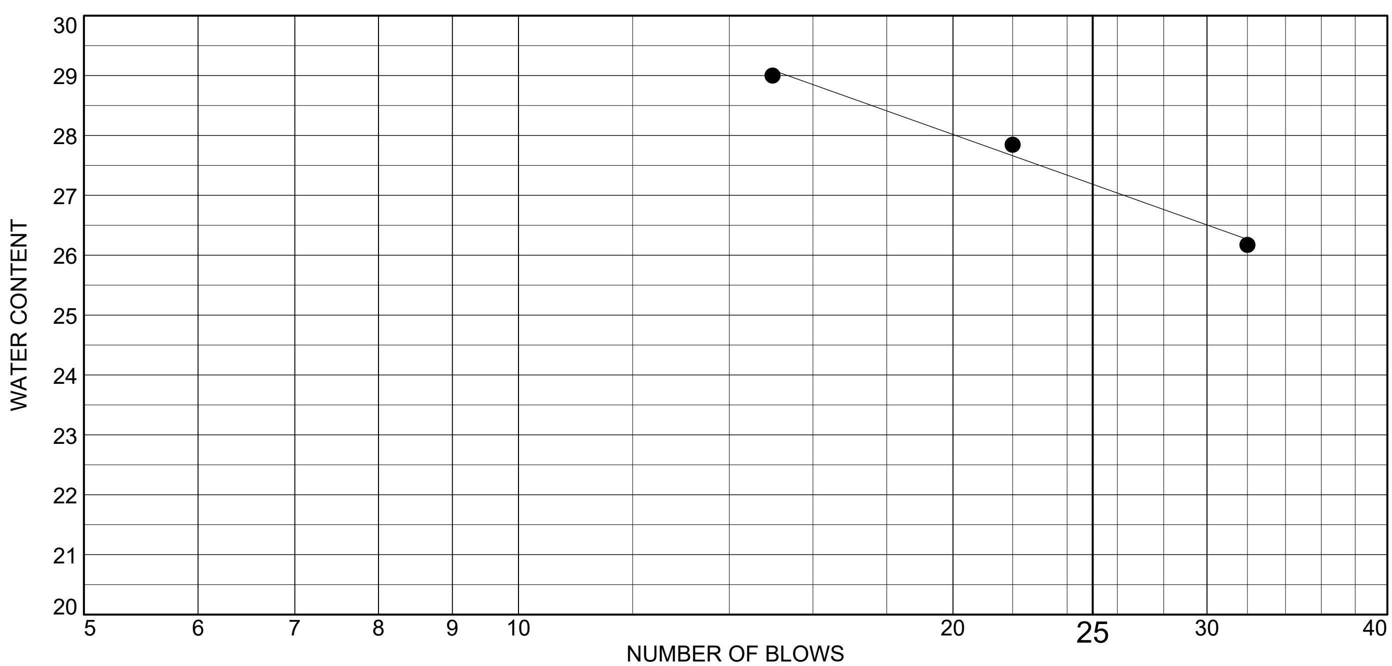
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN AND GRAY SANDY LEAN CLAY	27	14	13	86.0	65.4	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

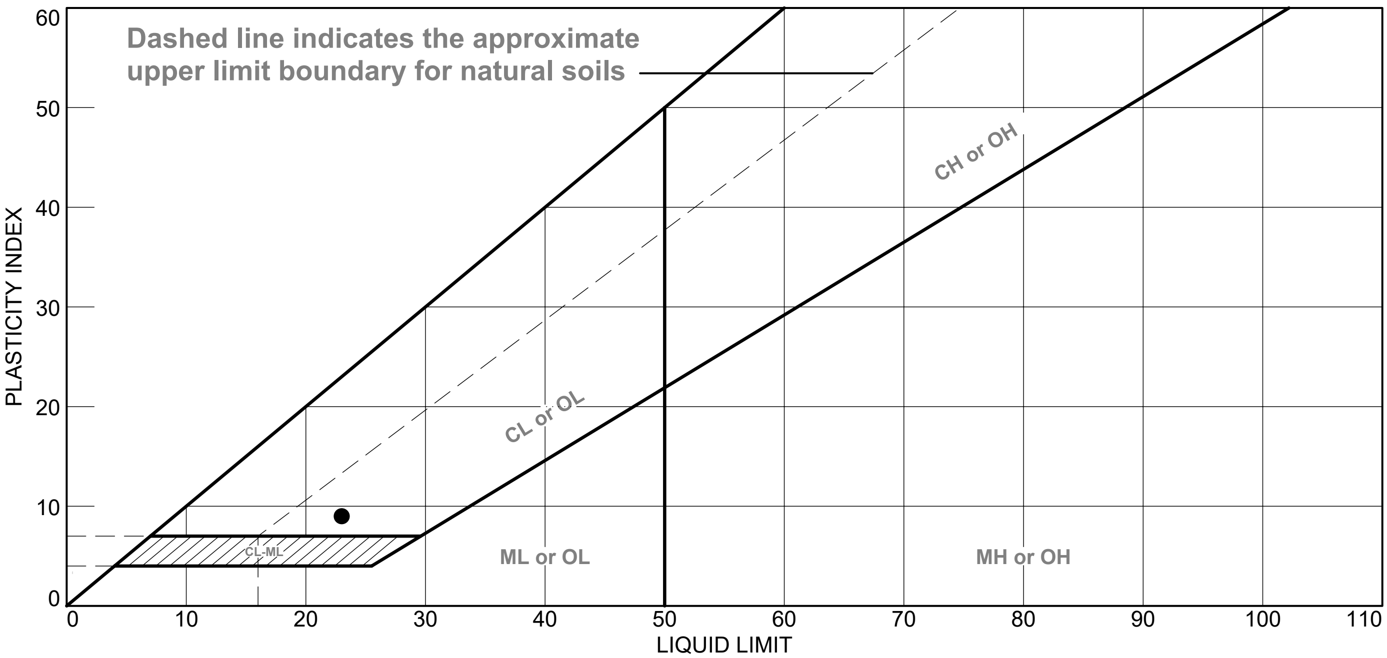
Source of Sample: SB-301 **Depth:** 48.0'-50.0'
Sample Number: 1330

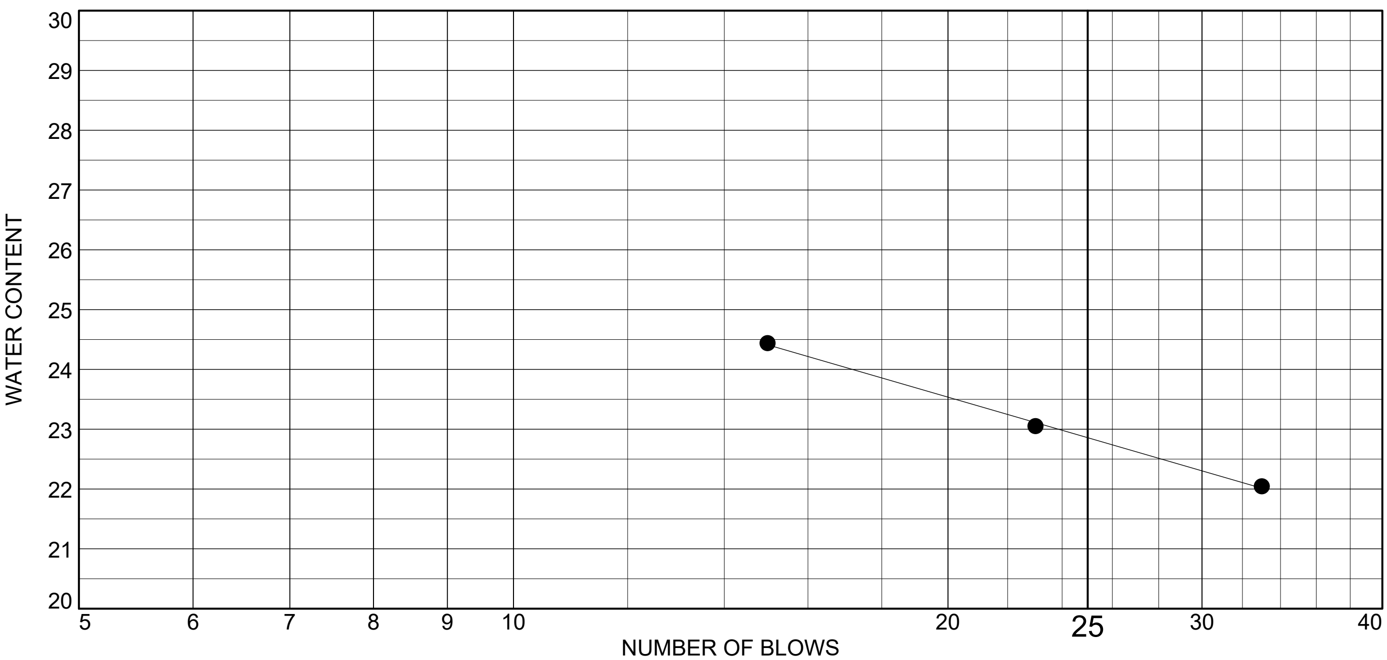
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY SANDY LEAN CLAY	23	14	9	92.5	68.7	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: SB-301 **Depth:** 68.5'-69.0'
Sample Number: 1600

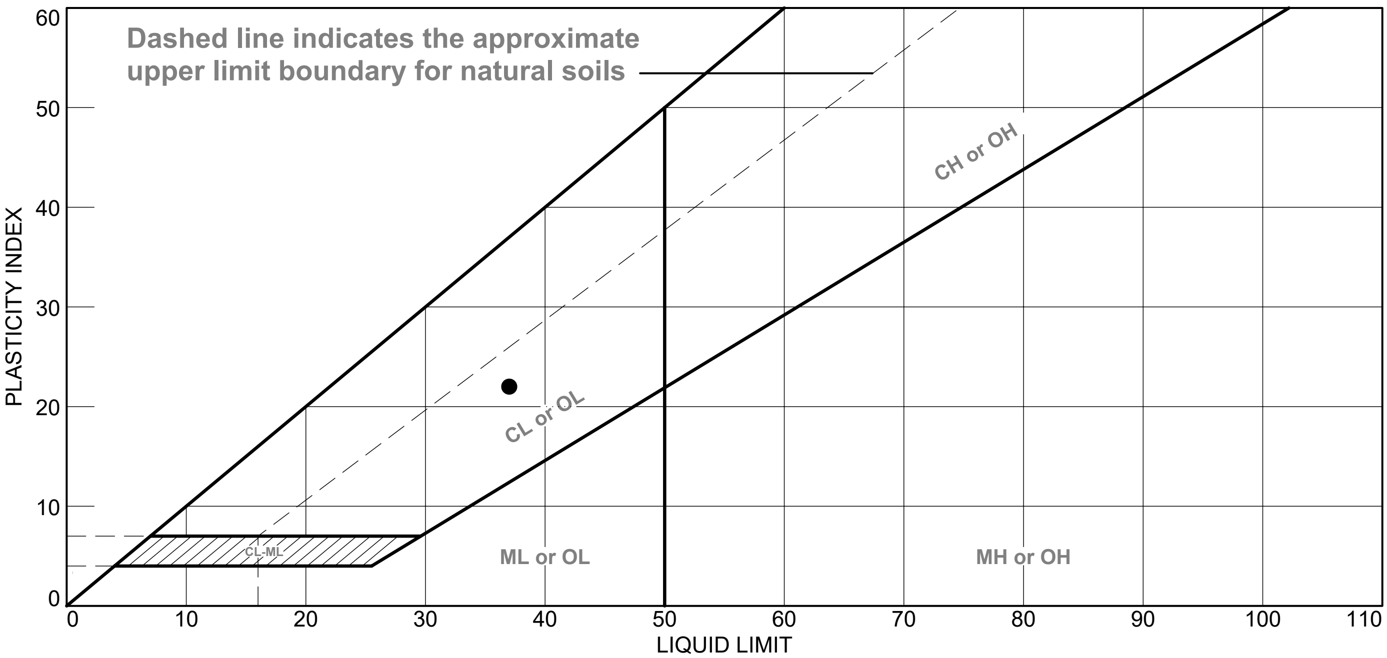
Terracon

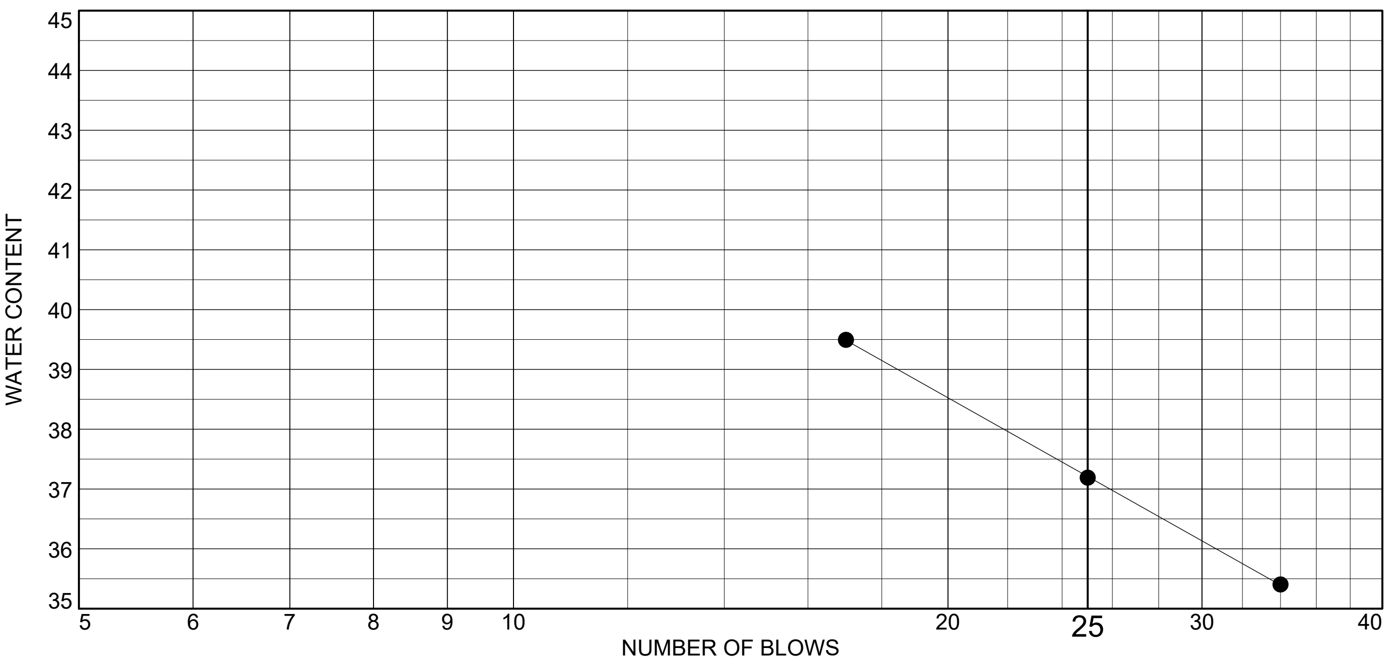
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWN TO DARK GRAY LEAN CLAY WITH SAND	37	15	22	97.0	82.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: SB-301 **Depth:** 98.0'-100.0'
Sample Number: 0946

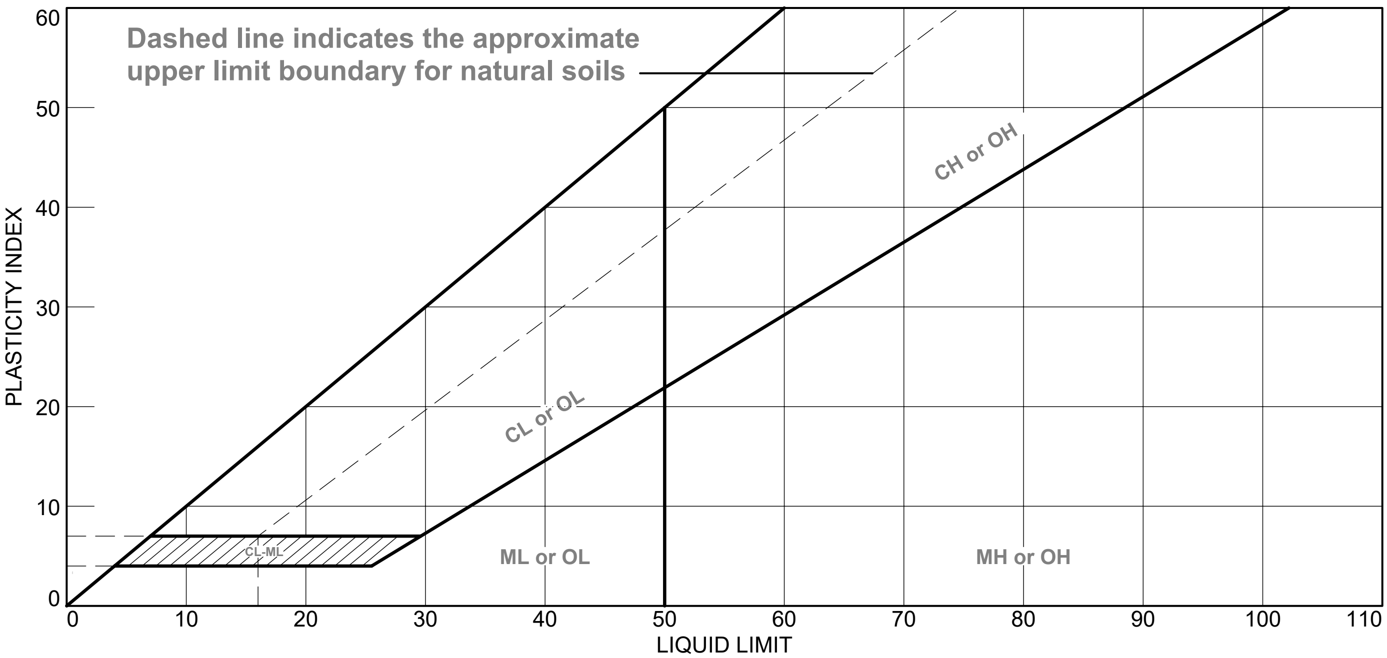
Terracon

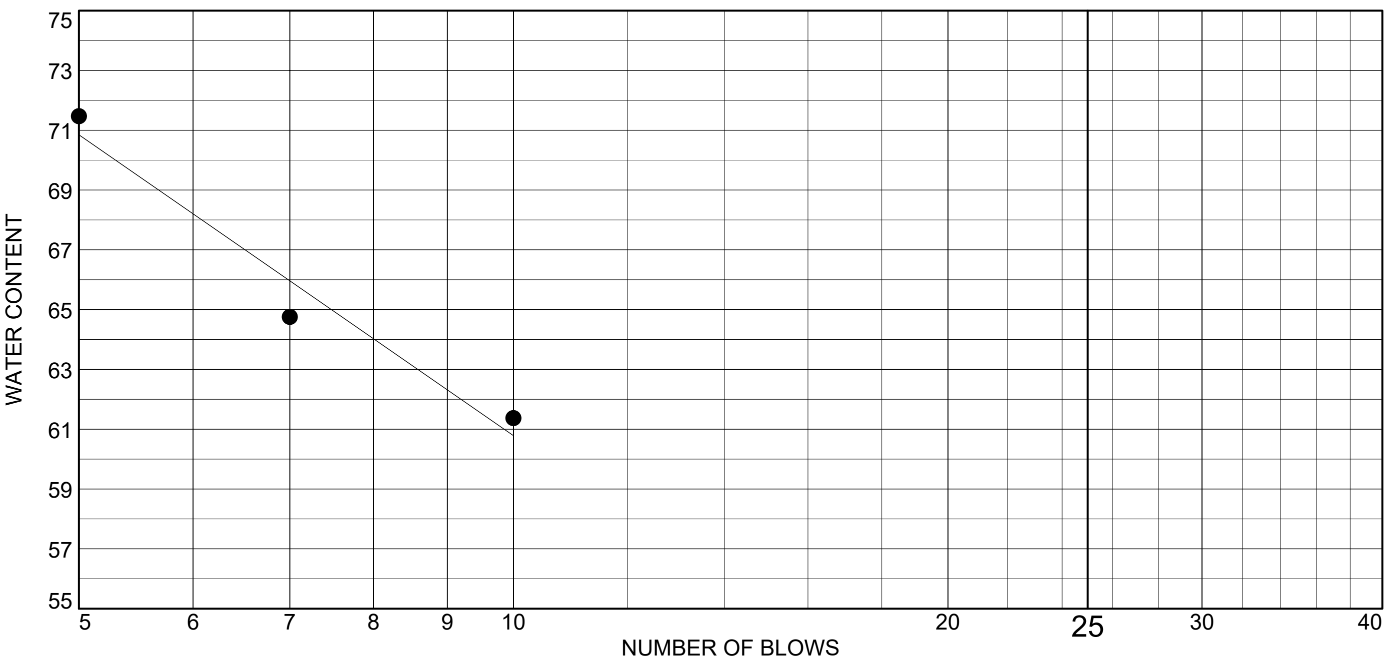
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK GRAY AND BROWN POORLY GRADED SAND WITH SILT AND GRAVEL	47	57	NP	22.3	11.8	SP-SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

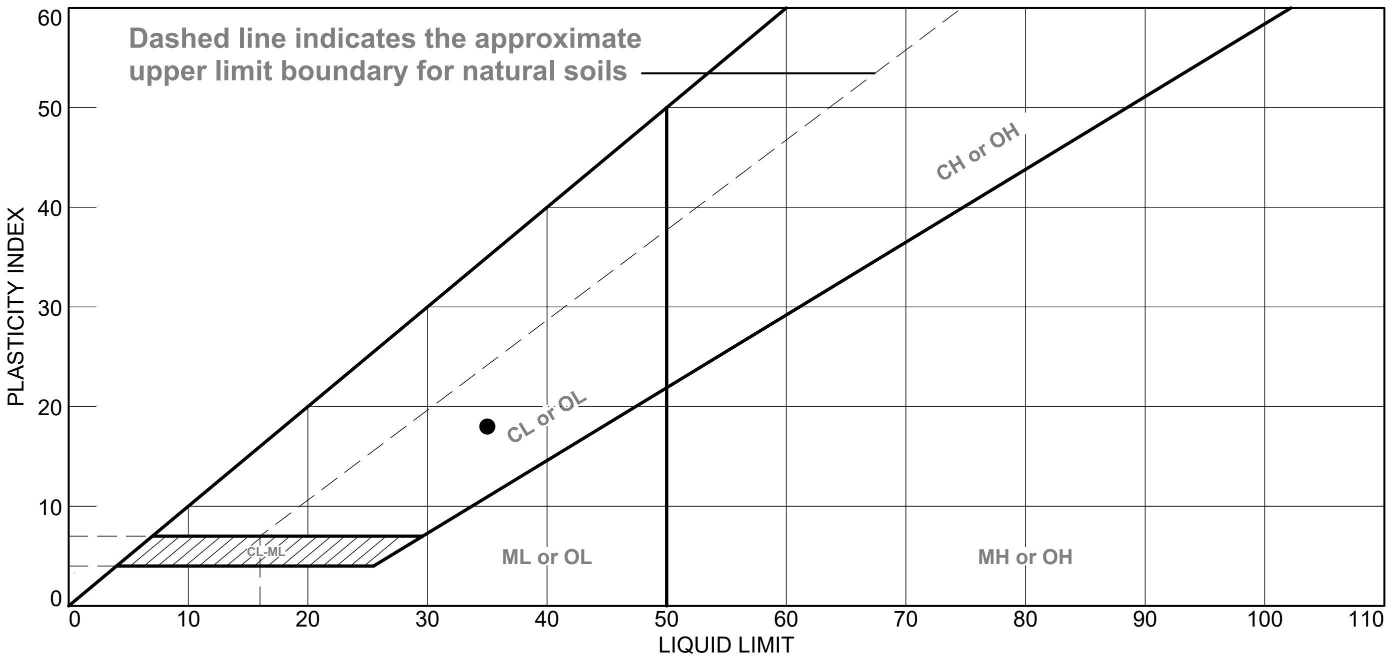
Source of Sample: XPW-01 **Depth:** 8.5'-9.0'
Sample Number: 0820

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND BROWN SANDY LEAN CLAY	35	17	18	81.1	61.3	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-01 **Depth:** 15.5'-16.0'
Sample Number: 0840

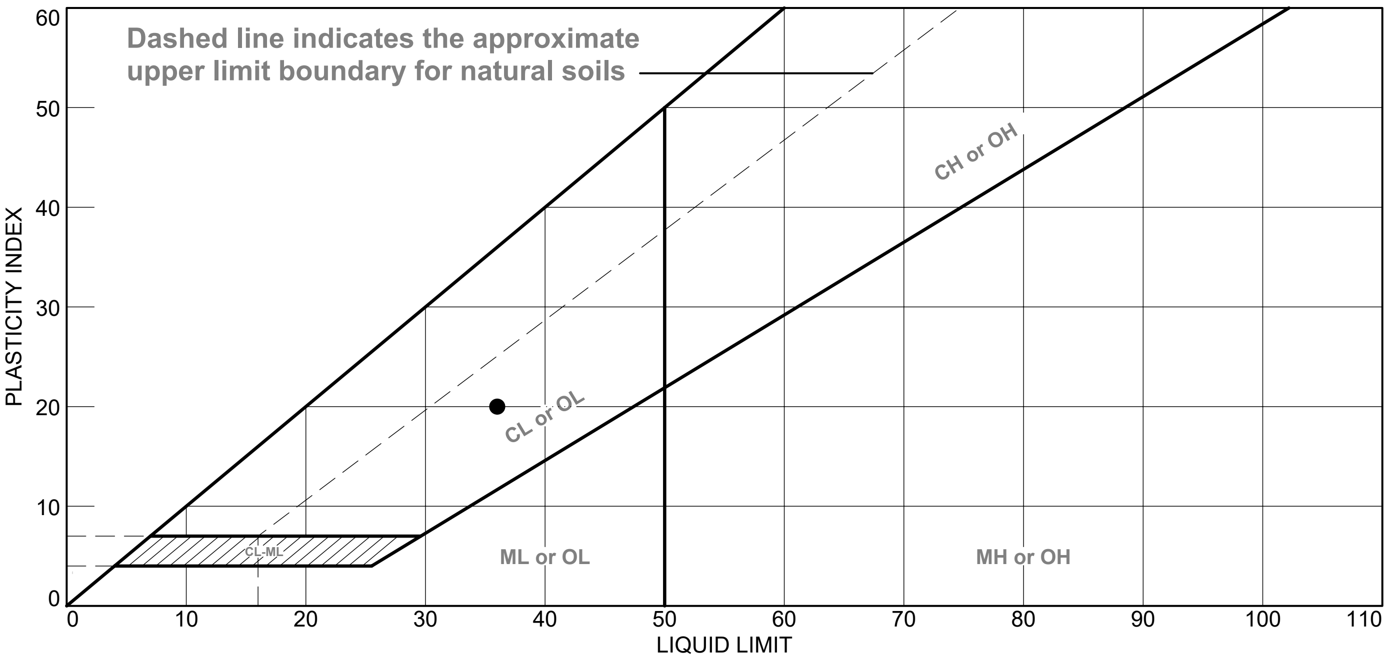
Terracon

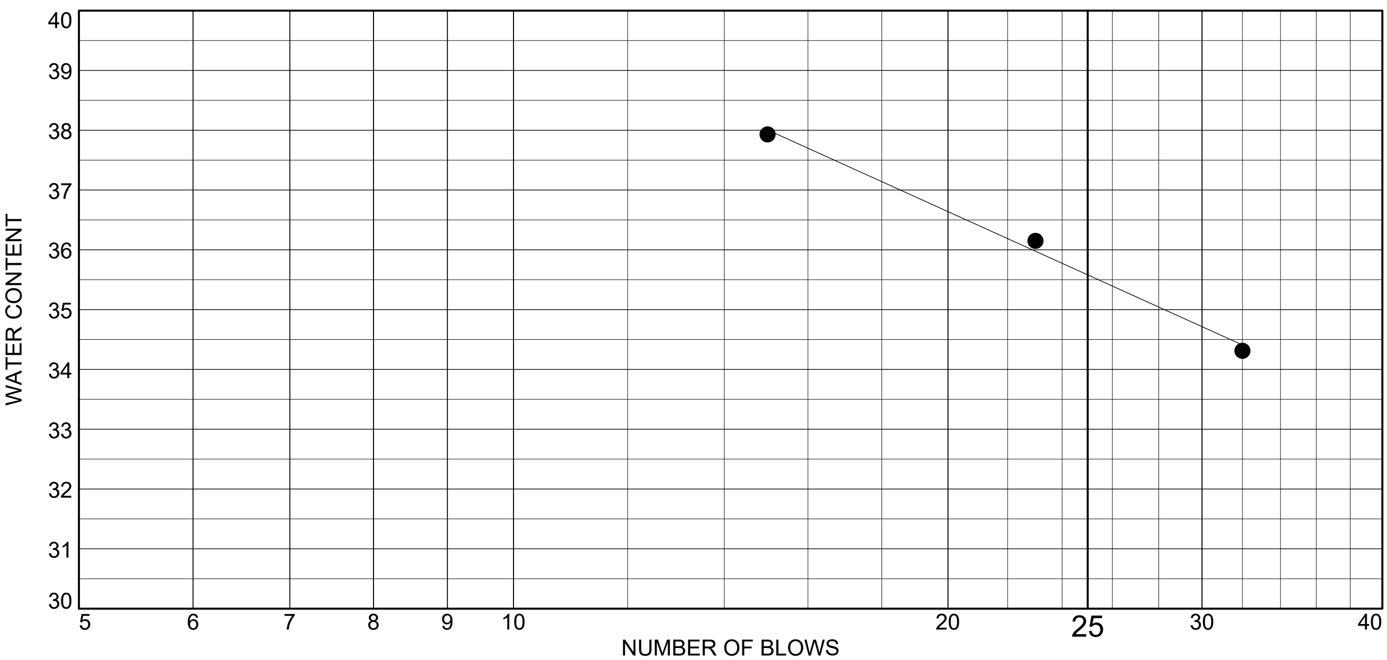
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	VERY DARK GRAY, GRAY AND BROWN SANDY LEAN CLAY	36	16	20	81.8	54.9	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-02 **Depth:** 8.0'-8.5'
Sample Number: 1530

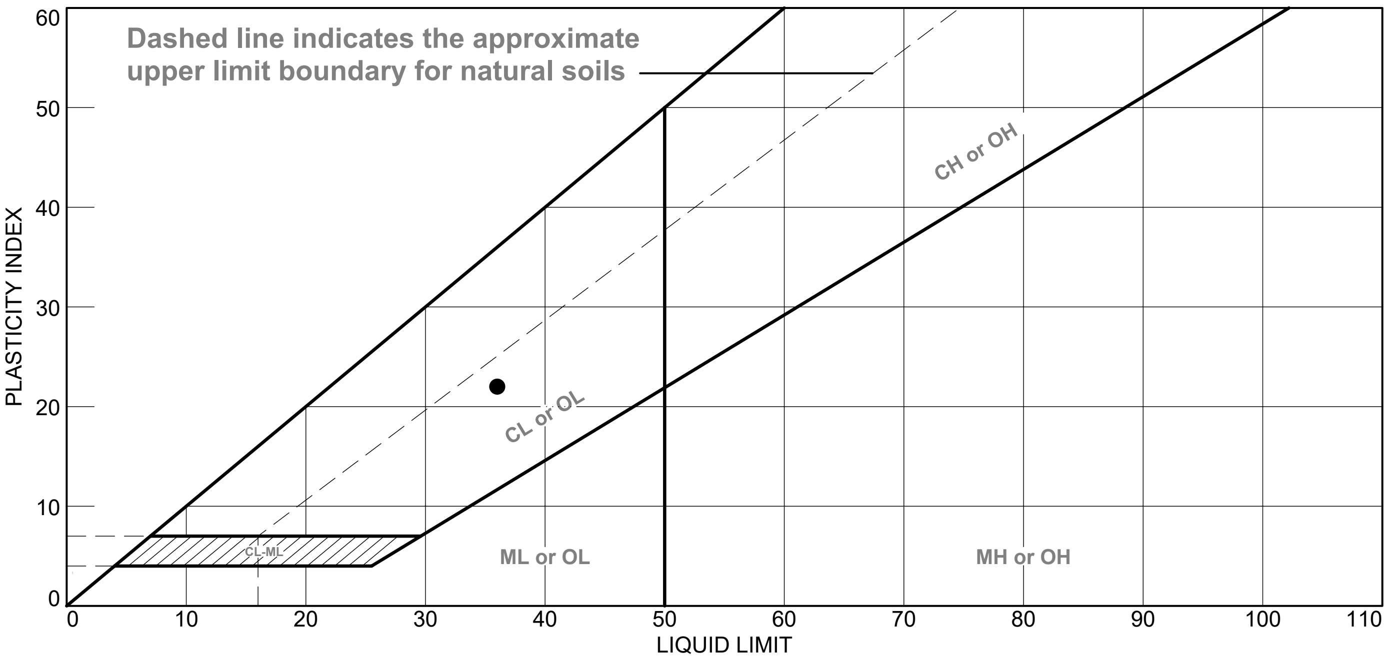
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND DARK BROWN LEAN CLAY WITH SAND	36	14	22	96.3	80.2	CL

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-02 **Depth:** 16.5'-17.0'
Sample Number: 1545

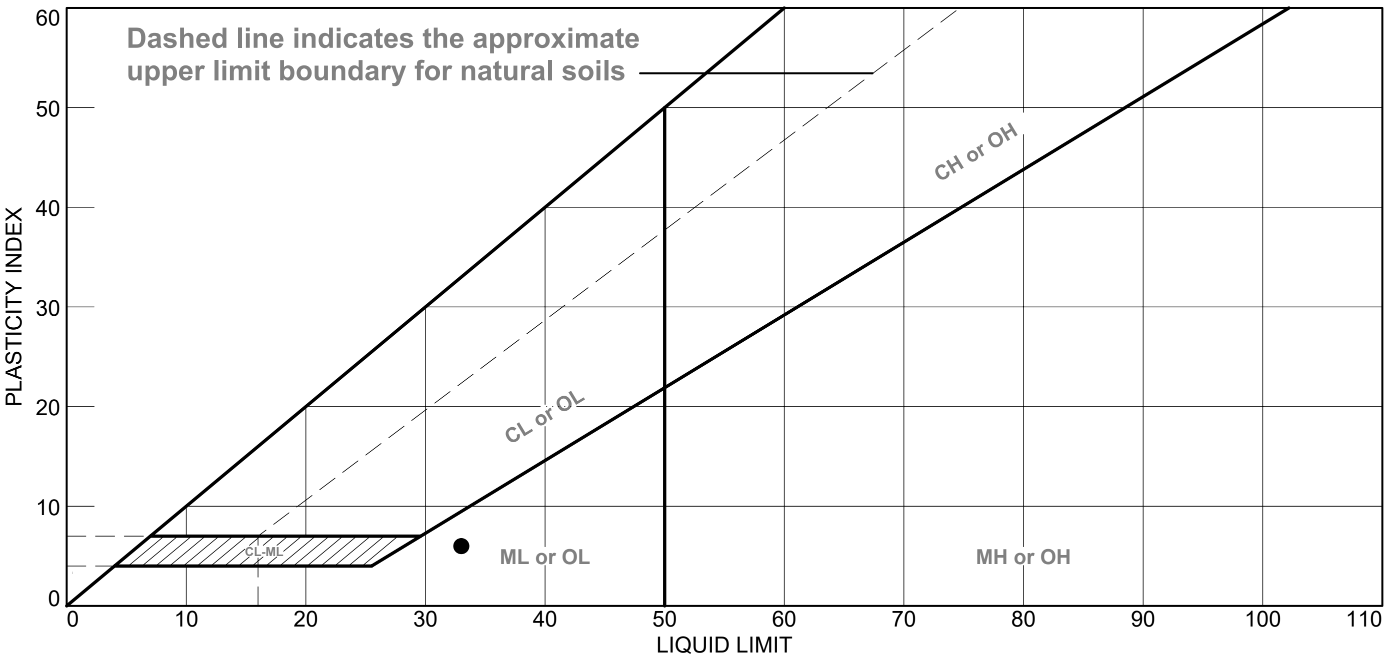
Terracon

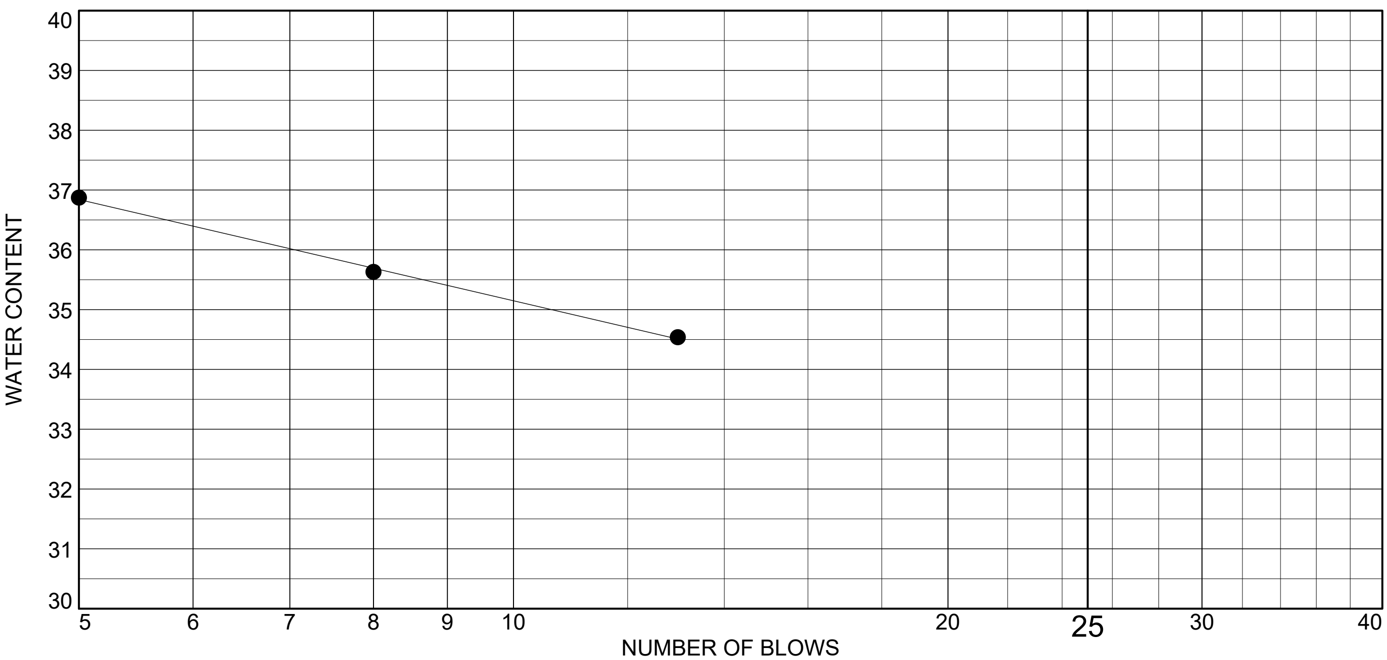
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWNISH GRAY SILTY SAND	33	27	6	46.6	21.5	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

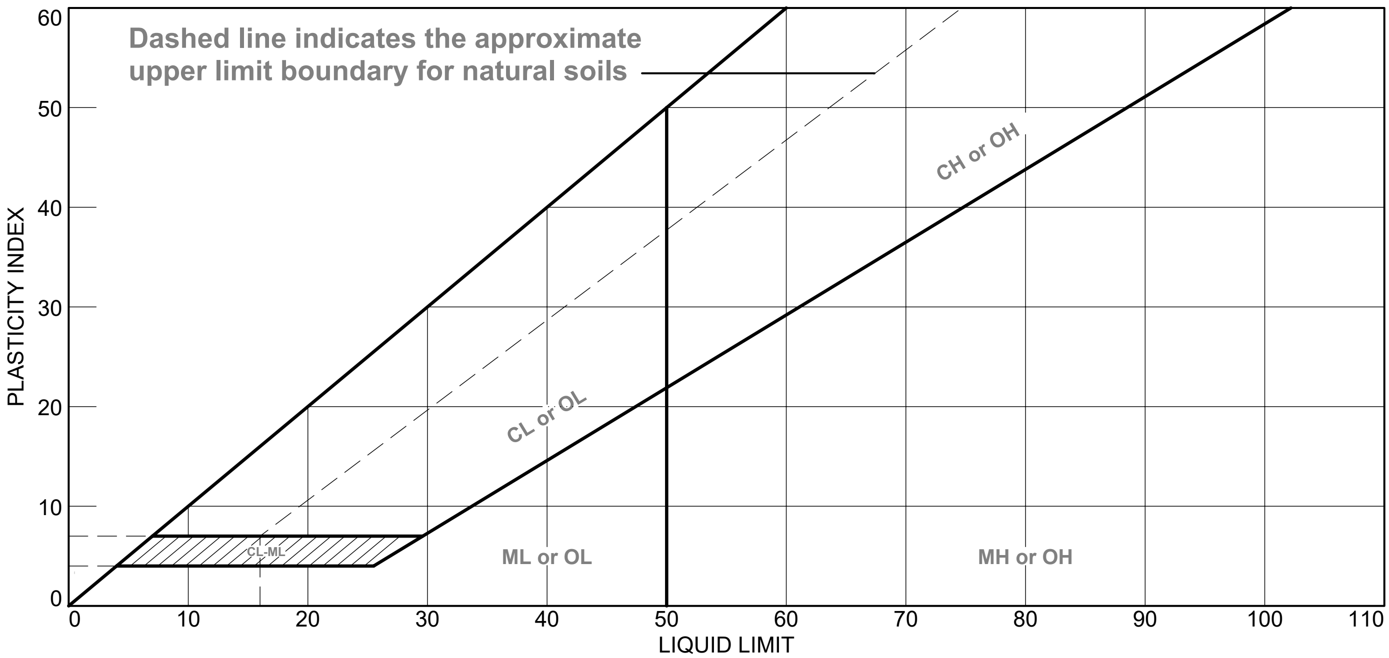
Source of Sample: XPW-03 **Depth:** 6.0'-6.5'
Sample Number: 1355

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWNISH GRAY SILTY SAND WITH GRAVEL	12	19	NP	46.1	16.3	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-03 **Depth:** 15.5'-16.0'
Sample Number: 1315

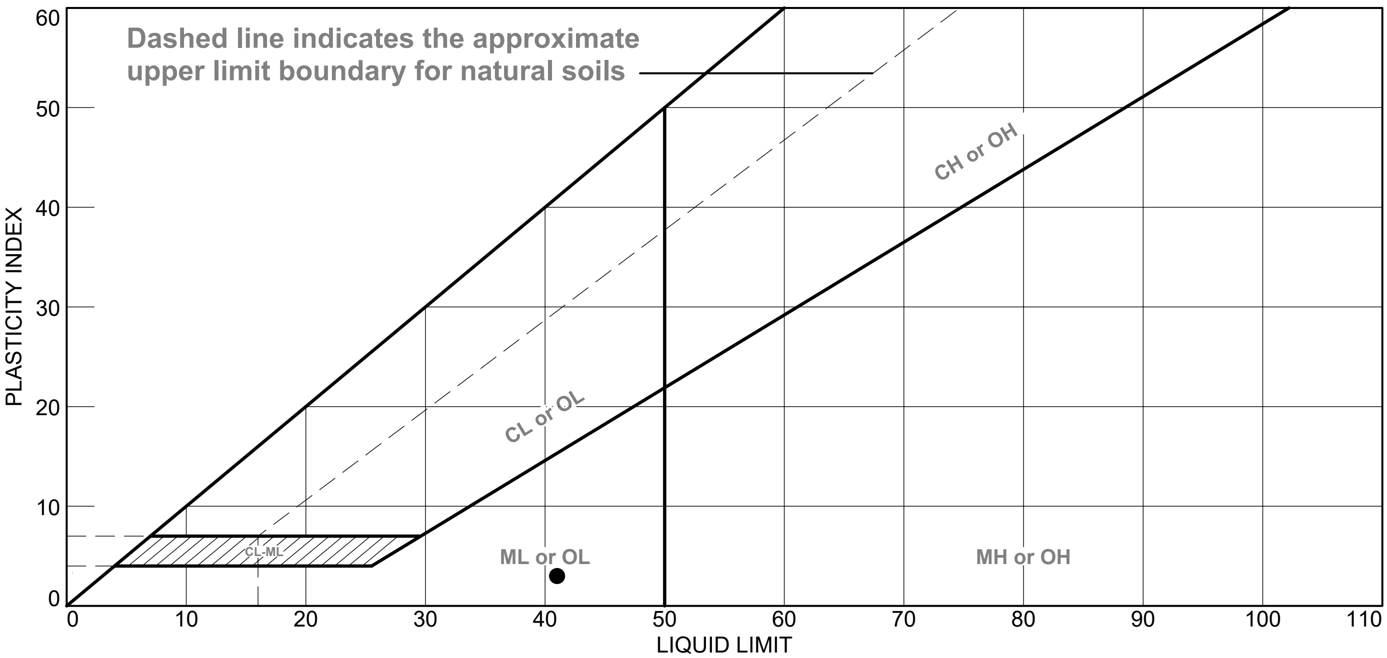
Terracon

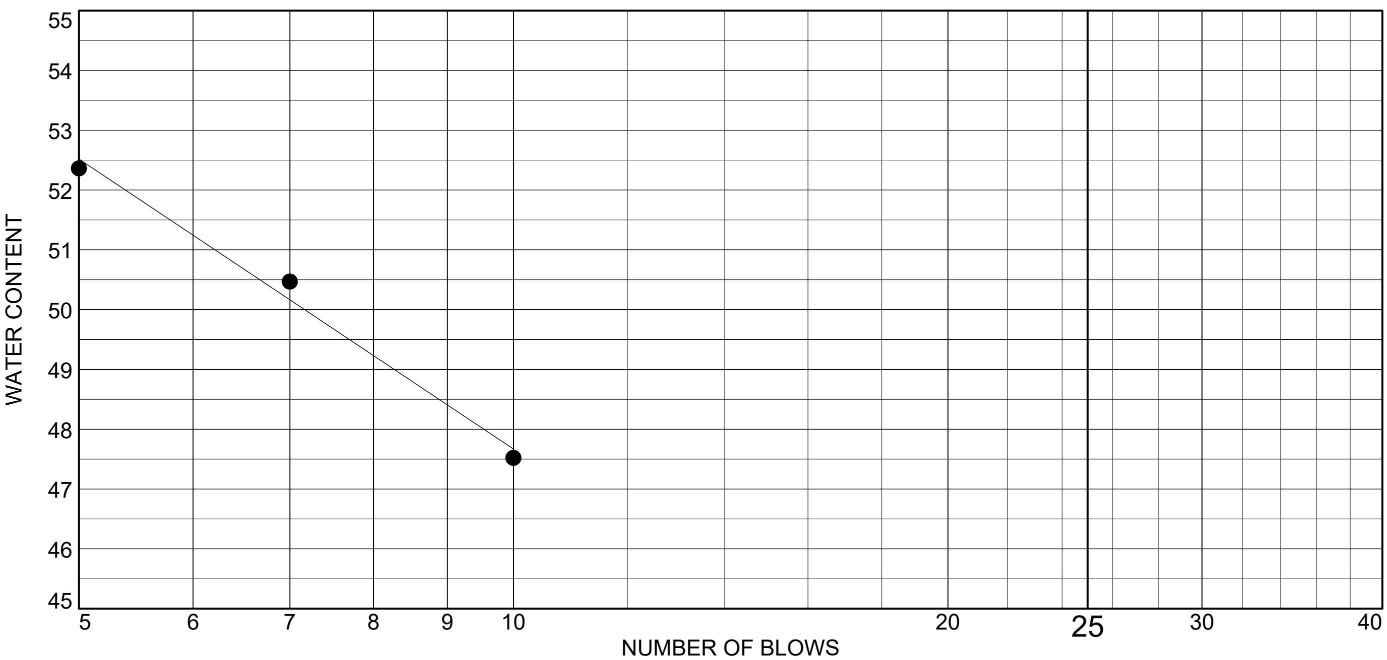
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY SILTY SAND	41	38	3	28.5	13.9	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-04 **Depth:** 6.5'-7.0'
Sample Number: 1000

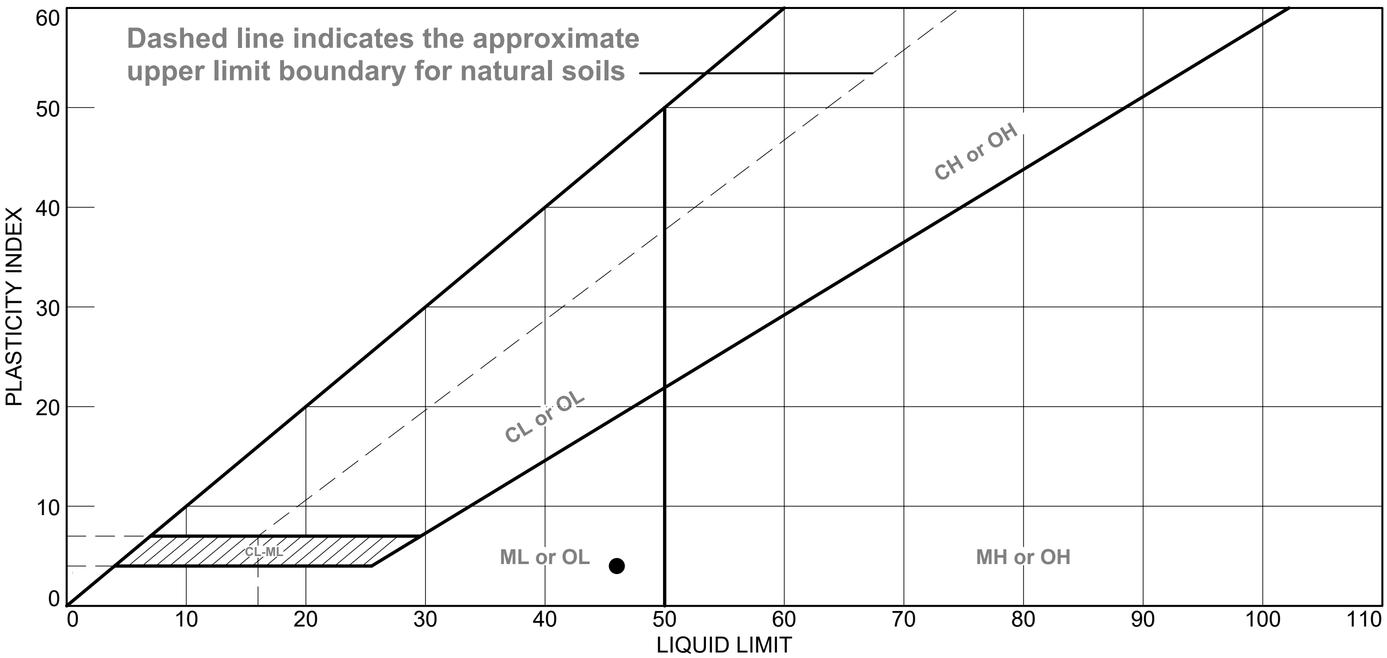
Terracon

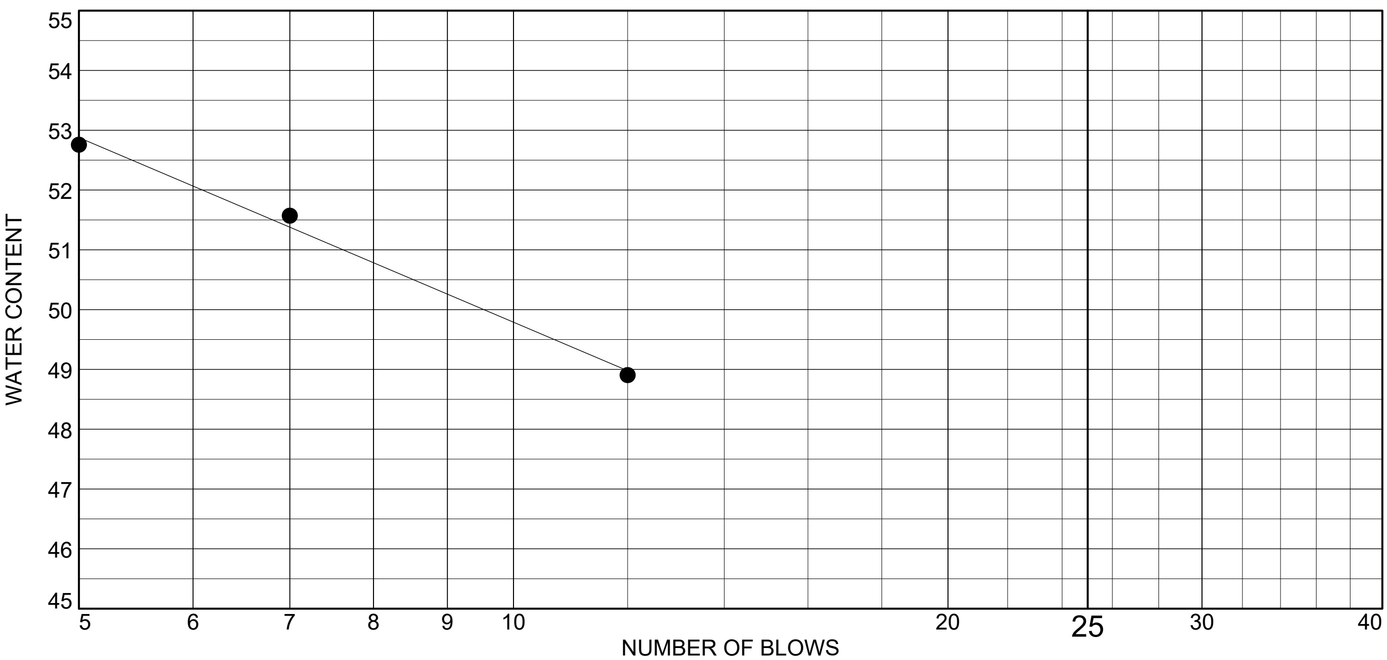
Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	DARK BROWNISH GRAY SILTY SAND WITH GRAVEL	46	42	4	45.5	33.3	SM

Project No. 11215019 **Client:** RAMBOLL ENVIRON US CORP.

Project: NEWTON POWER STATION

Source of Sample: XPW-04 **Depth:** 15.5'-16.0'
Sample Number: 1020

Terracon

Remarks:

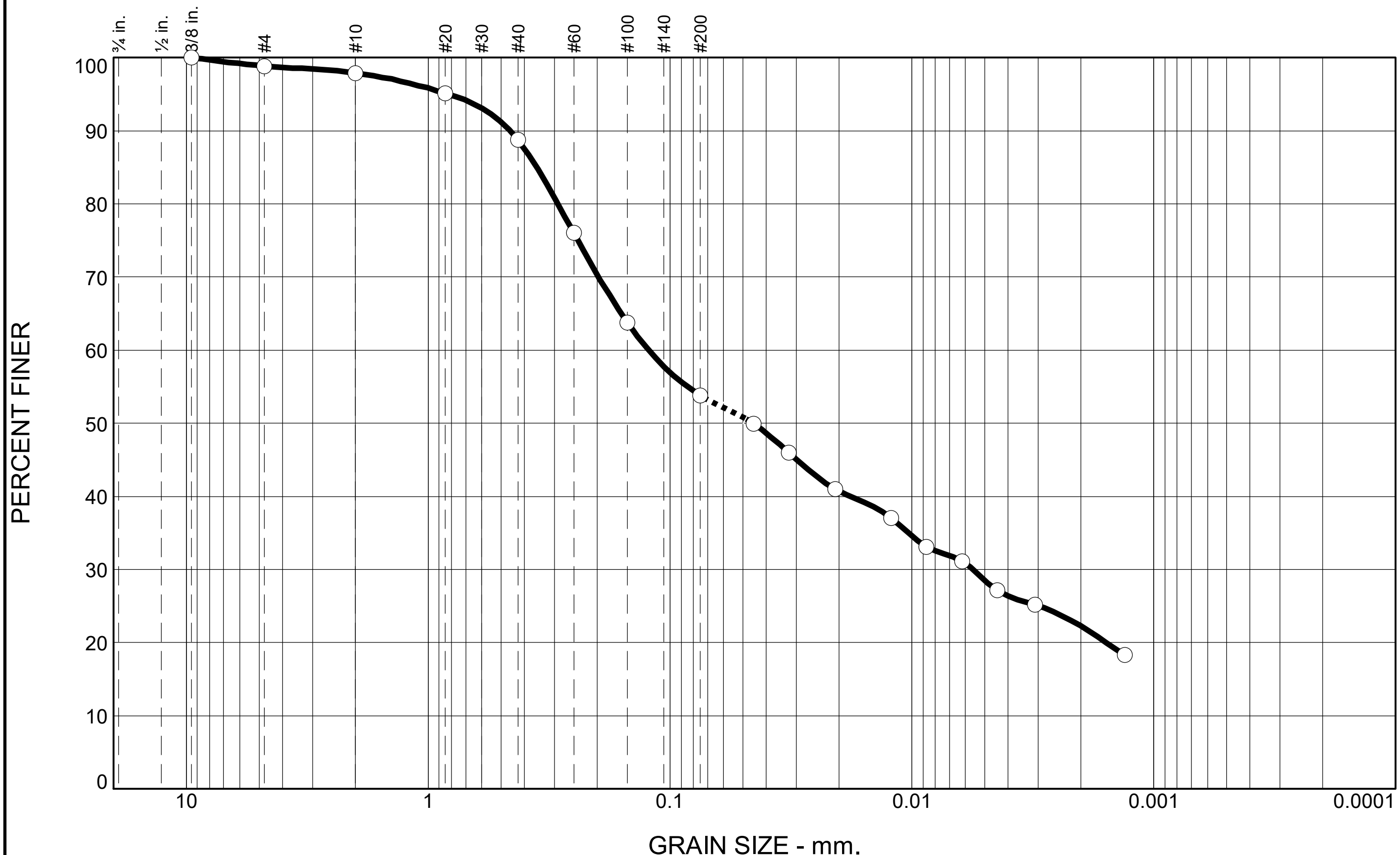
Figure

Tested By: DT **Checked By:** WPQ

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
ASTM D6913

Particle-Size Distribution (Gradation) of Fine-Grained Soils
Using the Sedimentation (Hydrometer) Analysis
ASTM D7928

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.1	1.0	9.2	34.9	25.2	28.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	98.9		
#10	97.9		
#20	95.1		
#40	88.7		
#60	76.0		
#100	63.8		
#200	53.8		
0.0450 mm.	49.9		
0.0323 mm.	46.0		
0.0208 mm.	41.0		
0.0122 mm.	37.1		
0.0087 mm.	33.1		
0.0062 mm.	31.1		
0.0044 mm.	27.2		
0.0031 mm.	25.2		
0.0013 mm.	18.3		

* (no specification provided)

Soil Description

BROWN SANDY LEAN CLAY

Atterberg Limits

PL= 12 LL= 28 PI= 16

Coefficients

D_{90}= 0.4588 D_{85}= 0.3552 D_{60}= 0.1224
D_{50}= 0.0454 D_{30}= 0.0056 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(5)

Remarks

F.M.=0.69

Source of Sample: APW-11 **Depth:** 10.0'-12.0'
Sample Number: 0805

Date: 3-30-21

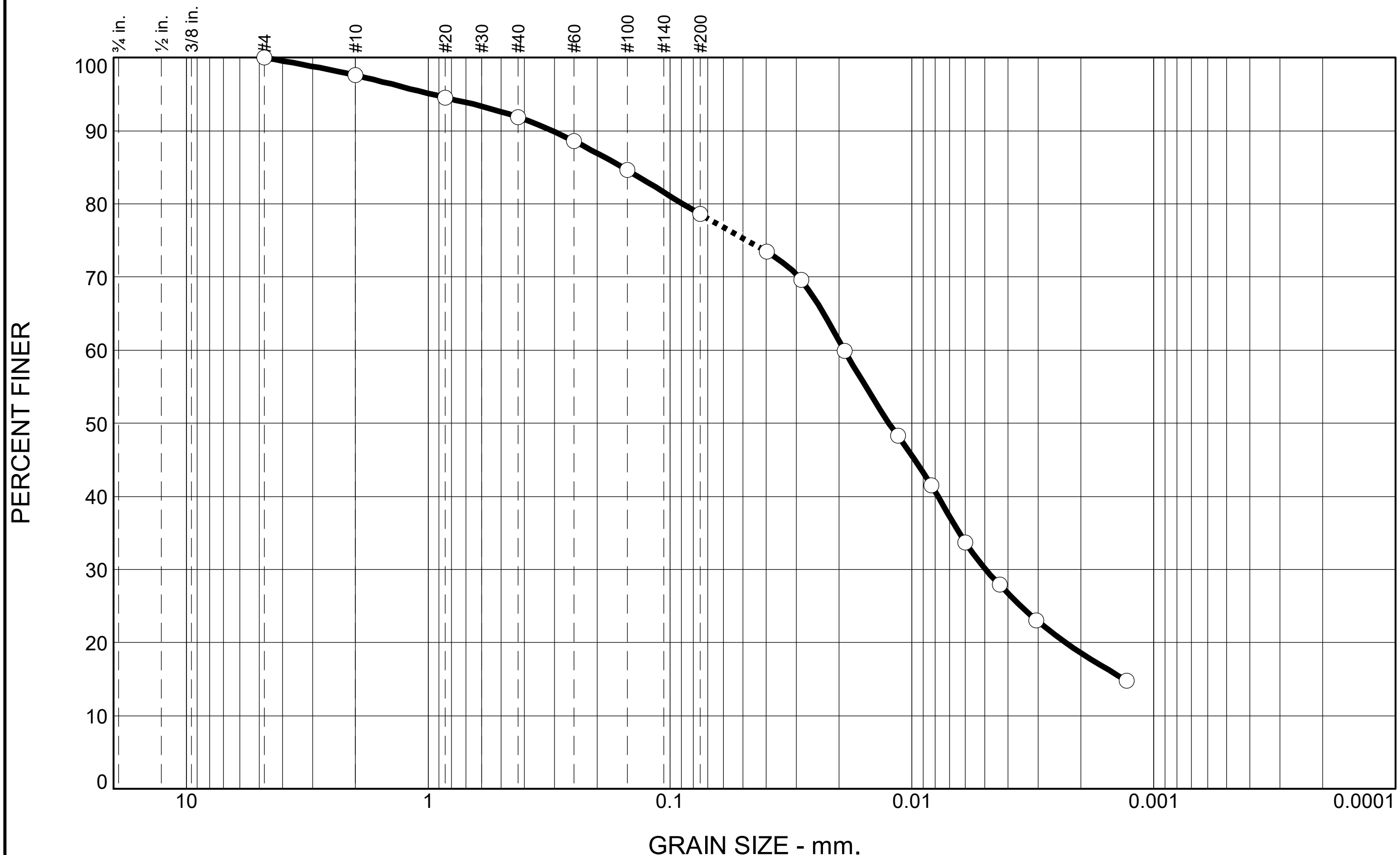
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	5.7	13.3	48.4	30.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	97.6		
#20	94.5		
#40	91.9		
#60	88.6		
#100	84.6		
#200	78.6		
0.0399 mm.	73.4		
0.0287 mm.	69.6		
0.0189 mm.	59.9		
0.0114 mm.	48.2		
0.0083 mm.	41.5		
0.0060 mm.	33.7		
0.0043 mm.	27.9		
0.0031 mm.	23.1		
0.0013 mm.	14.8		

* (no specification provided)

Soil Description

GRAYISH BROWN LEAN CLAY WITH SAND

Atterberg Limits

PL= 18 LL= 27 PI= 9

Coefficients

D_{90}= 0.3070 D_{85}= 0.1573 D_{60}= 0.0190
D_{50}= 0.0124 D_{30}= 0.0050 D_{15}= 0.0013
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(5)

Remarks

F.M.=0.38

Source of Sample: APW-11 **Depth:** 61.0'-61.5'
Sample Number: 1050

Date: 3-16-21

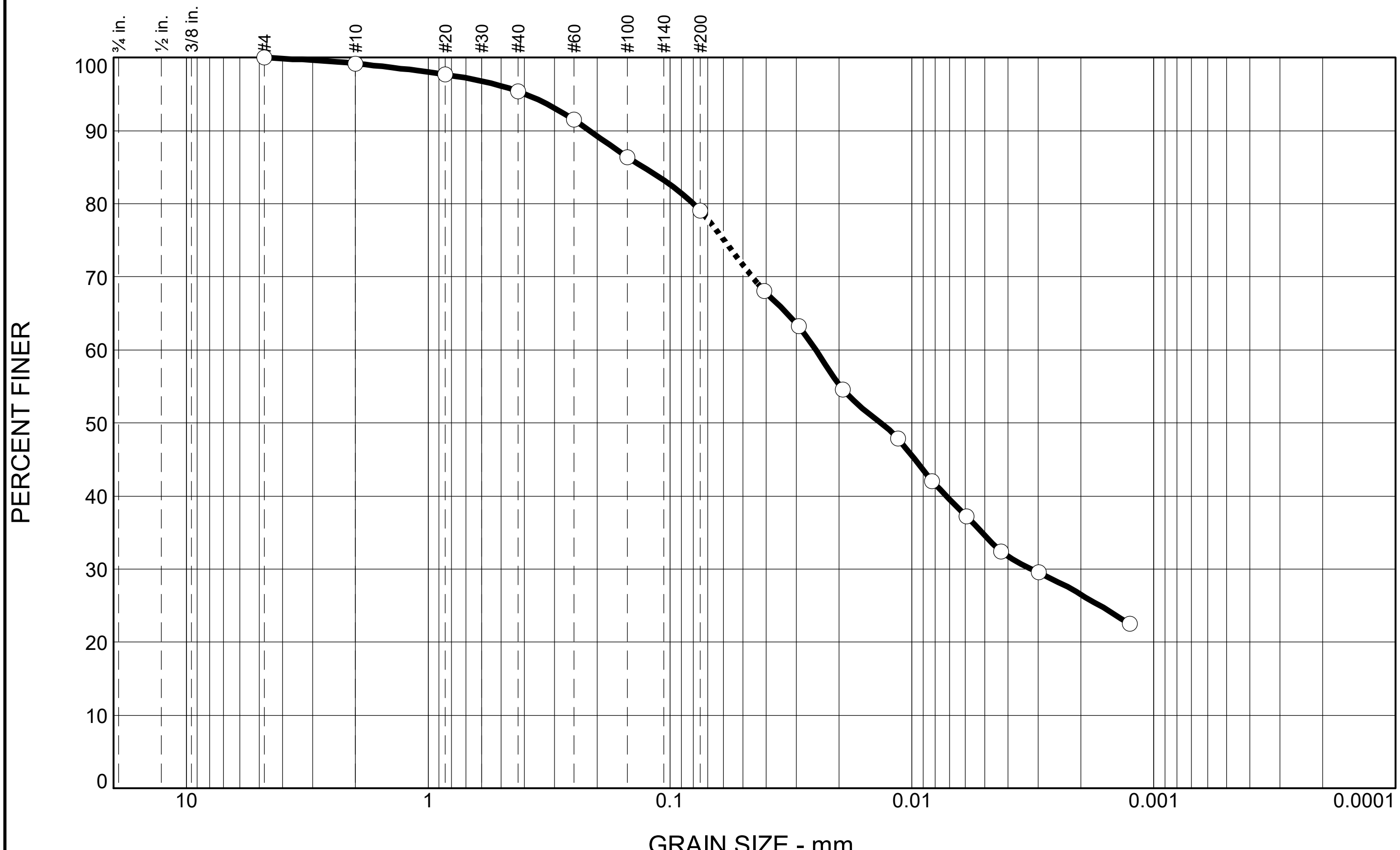
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.8	3.8	16.4	44.4	34.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.2		
#20	97.7		
#40	95.4		
#60	91.5		
#100	86.4		
#200	79.0		
0.0407 mm.	68.1		
0.0294 mm.	63.3		
0.0193 mm.	54.6		
0.0114 mm.	47.8		
0.0082 mm.	42.1		
0.0059 mm.	37.2		
0.0043 mm.	32.4		
0.0030 mm.	29.5		
0.0013 mm.	22.5		

* (no specification provided)

Soil Description

DARK GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 14 LL= 32 PI= 18

Coefficients

D_{90}= 0.2146 D_{85}= 0.1293 D_{60}= 0.0250
D_{50}= 0.0135 D_{30}= 0.0032 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

F.M.=0.26

Source of Sample: APW-11 **Depth:** 80.0'-82.0'
Sample Number: 1115

Date: 3-2-21

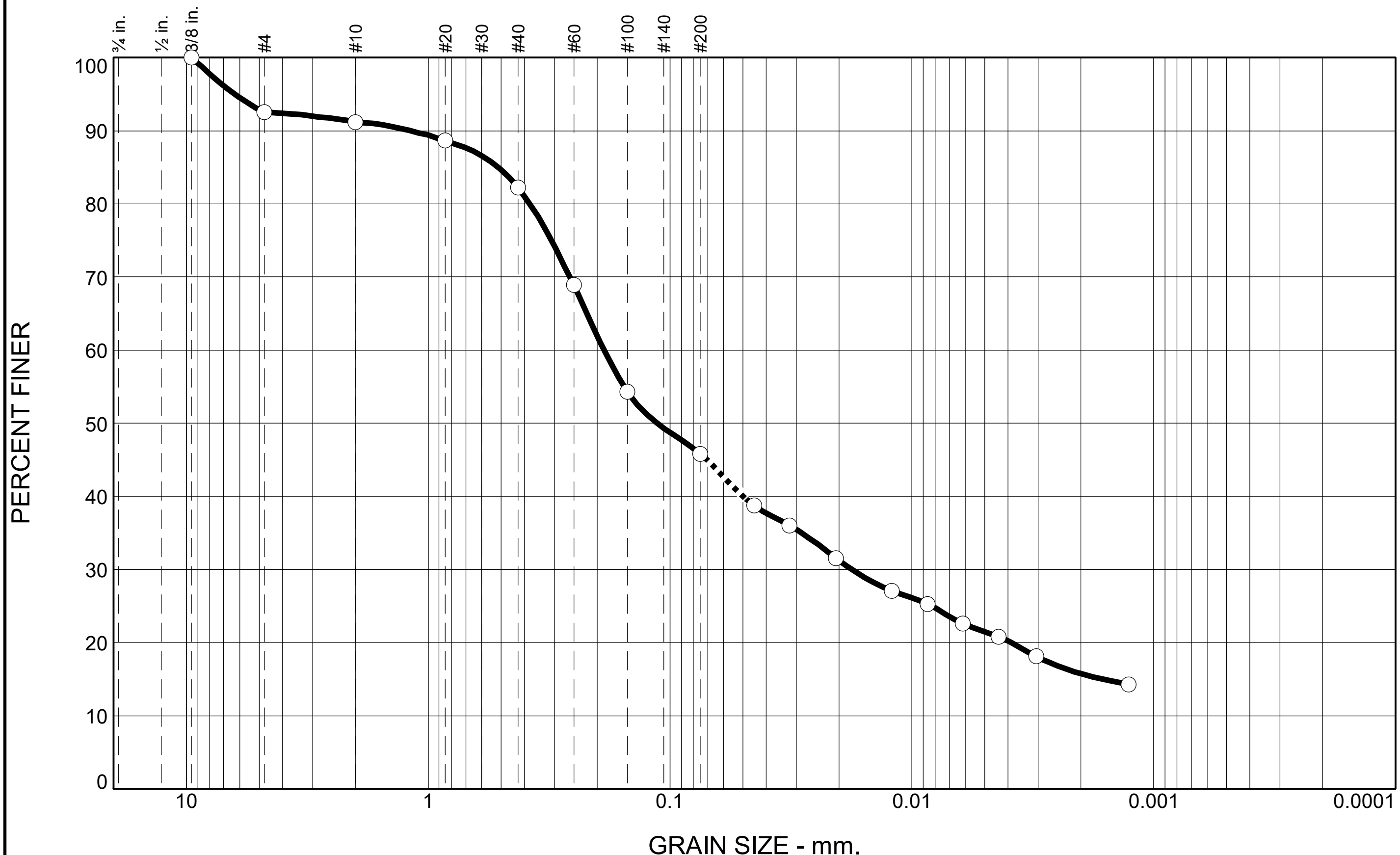
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.4	1.4	8.9	36.5	24.3	21.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	92.6		
#10	91.2		
#20	88.7		
#40	82.3		
#60	68.9		
#100	54.3		
#200	45.8		
0.0449 mm.	38.7		
0.0321 mm.	36.0		
0.0206 mm.	31.5		
0.0121 mm.	27.1		
0.0086 mm.	25.3		
0.0061 mm.	22.6		
0.0044 mm.	20.8		
0.0031 mm.	18.1		
0.0013 mm.	14.3		

* (no specification provided)

Soil Description

BROWN AND RUST BROWN CLAYEY SAND - ROOTS NOTED

Atterberg Limits

PL= 12 LL= 27 PI= 15

Coefficients

D_{90}= 1.1757 D_{85}= 0.5121 D_{60}= 0.1872
D_{50}= 0.1131 D_{30}= 0.0177 D_{15}= 0.0016
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(3)

Remarks

F.M.=1.11

Source of Sample: APW-12 **Depth:** 20.0'-22.0'
Sample Number: 0825 **Date:** 2-26-21

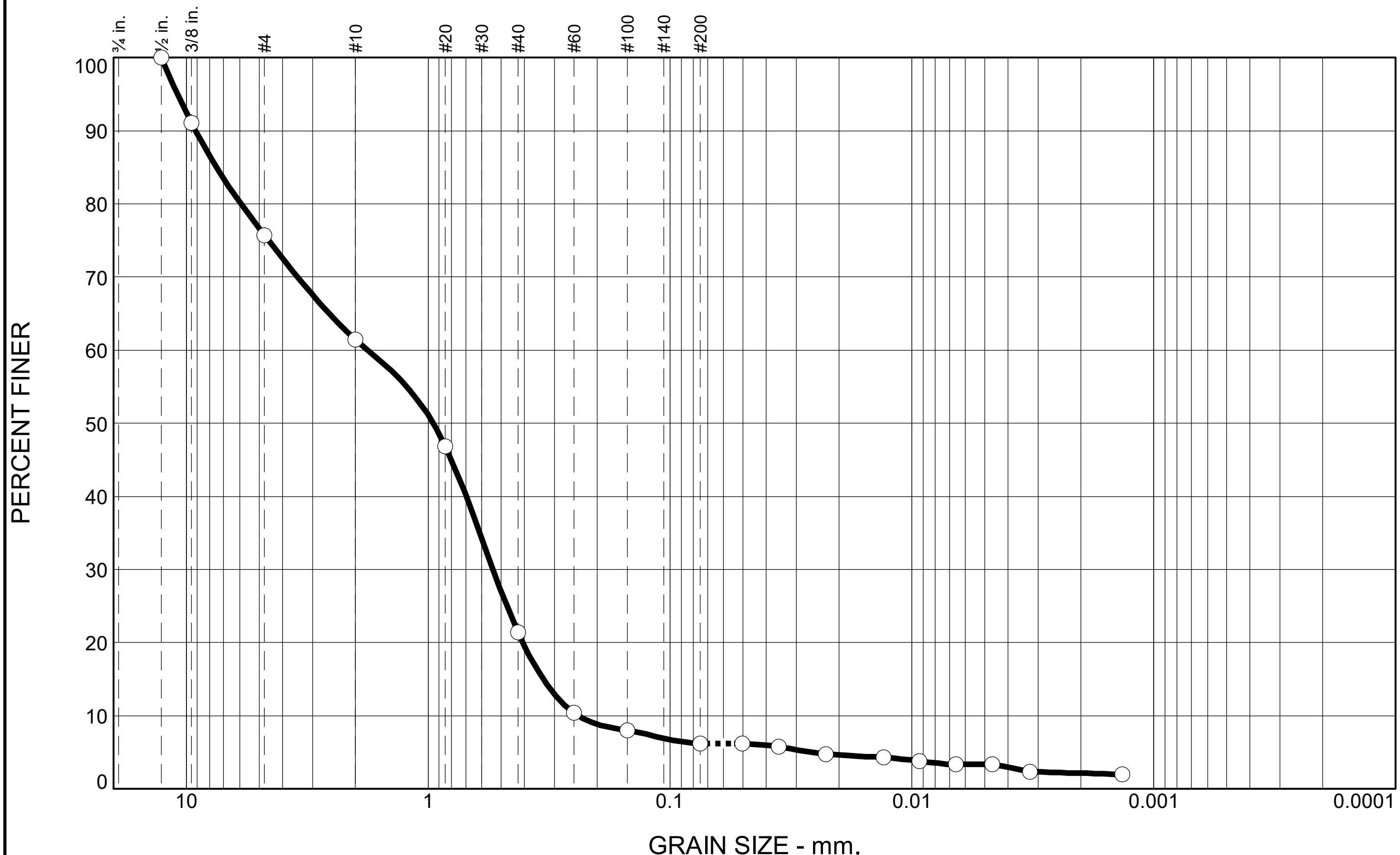
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.3	14.3	40.0	15.2	2.9	3.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	91.1		
#4	75.7		
#10	61.4		
#20	46.8		
#40	21.4		
#60	10.4		
#100	8.0		
#200	6.2		
0.0502 mm.	6.2		
0.0356 mm.	5.7		
0.0226 mm.	4.8		
0.0131 mm.	4.3		
0.0093 mm.	3.8		
0.0066 mm.	3.3		
0.0047 mm.	3.3		
0.0032 mm.	2.4		
0.0014 mm.	2.0		

* (no specification provided)

Soil Description

BROWN POORLY GRADED SAND WITH SILT AND GRAVEL

Atterberg Limits

PL= 13 LL= 10 PI= NP

Coefficients

D_{90}= 9.1597 D_{85}= 7.5109 D_{60}= 1.7814
D_{50}= 0.9547 D_{30}= 0.5391 D_{15}= 0.3343
D_{10}= 0.2395 C_u= 7.44 C_c= 0.68

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

F.M.=3.60

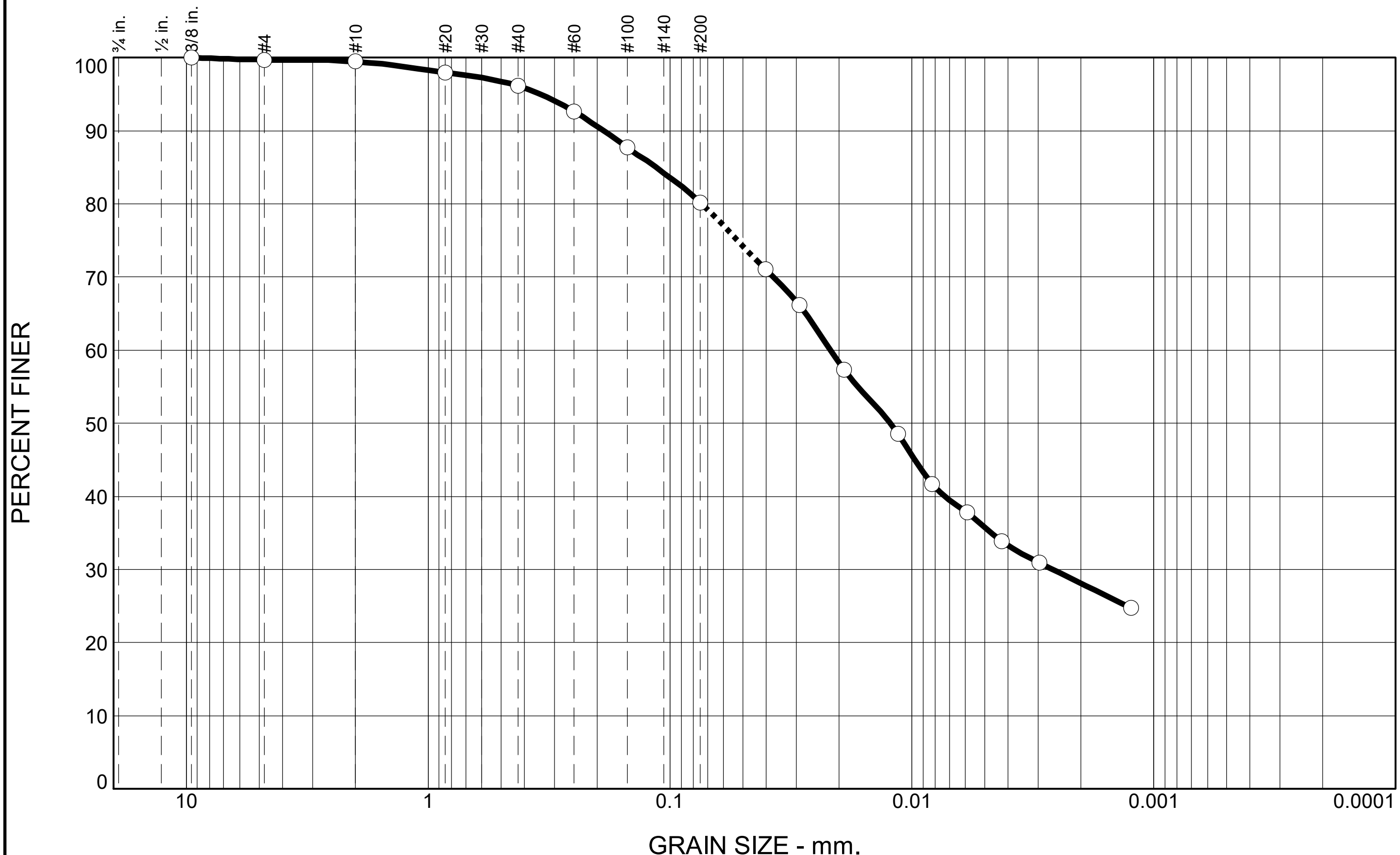
Source of Sample: APW-12 **Depth:** 25.5'-26.0'
Sample Number: 0845 **Date:** 3-11-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.3	0.2	3.4	15.9	44.4	35.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.7		
#10	99.5		
#20	98.0		
#40	96.1		
#60	92.7		
#100	87.7		
#200	80.2		
0.0403 mm.	71.0		
0.0291 mm.	66.1		
0.0191 mm.	57.3		
0.0114 mm.	48.5		
0.0083 mm.	41.7		
0.0059 mm.	37.8		
0.0042 mm.	33.9		
0.0030 mm.	30.9		
0.0012 mm.	24.8		

* (no specification provided)

Soil Description

DARK GRAY LEAN CLAY WITH SAND - SILT POCKETS NOTED

Atterberg Limits

PL= 14 LL= 29 PI= 15

Coefficients

D_{90}= 0.1885 D_{85}= 0.1144 D_{60}= 0.0217
D_{50}= 0.0123 D_{30}= 0.0026 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

F.M.=0.23

Source of Sample: APW-12 **Depth:** 85.0'-87.0'
Sample Number: 1245
Date: 3-2-21

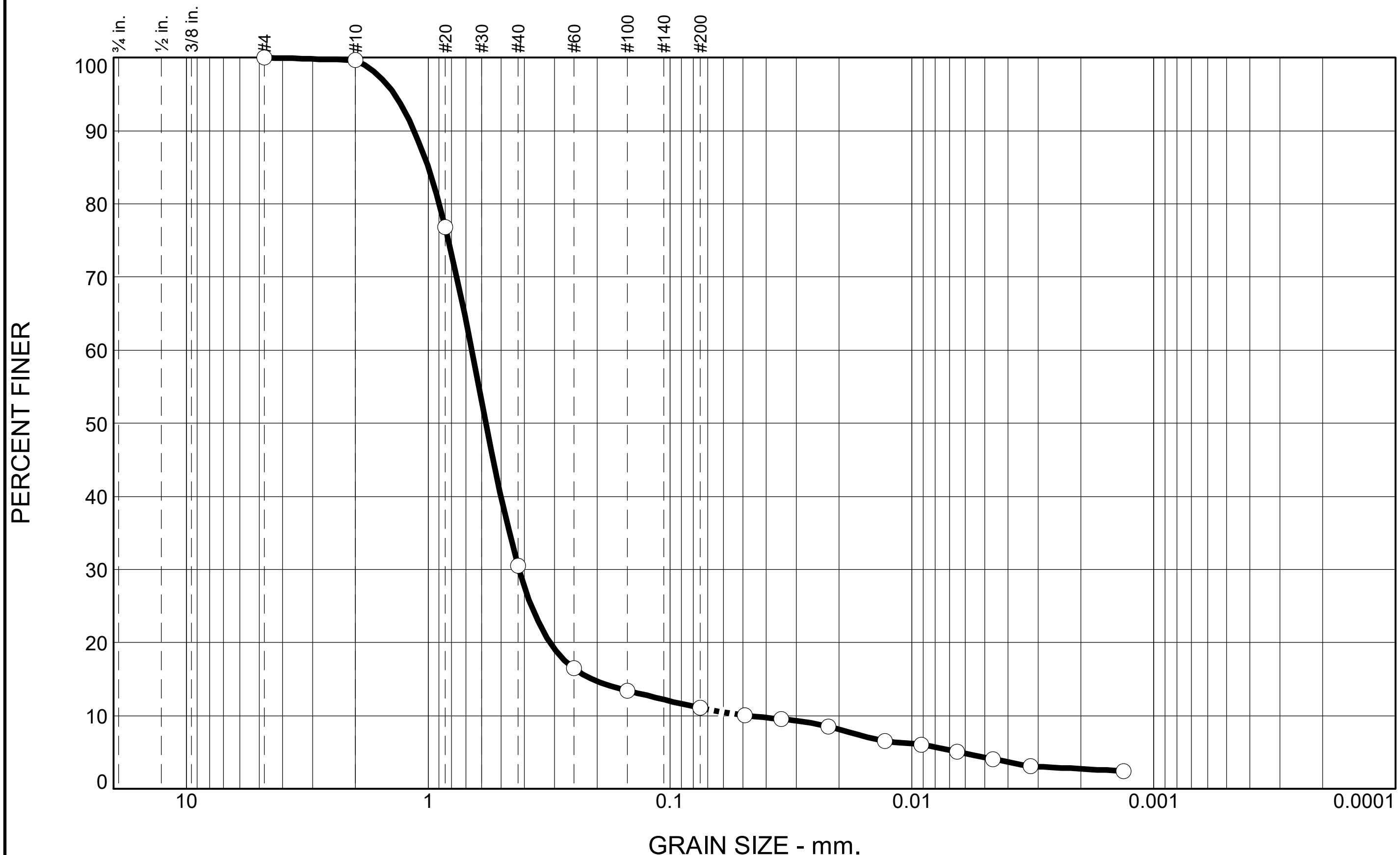
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	69.2	19.4	6.8	4.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	76.8		
#40	30.5		
#60	16.5		
#100	13.4		
#200	11.1		
0.0490 mm.	10.0		
0.0347 mm.	9.5		
0.0221 mm.	8.5		
0.0129 mm.	6.6		
0.0092 mm.	6.1		
0.0065 mm.	5.1		
0.0046 mm.	4.1		
0.0032 mm.	3.1		
0.0013 mm.	2.4		

* (no specification provided)

Soil Description

DARK BROWN AND GRAY POORLY GRADED SAND WITH SILT

Atterberg Limits

PL= 10 LL= 9 PI= NP

Coefficients

D_{90}= 1.1425 D_{85}= 1.0006 D_{60}= 0.6613
D_{50}= 0.5767 D_{30}= 0.4204 D_{15}= 0.2099
D_{10}= 0.0479 C_u= 13.80 C_c= 5.58

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

F.M.=2.24

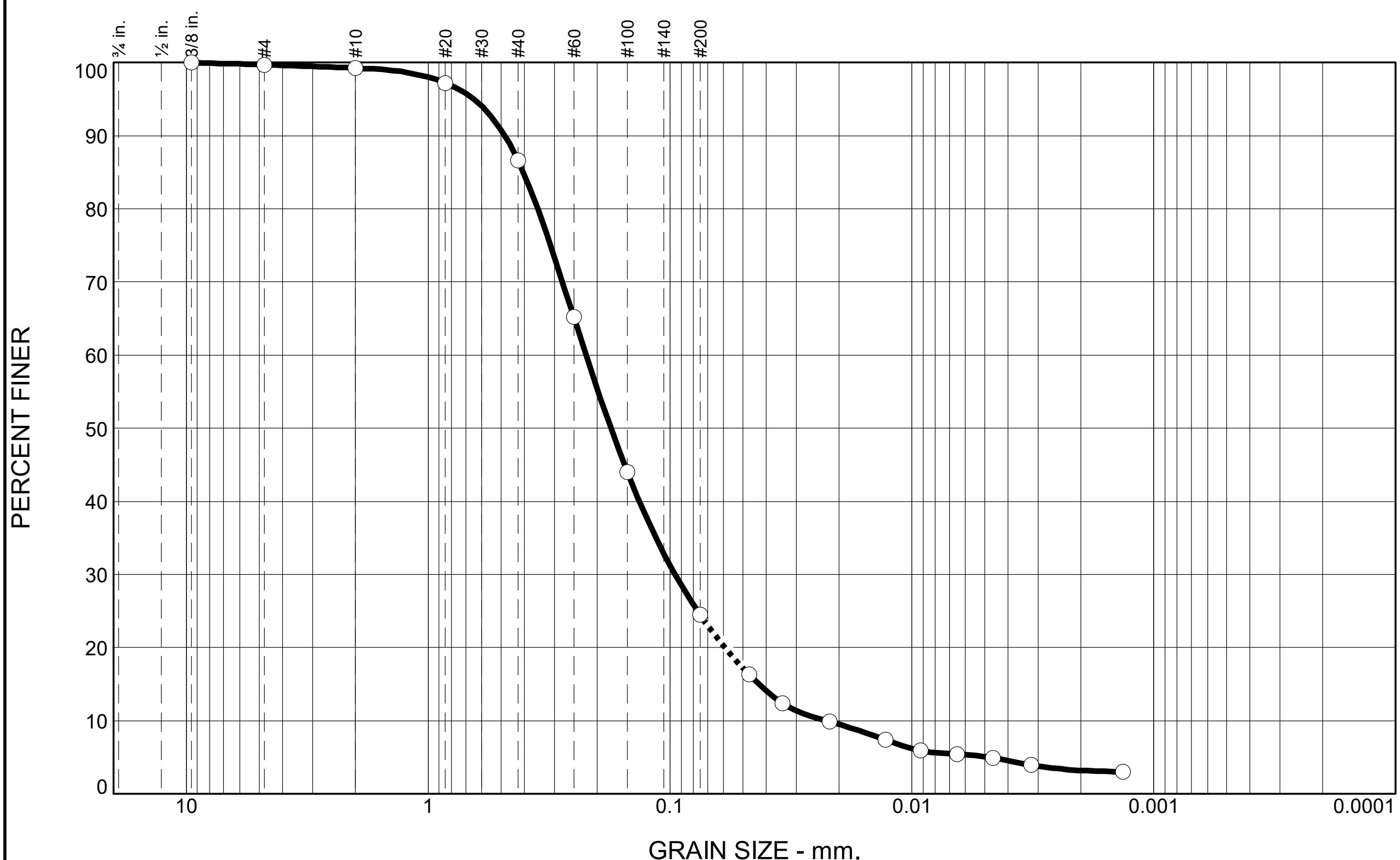
Source of Sample: APW-13 **Depth:** 25.0'-27.0'
Sample Number: 0845
Date: 2-26-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.3	0.4	12.7	62.1	19.4	5.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.7		
#10	99.3		
#20	97.2		
#40	86.6		
#60	65.2		
#100	44.0		
#200	24.5		
0.0471 mm.	16.3		
0.0342 mm.	12.4		
0.0220 mm.	9.9		
0.0129 mm.	7.4		
0.0092 mm.	5.9		
0.0065 mm.	5.4		
0.0046 mm.	4.9		
0.0032 mm.	3.9		
0.0013 mm.	3.0		

* (no specification provided)

Soil Description

BROWN SILTY SAND

Atterberg Limits

PL= 13 LL= 8 PI= NP

Coefficients

D_{90}= 0.4819 D_{85}= 0.4036 D_{60}= 0.2222
D_{50}= 0.1755 D_{30}= 0.0953 D_{15}= 0.0429
D_{10}= 0.0226 C_u= 9.84 C_c= 1.81

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=0.91

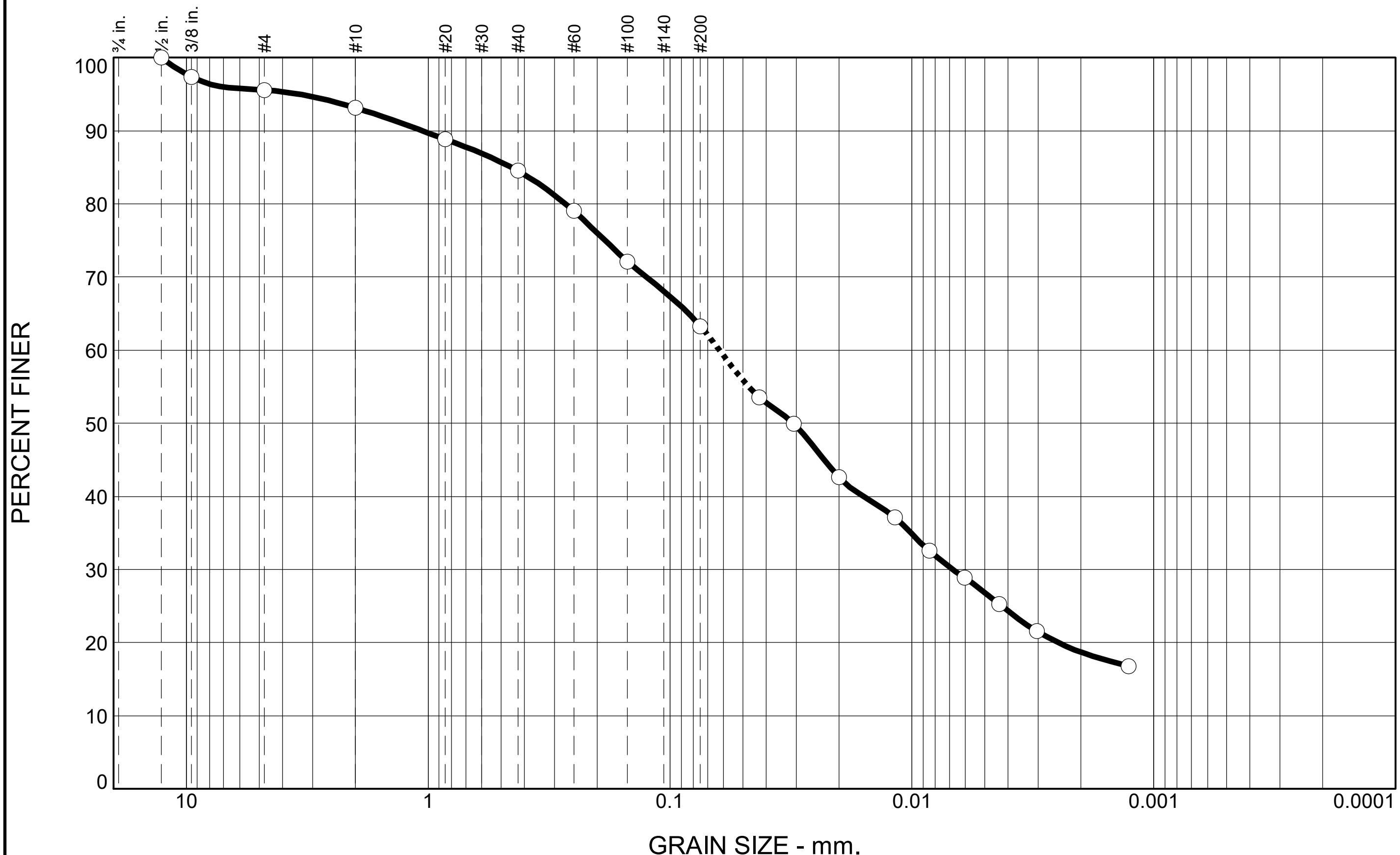
Source of Sample: APW-13 **Depth:** 60.5'-61.0'
Sample Number: 1345
Date: 3-11-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.4	2.5	8.6	21.2	36.5	26.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	97.3		
#4	95.6		
#10	93.1		
#20	88.8		
#40	84.5		
#60	79.0		
#100	72.1		
#200	63.3		
0.0427 mm.	53.6		
0.0307 mm.	49.9		
0.0200 mm.	42.6		
0.0118 mm.	37.1		
0.0085 mm.	32.6		
0.0061 mm.	28.9		
0.0043 mm.	25.2		
0.0030 mm.	21.6		
0.0013 mm.	16.7		

* (no specification provided)

Soil Description

BROWN SANDY LEAN CLAY

Atterberg Limits

PL= 14 LL= 26 PI= 12

Coefficients

D_{90}= 1.0607 D_{85}= 0.4525 D_{60}= 0.0625
D_{50}= 0.0309 D_{30}= 0.0068 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(5)

Remarks

F.M.=0.83

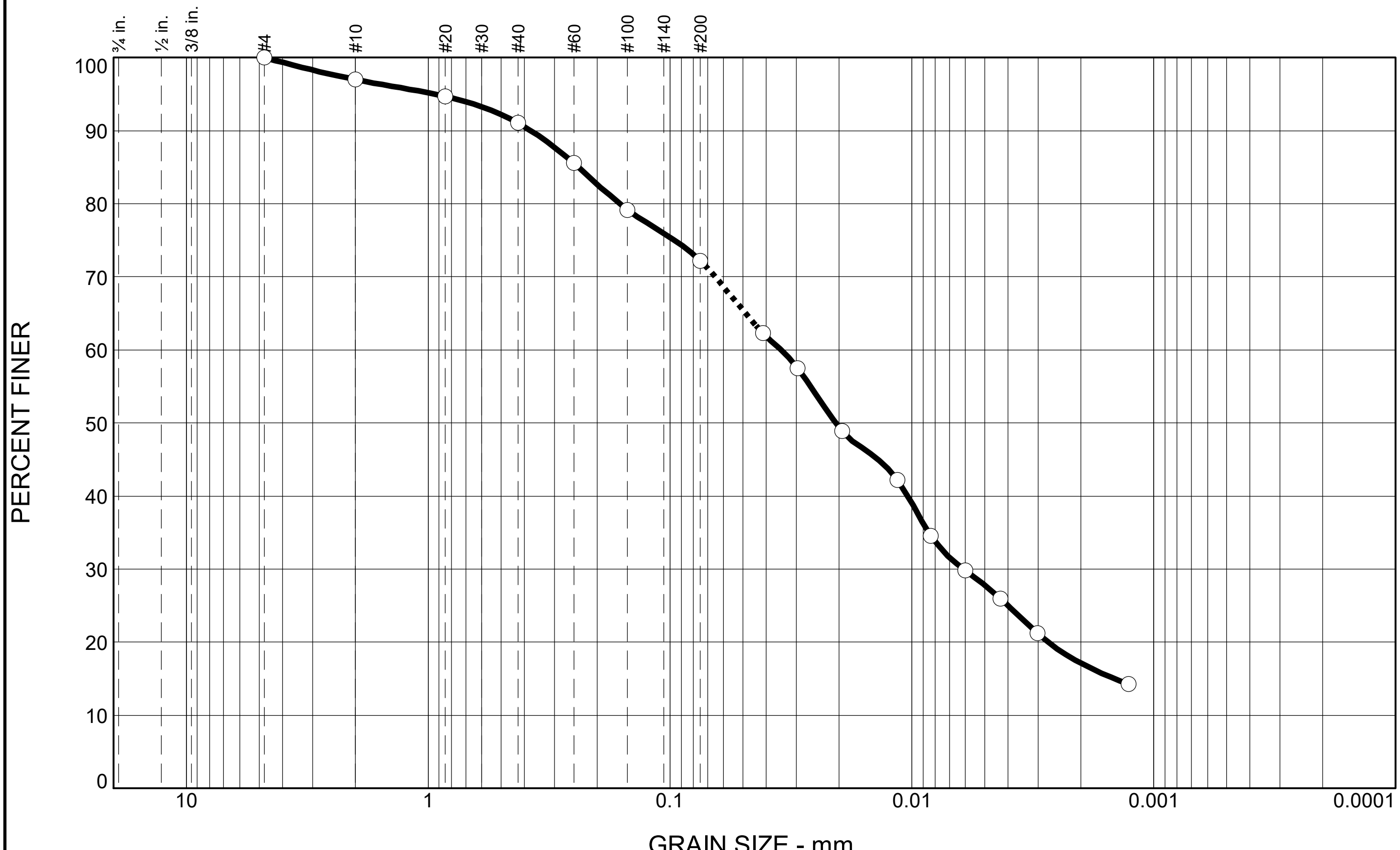
Source of Sample: APW-14 **Depth:** 45.0'-47.0'
Sample Number: 0955 **Date:** 3-2-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.0	5.9	18.9	44.4	27.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	97.0		
#20	94.7		
#40	91.1		
#60	85.6		
#100	79.2		
#200	72.2		
0.0411 mm.	62.3		
0.0297 mm.	57.5		
0.0194 mm.	48.9		
0.0115 mm.	42.2		
0.0084 mm.	34.6		
0.0060 mm.	29.8		
0.0043 mm.	26.0		
0.0030 mm.	21.2		
0.0013 mm.	14.2		

* (no specification provided)

Soil Description

GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 15 LL= 25 PI= 10

Coefficients

D_{90}= 0.3753 D_{85}= 0.2390 D_{60}= 0.0348
D_{50}= 0.0207 D_{30}= 0.0061 D_{15}= 0.0014
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(5)

Remarks

F.M.=0.47

Source of Sample: APW-14 **Depth:** 55.5'-56.0'
Sample Number: 1045 **Date:** 2-26-21

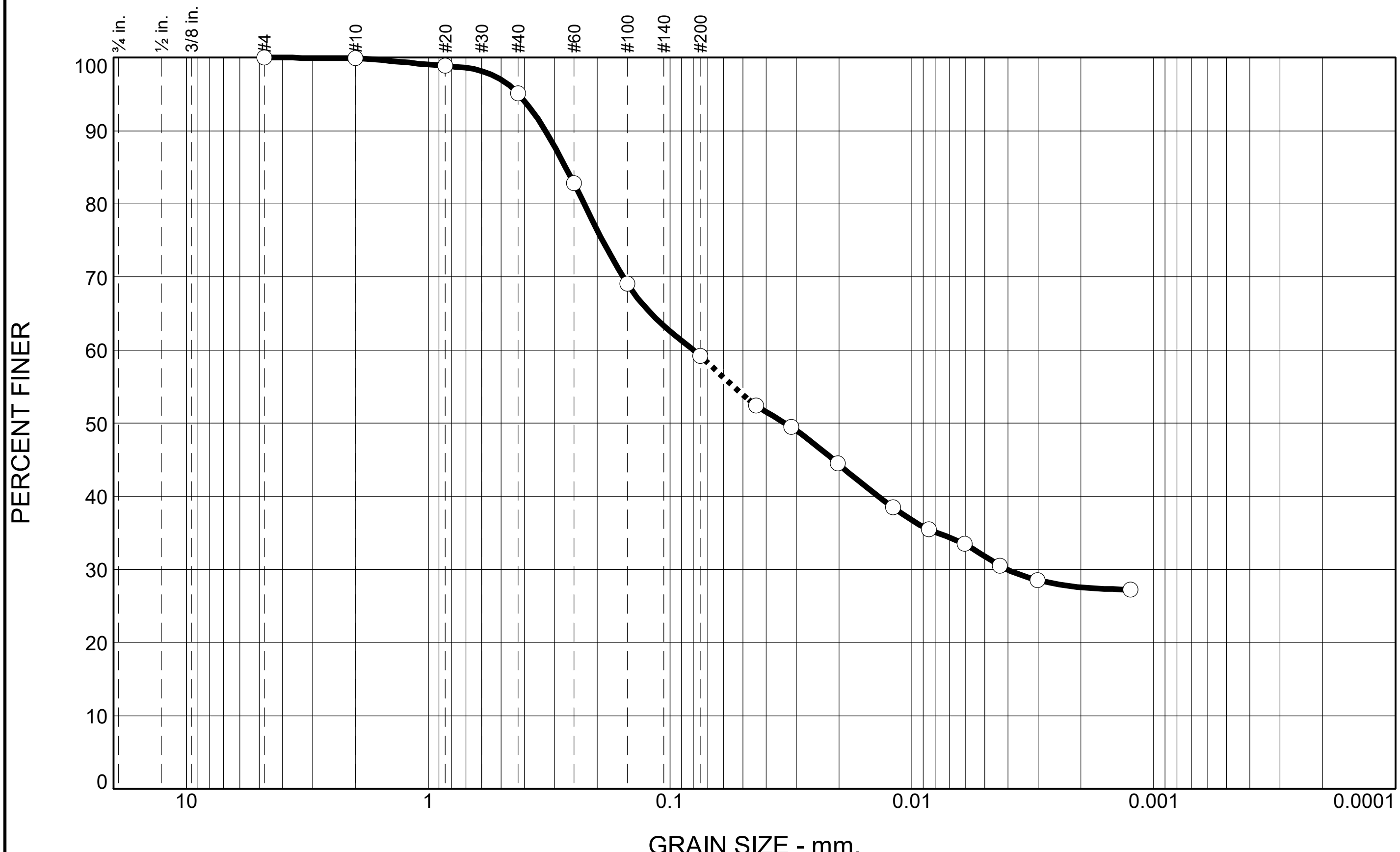
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	4.8	35.9	27.4	31.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	98.9		
#40	95.1		
#60	82.9		
#100	69.1		
#200	59.2		
0.0440 mm.	52.4		
0.0314 mm.	49.5		
0.0202 mm.	44.5		
0.0119 mm.	38.5		
0.0085 mm.	35.5		
0.0061 mm.	33.5		
0.0043 mm.	30.5		
0.0030 mm.	28.5		
0.0012 mm.	27.2		

* (no specification provided)

Soil Description

BROWN SANDY LEAN CLAY

Atterberg Limits

PL= 10 LL= 33 PI= 23

Coefficients

D_{90}= 0.3277 D_{85}= 0.2698 D_{60}= 0.0802
D_{50}= 0.0334 D_{30}= 0.0040 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

F.M.=0.46

Source of Sample: APW-15 **Depth:** 20.0'-22.0'
Sample Number: 1005

Date: 3-2-21

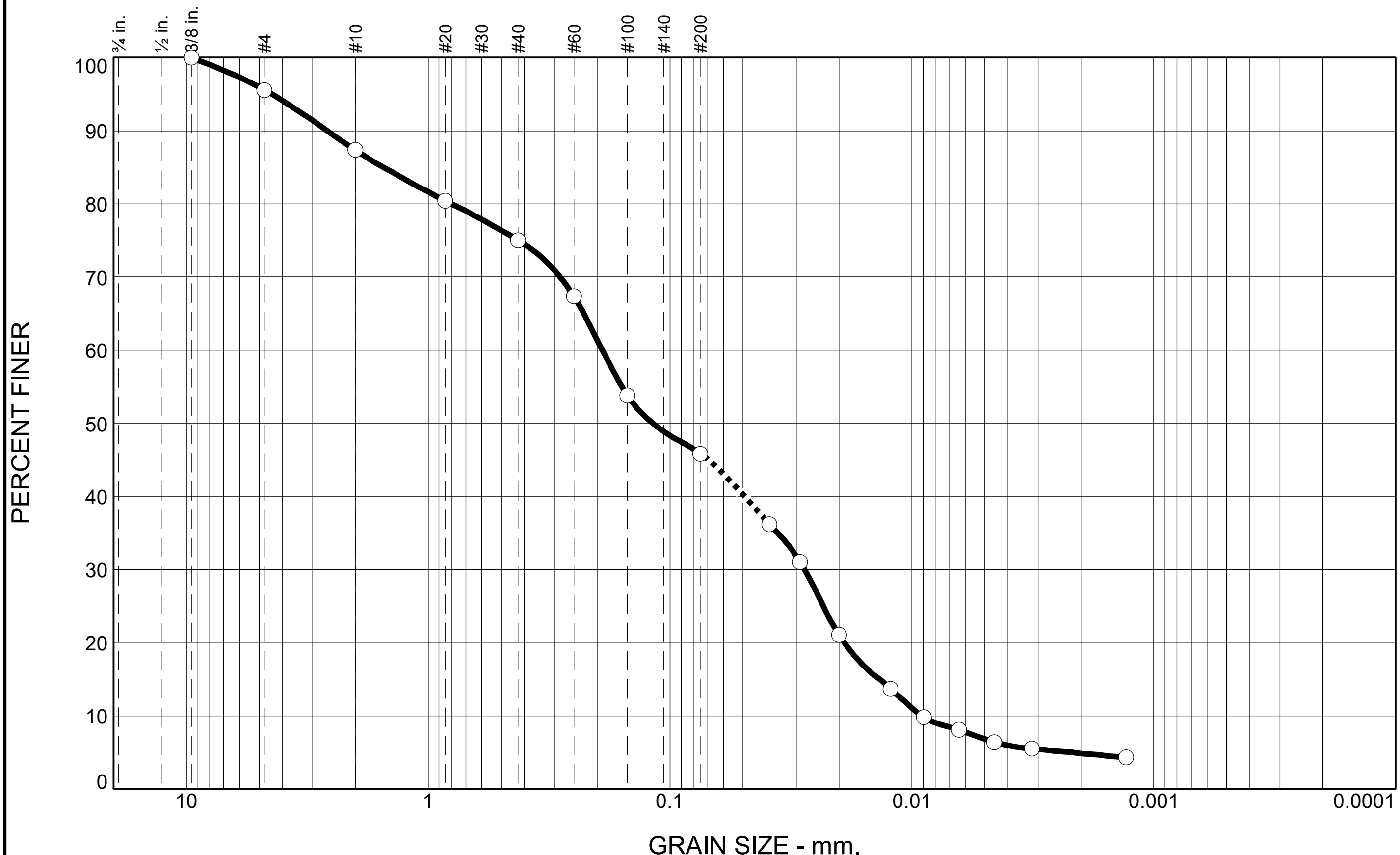
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.4	8.2	12.4	29.2	39.0	6.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	95.6		
#10	87.4		
#20	80.4		
#40	75.0		
#60	67.4		
#100	53.8		
#200	45.8		
0.0388 mm.	36.2		
0.0290 mm.	31.0		
0.0201 mm.	21.1		
0.0123 mm.	13.7		
0.0089 mm.	9.8		
0.0064 mm.	8.1		
0.0046 mm.	6.3		
0.0032 mm.	5.5		
0.0013 mm.	4.3		

* (no specification provided)

Soil Description

GRAY SILTY SAND

Atterberg Limits

PL= 12 LL= 15 PI= 3

Coefficients

D_{90}= 2.6175 D_{85}= 1.5318 D_{60}= 0.1904
D_{50}= 0.1183 D_{30}= 0.0278 D_{15}= 0.0137
D_{10}= 0.0091 C_u= 20.90 C_c= 0.45

Classification

USCS= SM AASHTO= A-4(0)

Remarks

F.M.=1.30

Source of Sample: APW-15 **Depth:** 100.5'-101.0'
Sample Number: 0755

Date: 2-26-21

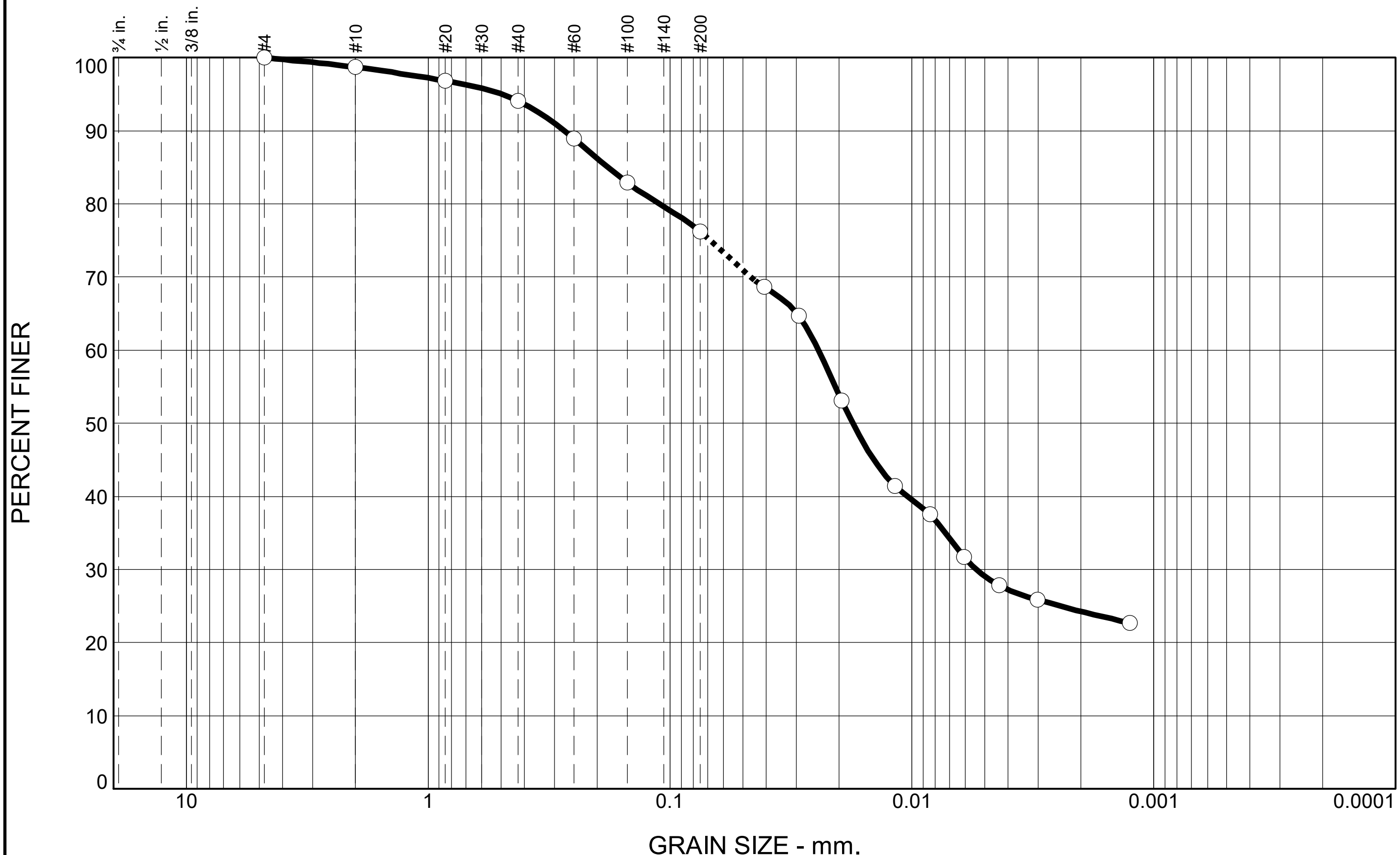
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	4.6	17.9	47.1	29.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.7		
#20	96.8		
#40	94.1		
#60	89.0		
#100	82.9		
#200	76.2		
0.0409 mm.	68.6		
0.0294 mm.	64.7		
0.0195 mm.	53.1		
0.0118 mm.	41.4		
0.0084 mm.	37.5		
0.0061 mm.	31.7		
0.0044 mm.	27.8		
0.0030 mm.	25.9		
0.0013 mm.	22.7		

* (no specification provided)

Soil Description

DARK GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 13 LL= 29 PI= 16

Coefficients

D_{90}= 0.2737 D_{85}= 0.1806 D_{60}= 0.0244
D_{50}= 0.0175 D_{30}= 0.0054 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

F.M.=0.34

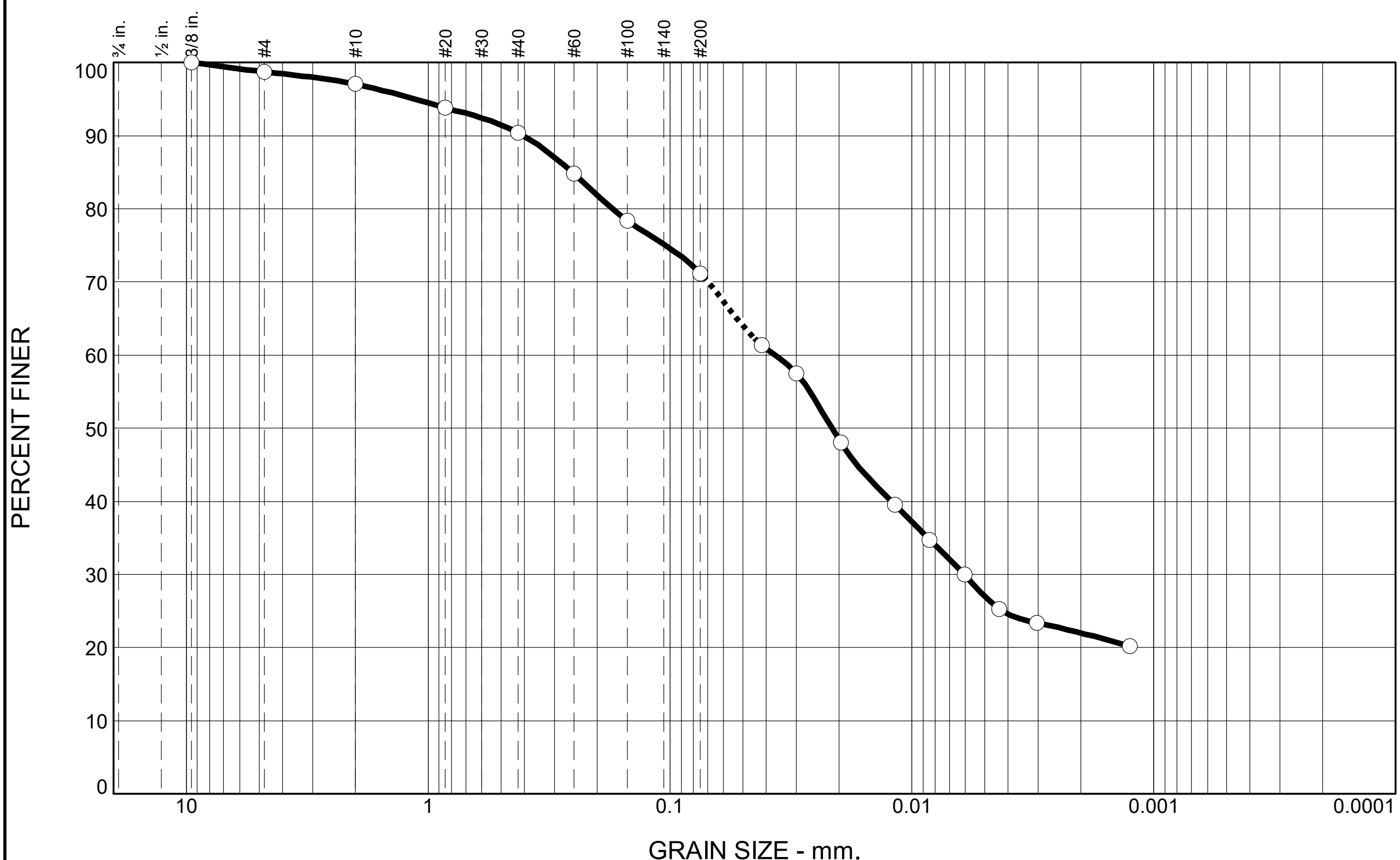
Source of Sample: APW-15 **Depth:** 105.0'-107.0'
Sample Number: 0905 **Date:** 3-2-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.3	1.6	6.7	19.3	44.1	27.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	98.7		
#10	97.1		
#20	93.8		
#40	90.4		
#60	84.8		
#100	78.4		
#200	71.1		
0.0417 mm.	61.3		
0.0300 mm.	57.5		
0.0197 mm.	48.0		
0.0117 mm.	39.5		
0.0084 mm.	34.8		
0.0061 mm.	30.0		
0.0044 mm.	25.3		
0.0030 mm.	23.4		
0.0013 mm.	20.2		

* (no specification provided)

Soil Description

GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 13 LL= 26 PI= 13

Coefficients

D_{90}= 0.4047 D_{85}= 0.2534 D_{60}= 0.0368
D_{50}= 0.0214 D_{30}= 0.0061 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

F.M.=0.51

Source of Sample: APW-17 **Depth:** 40.0'-42.0'
Sample Number: 0945

Date: 3-2-21

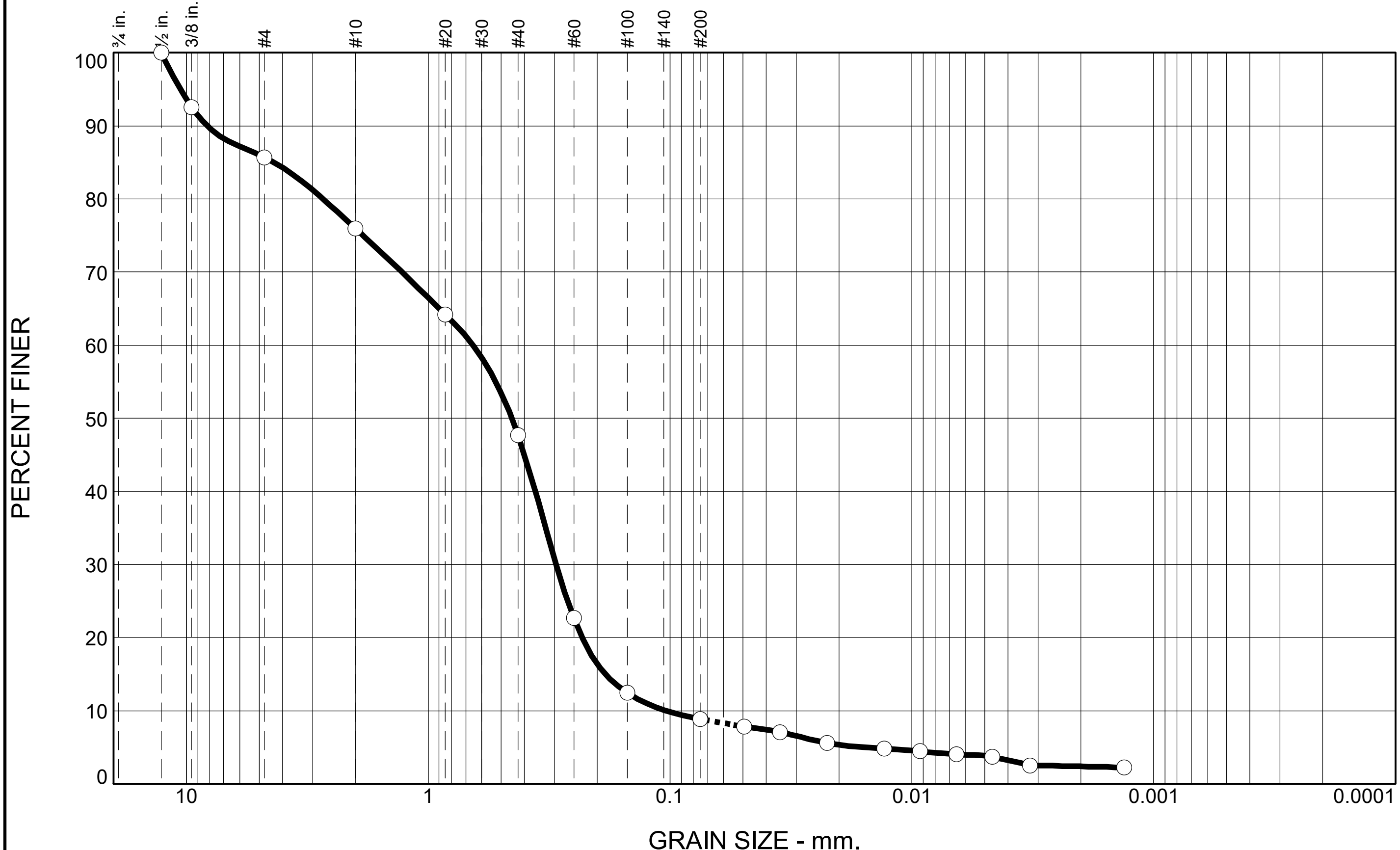
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.3	9.7	28.3	38.8	5.1	3.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	92.6		
#4	85.7		
#10	76.0		
#20	64.2		
#40	47.7		
#60	22.7		
#100	12.5		
#200	8.9		
0.0493 mm.	7.9		
0.0350 mm.	7.1		
0.0224 mm.	5.6		
0.0130 mm.	4.8		
0.0092 mm.	4.4		
0.0065 mm.	4.1		
0.0046 mm.	3.7		
0.0032 mm.	2.5		
0.0013 mm.	2.2		

* (no specification provided)

Soil Description

GRAY WELL GRADED SAND WITH SILT

Atterberg Limits

PL= 9 LL= 5 PI= NP

Coefficients

D_{90}= 8.1927 D_{85}= 4.3406 D_{60}= 0.6532
D_{50}= 0.4503 D_{30}= 0.2954 D_{15}= 0.1851
D_{10}= 0.1038 C_u= 6.29 C_c= 1.29

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

F.M.=2.73

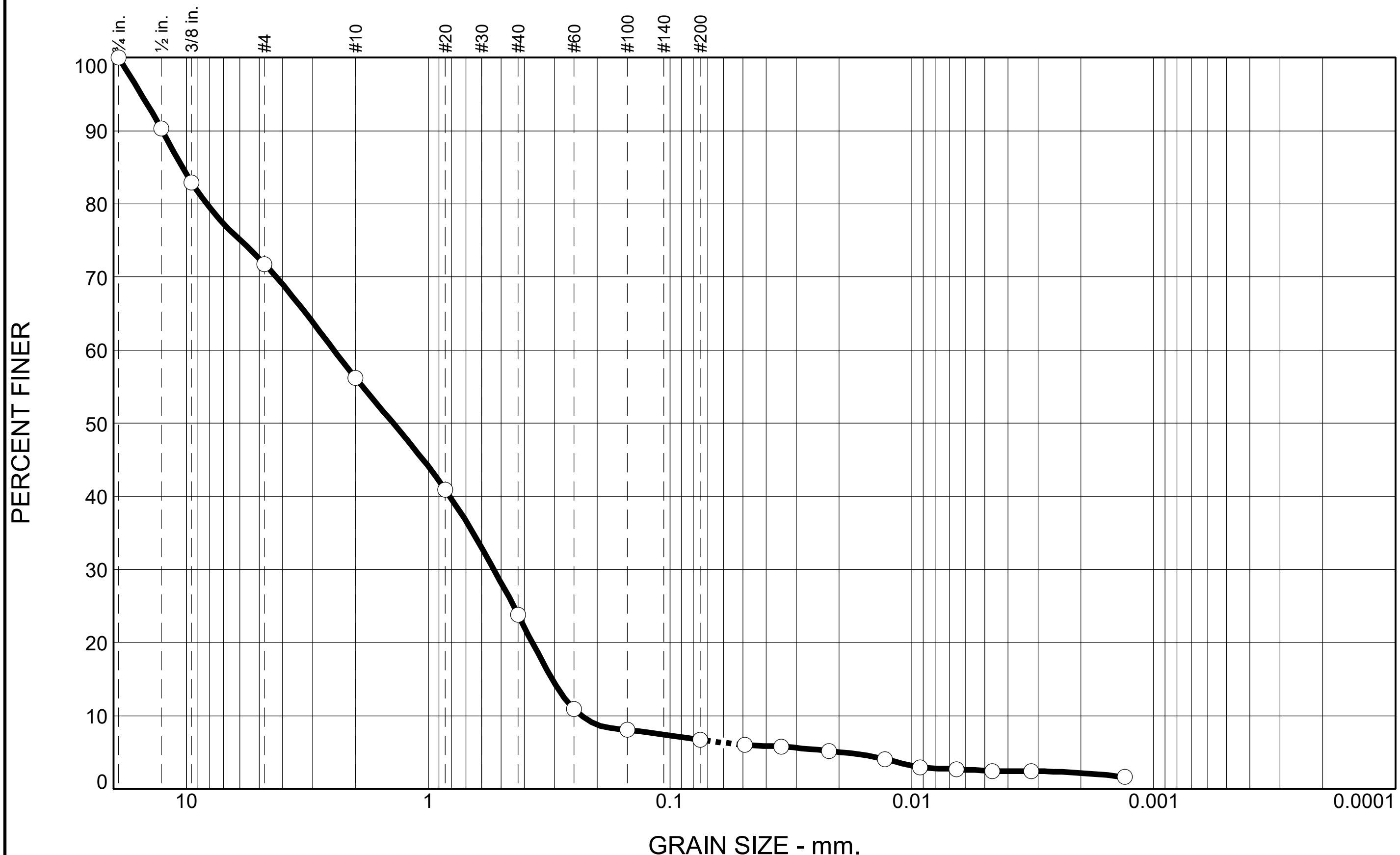
Source of Sample: APW-17 **Depth:** 71.0'-71.5'
Sample Number: 1045
Date: 2-26-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	28.2	15.6	32.4	17.1	4.2	2.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	90.3		
.375	83.0		
#4	71.8		
#10	56.2		
#20	40.9		
#40	23.8		
#60	10.9		
#100	8.0		
#200	6.7		
0.0489 mm.	6.0		
0.0347 mm.	5.7		
0.0221 mm.	5.2		
0.0129 mm.	4.1		
0.0092 mm.	3.0		
0.0065 mm.	2.7		
0.0046 mm.	2.4		
0.0032 mm.	2.4		
0.0013 mm.	1.6		

* (no specification provided)

Soil Description

GRAYISH BROWN POORLY GRADED SAND WITH SILT AND GRAVEL

Atterberg Limits

PL= 8 LL= 6 PI= NP

Coefficients

D_{90}= 12.5520 D_{85}= 10.3682 D_{60}= 2.4528
D_{50}= 1.3942 D_{30}= 0.5340 D_{15}= 0.3065
D_{10}= 0.2326 C_u= 10.54 C_c= 0.50

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

F.M.=3.83

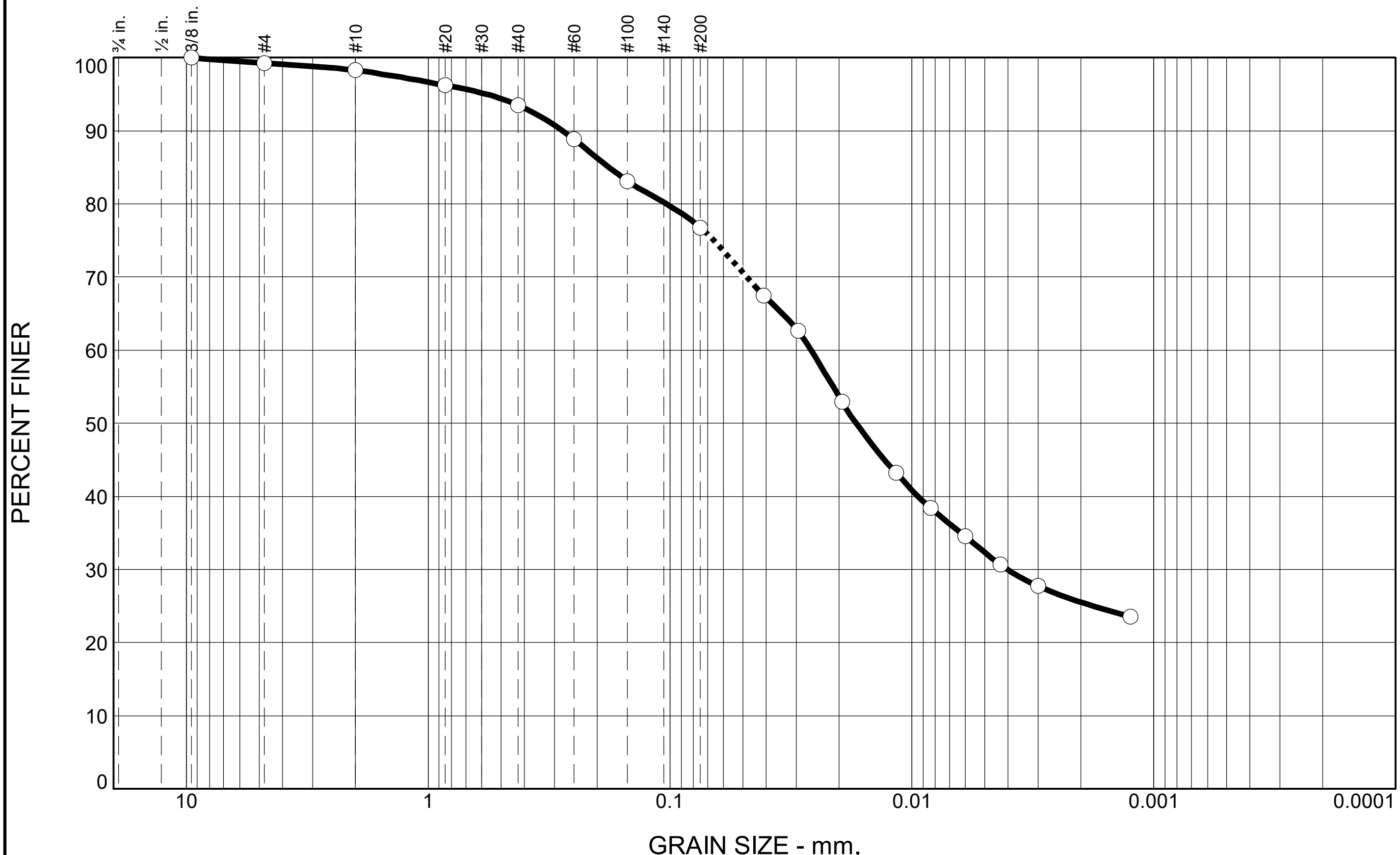
Source of Sample: APW-17 **Depth:** 90.5'-91.0'
Sample Number: 1200
Date: 2-26-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.8	0.9	4.8	16.7	44.5	32.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.2		
#10	98.3		
#20	96.2		
#40	93.5		
#60	88.9		
#100	83.1		
#200	76.8		
0.0410 mm.	67.5		
0.0296 mm.	62.6		
0.0194 mm.	52.9		
0.0116 mm.	43.2		
0.0084 mm.	38.4		
0.0060 mm.	34.5		
0.0043 mm.	30.6		
0.0030 mm.	27.7		
0.0013 mm.	23.6		

* (no specification provided)

Soil Description

DARK GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 12 LL= 32 PI= 20

Coefficients

D_{90}= 0.2782 D_{85}= 0.1790 D_{60}= 0.0261
D_{50}= 0.0170 D_{30}= 0.0040 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

F.M.=0.36

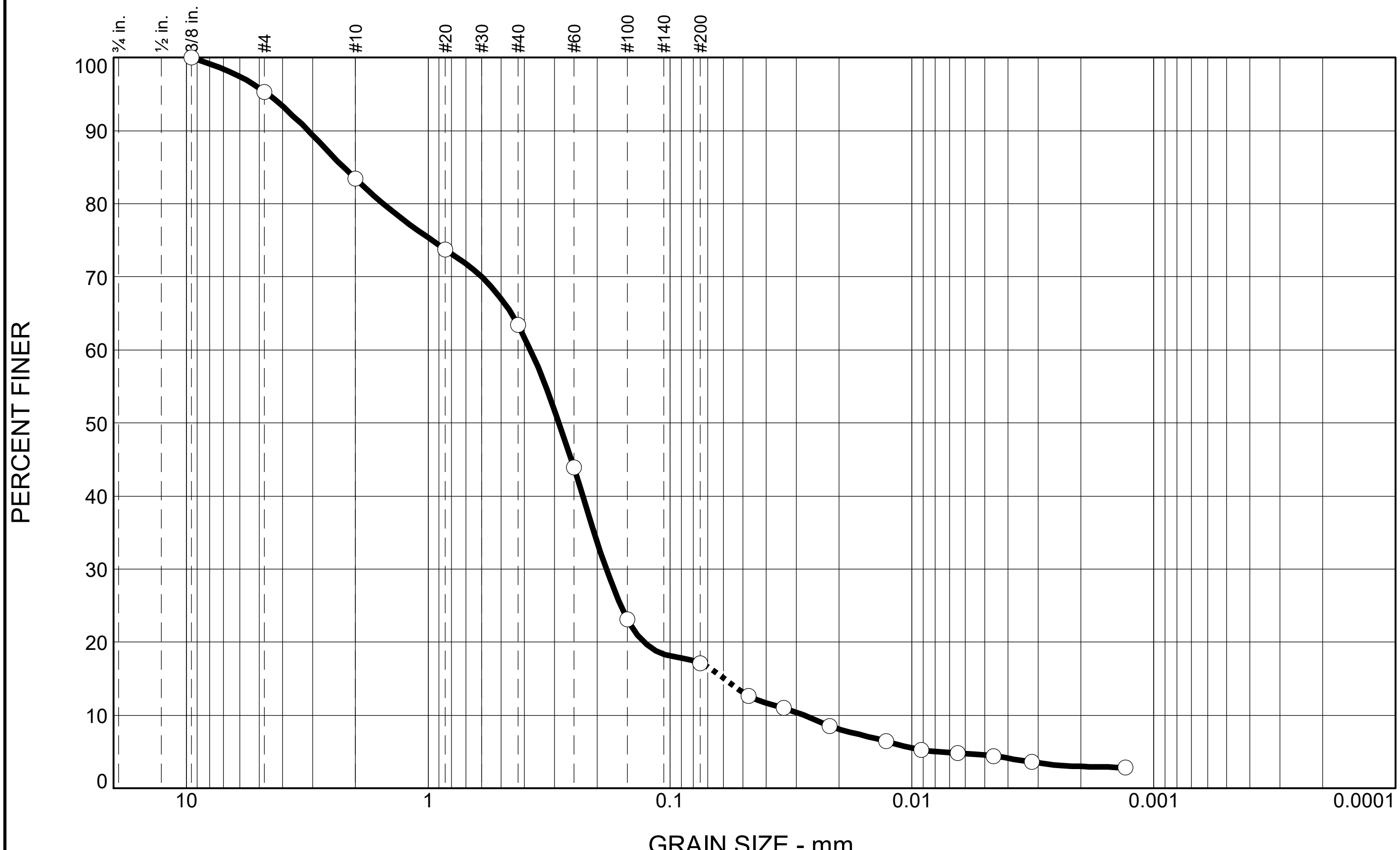
Source of Sample: SB-300 **Depth:** 50.0'-52.0'
Sample Number: 0825 **Date:** 3-2-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.7	11.9	20.0	46.3	12.5	4.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	95.3		
#10	83.4		
#20	73.7		
#40	63.4		
#60	43.9		
#100	23.1		
#200	17.1		
0.0474 mm.	12.7		
0.0339 mm.	11.0		
0.0219 mm.	8.5		
0.0128 mm.	6.5		
0.0091 mm.	5.2		
0.0065 mm.	4.8		
0.0046 mm.	4.4		
0.0032 mm.	3.6		
0.0013 mm.	2.9		

* (no specification provided)

Soil Description

GRAYISH BROWN SILTY SAND

Atterberg Limits

PL= 9 LL= 5 PI= NP

Coefficients

D_{90}= 3.1361 D_{85}= 2.2352 D_{60}= 0.3777
D_{50}= 0.2877 D_{30}= 0.1834 D_{15}= 0.0597
D_{10}= 0.0281 C_u= 13.44 C_c= 3.17

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.97

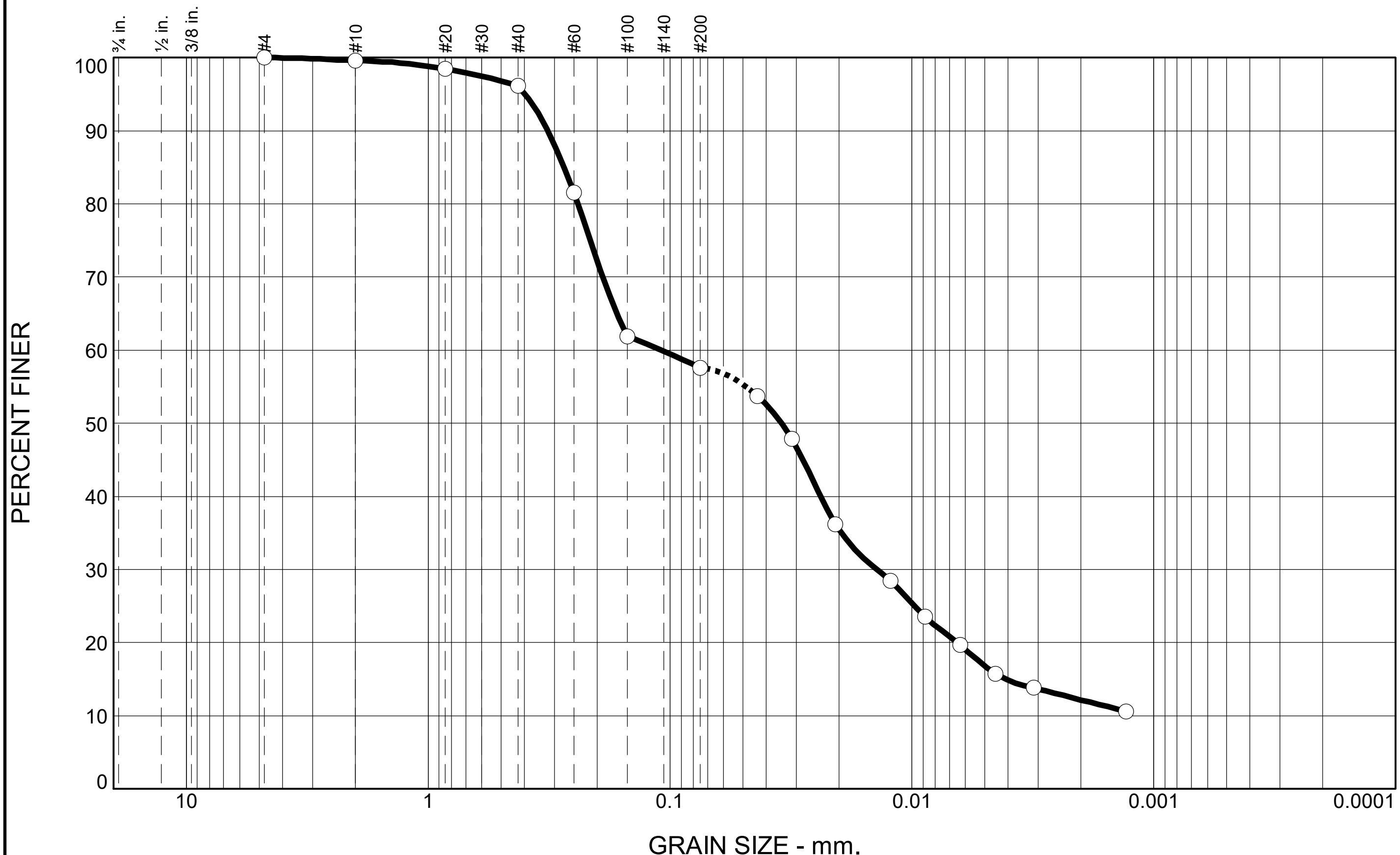
Source of Sample: SB-300 **Depth:** 61.0'-61.5'
Sample Number: 0905 **Date:** 2-26-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	3.5	38.5	40.8	16.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	98.5		
#40	96.1		
#60	81.6		
#100	61.9		
#200	57.6		
0.0434 mm.	53.7		
0.0314 mm.	47.9		
0.0207 mm.	36.2		
0.0123 mm.	28.4		
0.0088 mm.	23.5		
0.0063 mm.	19.6		
0.0045 mm.	15.7		
0.0031 mm.	13.8		
0.0013 mm.	10.6		

* (no specification provided)

Soil Description

GRAY AND BROWN SANDY SILTY CLAY

Atterberg Limits

PL= 14 LL= 20 PI= 6

Coefficients

D_{90}= 0.3201 D_{85}= 0.2739 D_{60}= 0.1090
D_{50}= 0.0345 D_{30}= 0.0139 D_{15}= 0.0041
D_{10}= C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(1)

Remarks

F.M.=0.54

Source of Sample: SB-300 **Depth:** 62.5'-63.0'
Sample Number: 0920 **Date:** 2-26-21

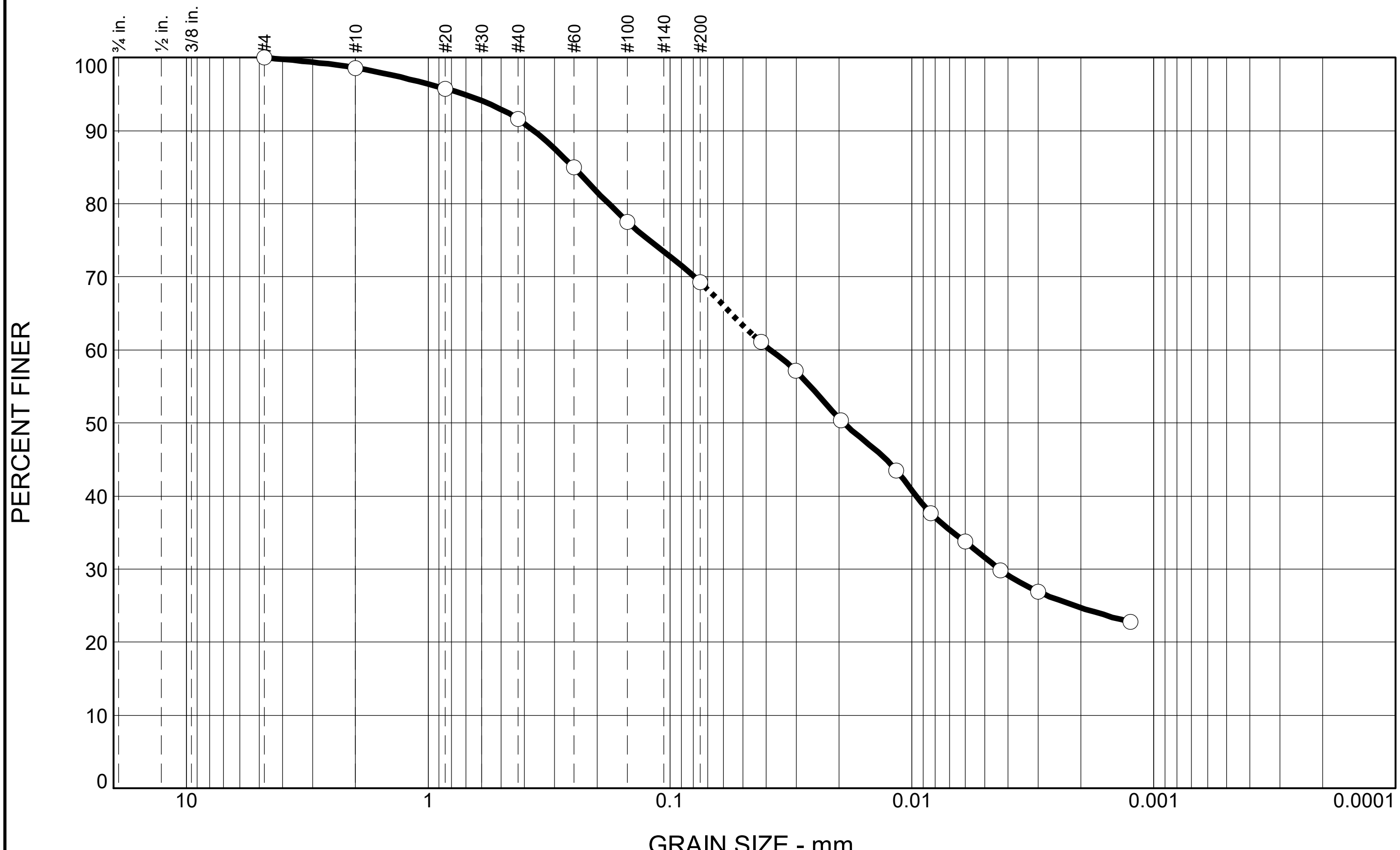
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	7.0	22.3	37.7	31.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.6		
#20	95.7		
#40	91.6		
#60	84.9		
#100	77.5		
#200	69.3		
0.0420 mm.	61.1		
0.0302 mm.	57.2		
0.0196 mm.	50.3		
0.0116 mm.	43.5		
0.0084 mm.	37.7		
0.0060 mm.	33.8		
0.0043 mm.	29.9		
0.0030 mm.	26.9		
0.0013 mm.	22.7		

* (no specification provided)

Soil Description

DARK GRAY SANDY LEAN CLAY

Atterberg Limits

PL= 13 LL= 28 PI= 15

Coefficients

D_{90}= 0.3661 D_{85}= 0.2511 D_{60}= 0.0384
D_{50}= 0.0191 D_{30}= 0.0044 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

F.M.=0.45

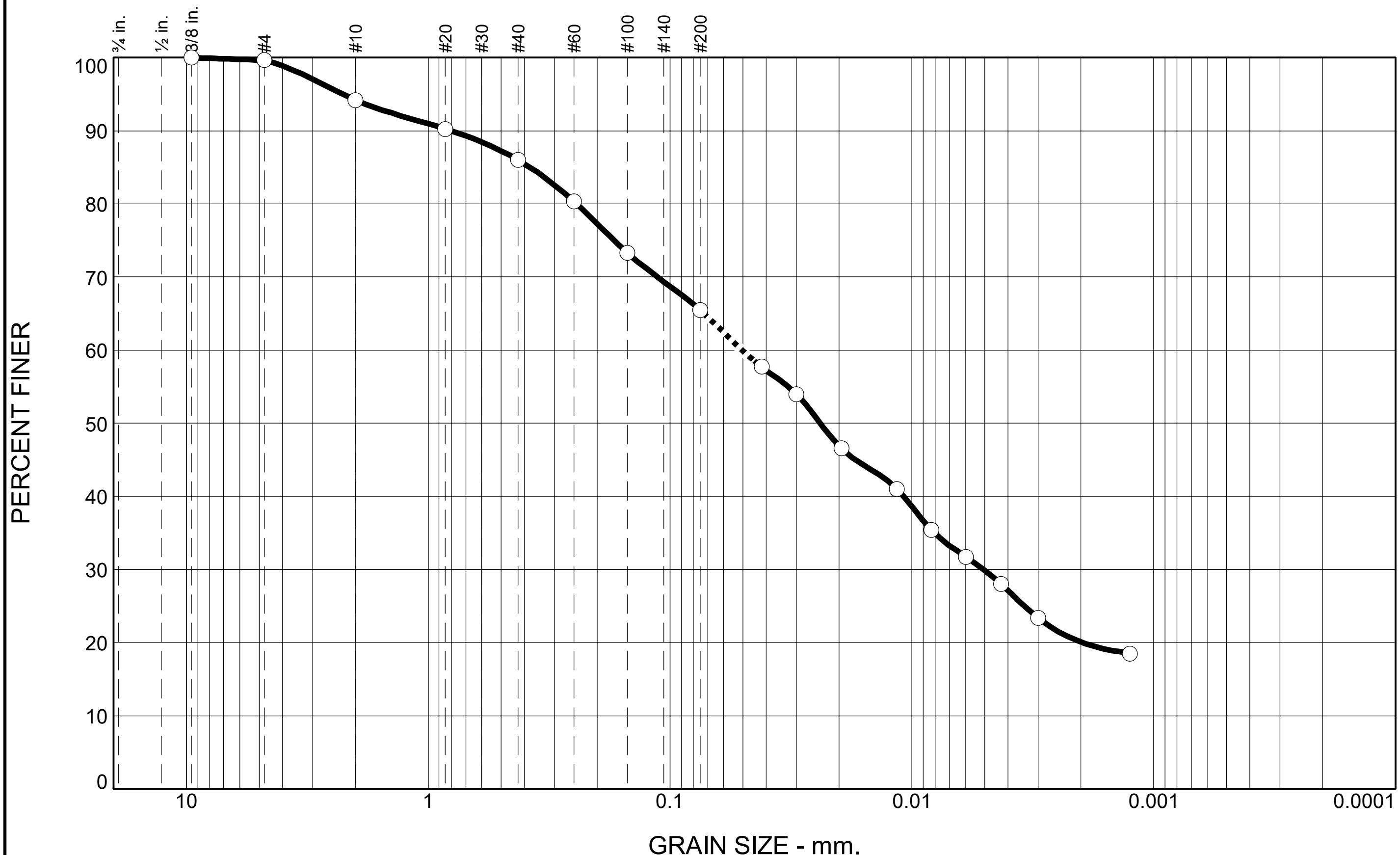
Source of Sample: SB-300 **Depth:** 105.0'-107.0'
Sample Number: 1350 **Date:** 3-2-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.4	5.4	8.2	20.6	35.5	29.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.6		
#10	94.2		
#20	90.2		
#40	86.0		
#60	80.3		
#100	73.3		
#200	65.4		
0.0418 mm.	57.7		
0.0300 mm.	54.0		
0.0196 mm.	46.6		
0.0115 mm.	41.0		
0.0083 mm.	35.4		
0.0060 mm.	31.7		
0.0043 mm.	28.0		
0.0030 mm.	23.4		
0.0013 mm.	18.5		

* (no specification provided)

Soil Description

BROWN AND GRAY SANDY LEAN CLAY

Atterberg Limits

PL= 14 LL= 27 PI= 13

Coefficients

D_{90}= 0.8050 D_{85}= 0.3797 D_{60}= 0.0504
D_{50}= 0.0239 D_{30}= 0.0051 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

F.M.=0.69

Source of Sample: SB-301 **Depth:** 48.0'-50.0'
Sample Number: 1330

Date: 2-26-21

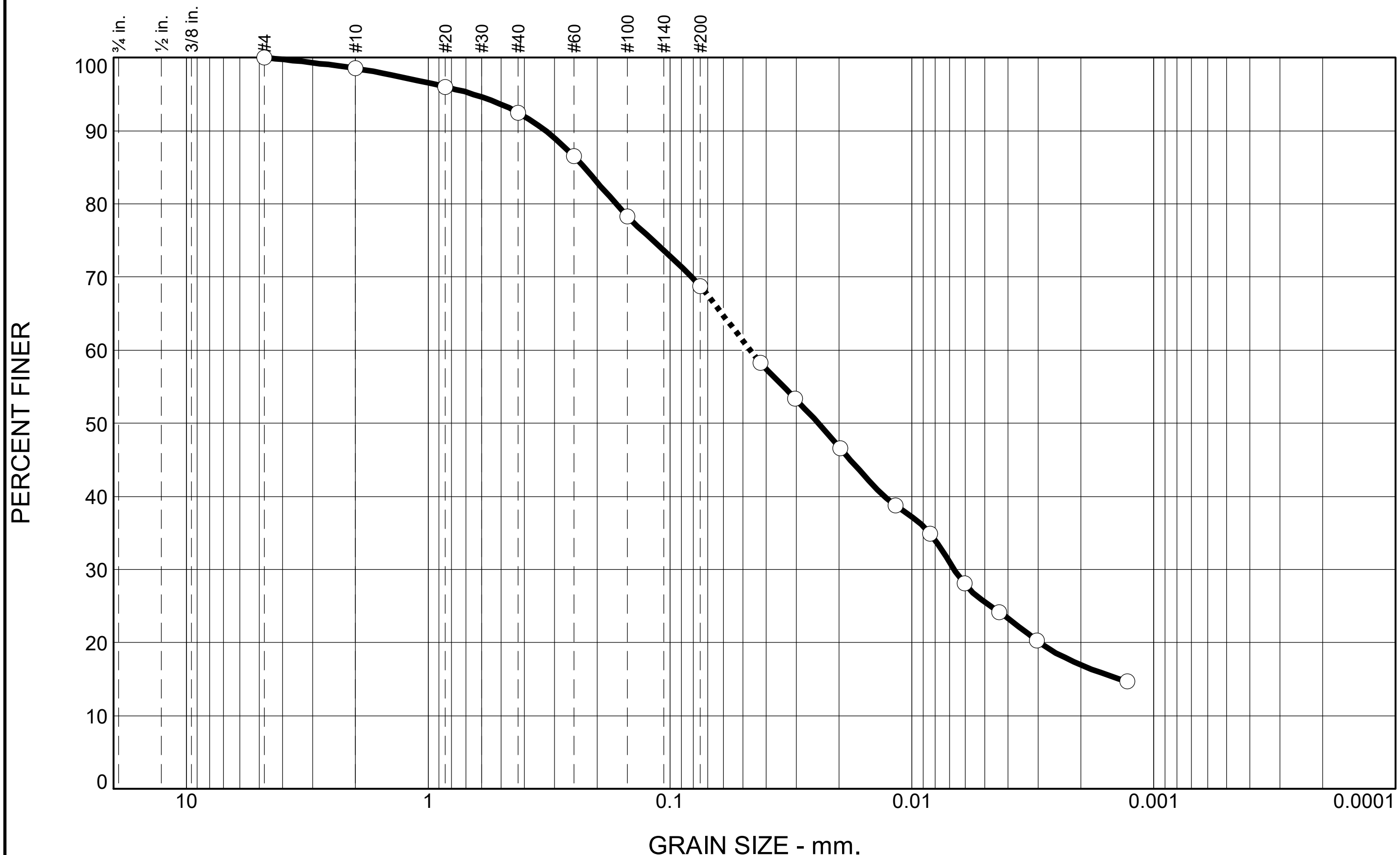
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	6.0	23.8	43.2	25.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.5		
#20	96.0		
#40	92.5		
#60	86.5		
#100	78.3		
#200	68.7		
0.0422 mm.	58.3		
0.0304 mm.	53.4		
0.0197 mm.	46.6		
0.0117 mm.	38.8		
0.0084 mm.	34.9		
0.0061 mm.	28.1		
0.0043 mm.	24.2		
0.0030 mm.	20.3		
0.0013 mm.	14.7		

* (no specification provided)

Soil Description

GRAY SANDY LEAN CLAY

Atterberg Limits

PL= 14 LL= 23 PI= 9

Coefficients

D_{90}= 0.3271 D_{85}= 0.2265 D_{60}= 0.0466
D_{50}= 0.0243 D_{30}= 0.0067 D_{15}= 0.0014
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(3)

Remarks

F.M.=0.42

Source of Sample: SB-301 **Depth:** 68.5'-69.0'
Sample Number: 1600

Date: 3-31-21

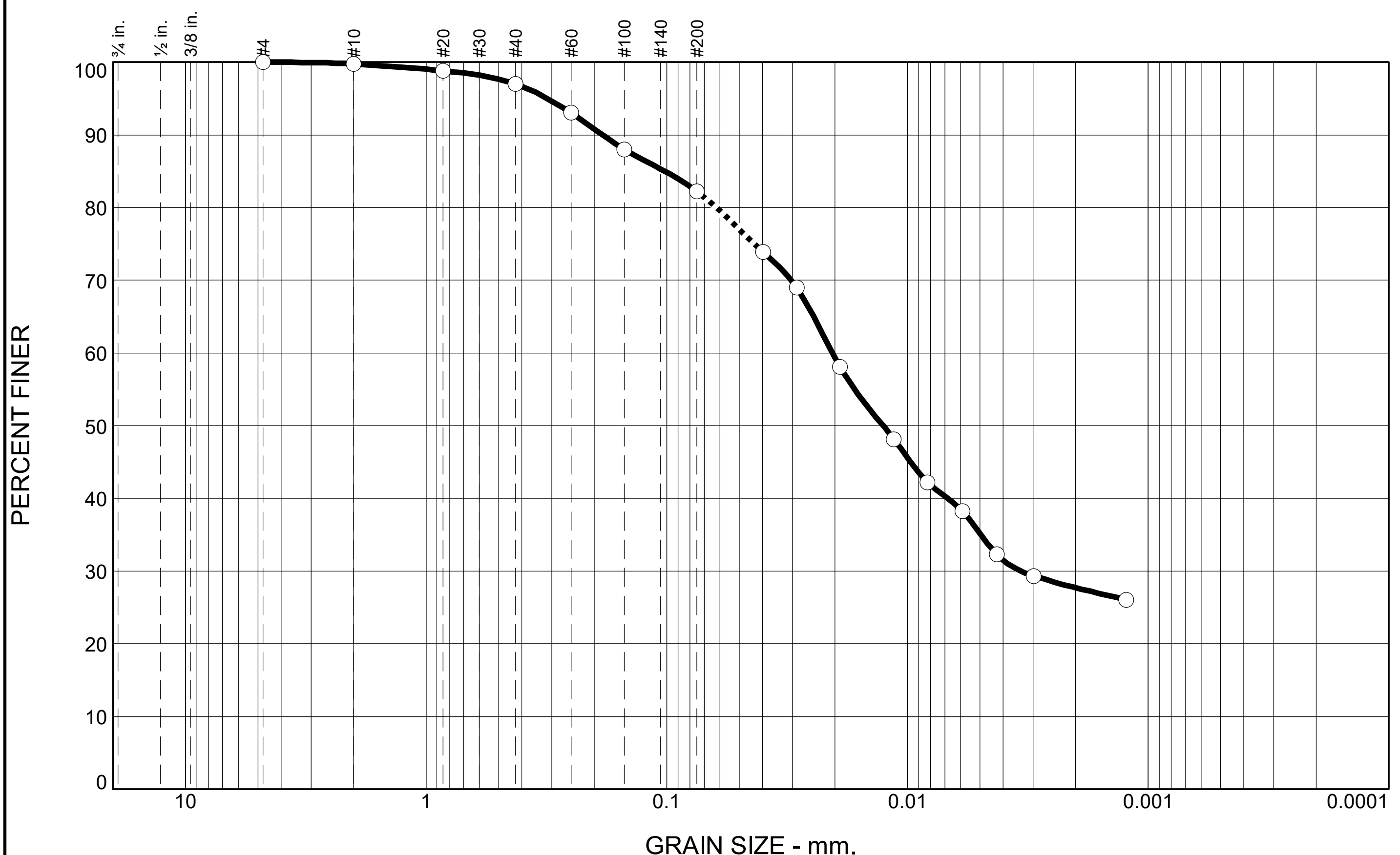
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	2.8	14.8	47.0	35.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#20	98.8		
#40	97.0		
#60	93.0		
#100	88.0		
#200	82.2		
0.0398 mm.	73.9		
0.0288 mm.	69.0		
0.0190 mm.	58.1		
0.0114 mm.	48.2		
0.0082 mm.	42.2		
0.0059 mm.	38.3		
0.0043 mm.	32.3		
0.0030 mm.	29.3		
0.0012 mm.	26.1		

* (no specification provided)

Soil Description

DARK BROWN TO DARK GRAY LEAN CLAY WITH SAND

Atterberg Limits

PL= 15 LL= 37 PI= 22

Coefficients

D_{90}= 0.1848 D_{85}= 0.1019 D_{60}= 0.0205
D_{50}= 0.0126 D_{30}= 0.0034 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(17)

Remarks

F.M.=0.20

Source of Sample: SB-301 **Depth:** 98.0'-100.0'
Sample Number: 0946

Date: 3-2-21

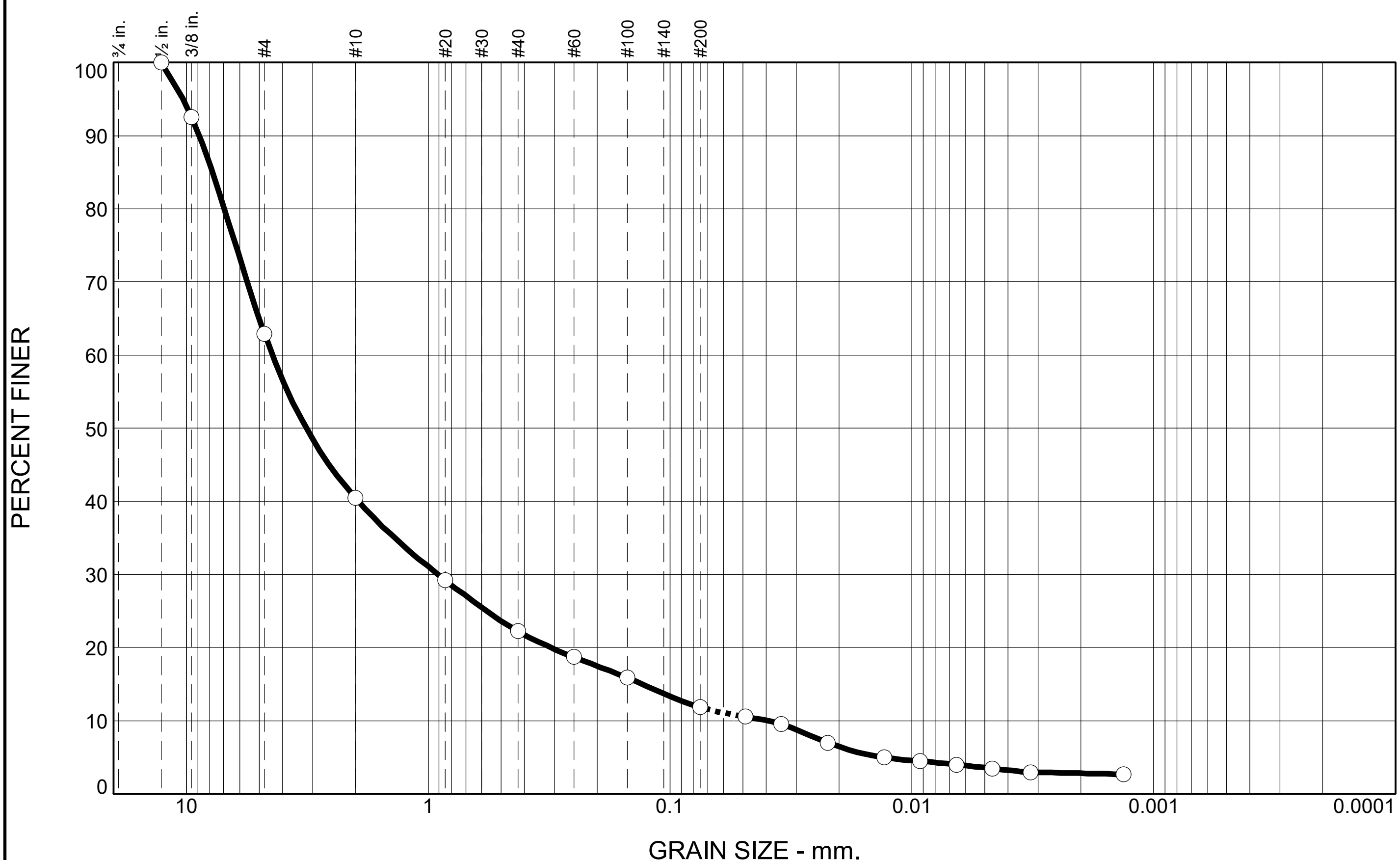
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	37.1	22.4	18.2	10.5	8.2	3.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	92.6		
#4	62.9		
#10	40.5		
#20	29.2		
#40	22.3		
#60	18.7		
#100	15.9		
#200	11.8		
0.0489 mm.	10.5		
0.0348 mm.	9.5		
0.0223 mm.	7.0		
0.0130 mm.	5.0		
0.0092 mm.	4.5		
0.0065 mm.	4.0		
0.0046 mm.	3.5		
0.0032 mm.	2.9		
0.0013 mm.	2.7		

* (no specification provided)

Soil Description

DARK GRAY AND BROWN POORLY GRADED SAND WITH SILT AND GRAVEL

Atterberg Limits

PL= 57 LL= 47 PI= NP

Coefficients

D_{90}= 8.8427 D_{85}= 7.7995 D_{60}= 4.4077
D_{50}= 3.1925 D_{30}= 0.9113 D_{15}= 0.1303
D_{10}= 0.0394 C_u= 111.78 C_c= 4.78

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

F.M.=4.07

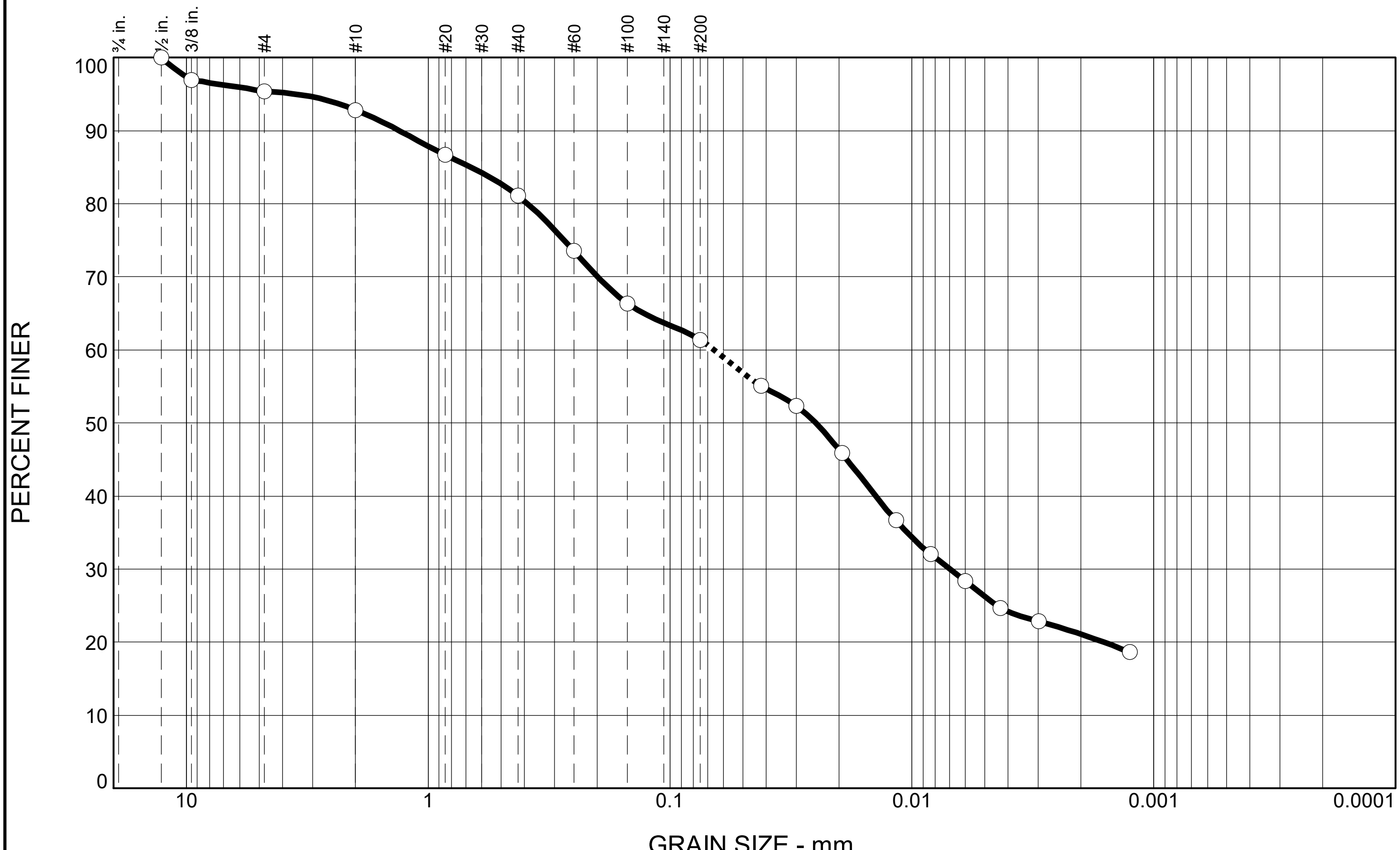
Source of Sample: XPW-01 **Depth:** 8.5'-9.0'
Sample Number: 0820
Date: 3-16-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.6	2.6	11.7	19.8	35.1	26.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	96.9		
#4	95.4		
#10	92.8		
#20	86.7		
#40	81.1		
#60	73.5		
#100	66.3		
#200	61.3		
0.0419 mm.	55.1		
0.0300 mm.	52.3		
0.0195 mm.	45.9		
0.0116 mm.	36.7		
0.0084 mm.	32.1		
0.0060 mm.	28.4		
0.0043 mm.	24.7		
0.0030 mm.	22.9		
0.0013 mm.	18.7		

* (no specification provided)

Soil Description

GRAY AND BROWN SANDY LEAN CLAY

Atterberg Limits

PL= 17 LL= 35 PI= 18

Coefficients

D_{90}= 1.3206 D_{85}= 0.6662 D_{60}= 0.0657
D_{50}= 0.0250 D_{30}= 0.0070 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

F.M.=0.98

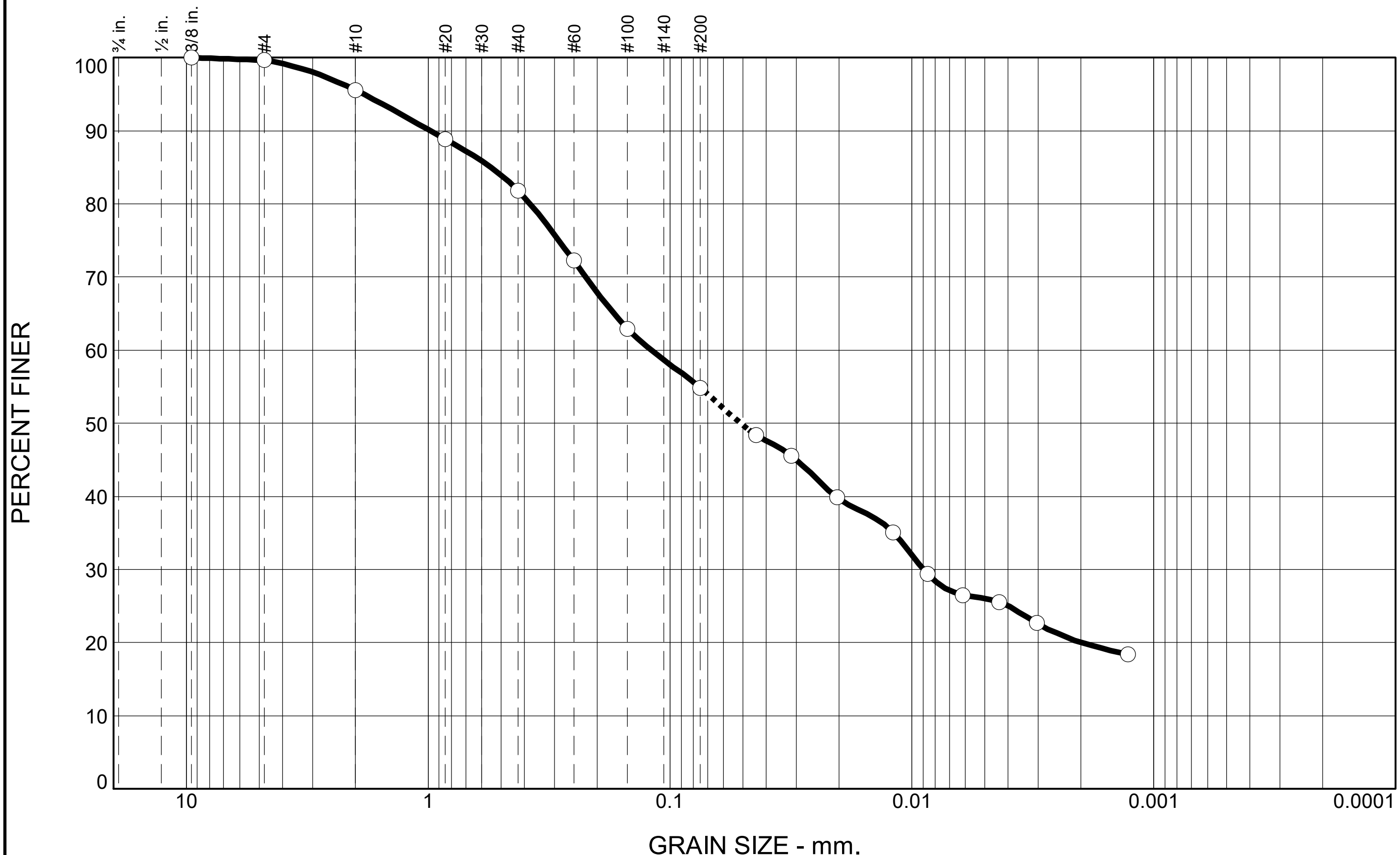
Source of Sample: XPW-01 **Depth:** 15.5'-16.0'
Sample Number: 0840 **Date:** 3-16-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.3	4.1	13.8	26.9	28.9	26.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.7		
#10	95.6		
#20	88.8		
#40	81.8		
#60	72.2		
#100	62.9		
#200	54.9		
0.0440 mm.	48.4		
0.0315 mm.	45.5		
0.0203 mm.	39.8		
0.0119 mm.	35.1		
0.0086 mm.	29.4		
0.0061 mm.	26.5		
0.0044 mm.	25.5		
0.0030 mm.	22.7		
0.0013 mm.	18.4		

* (no specification provided)

Soil Description

VERY DARK GRAY, GRAY AND BROWN SANDY LEAN CLAY

Atterberg Limits

PL= 16 LL= 36 PI= 20

Coefficients

D_{90}= 0.9818 D_{85}= 0.5511 D_{60}= 0.1197
D_{50}= 0.0512 D_{30}= 0.0090 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

F.M.=0.88

Source of Sample: XPW-02 **Depth:** 8.0'-8.5'
Sample Number: 1530

Date: 3-16-21

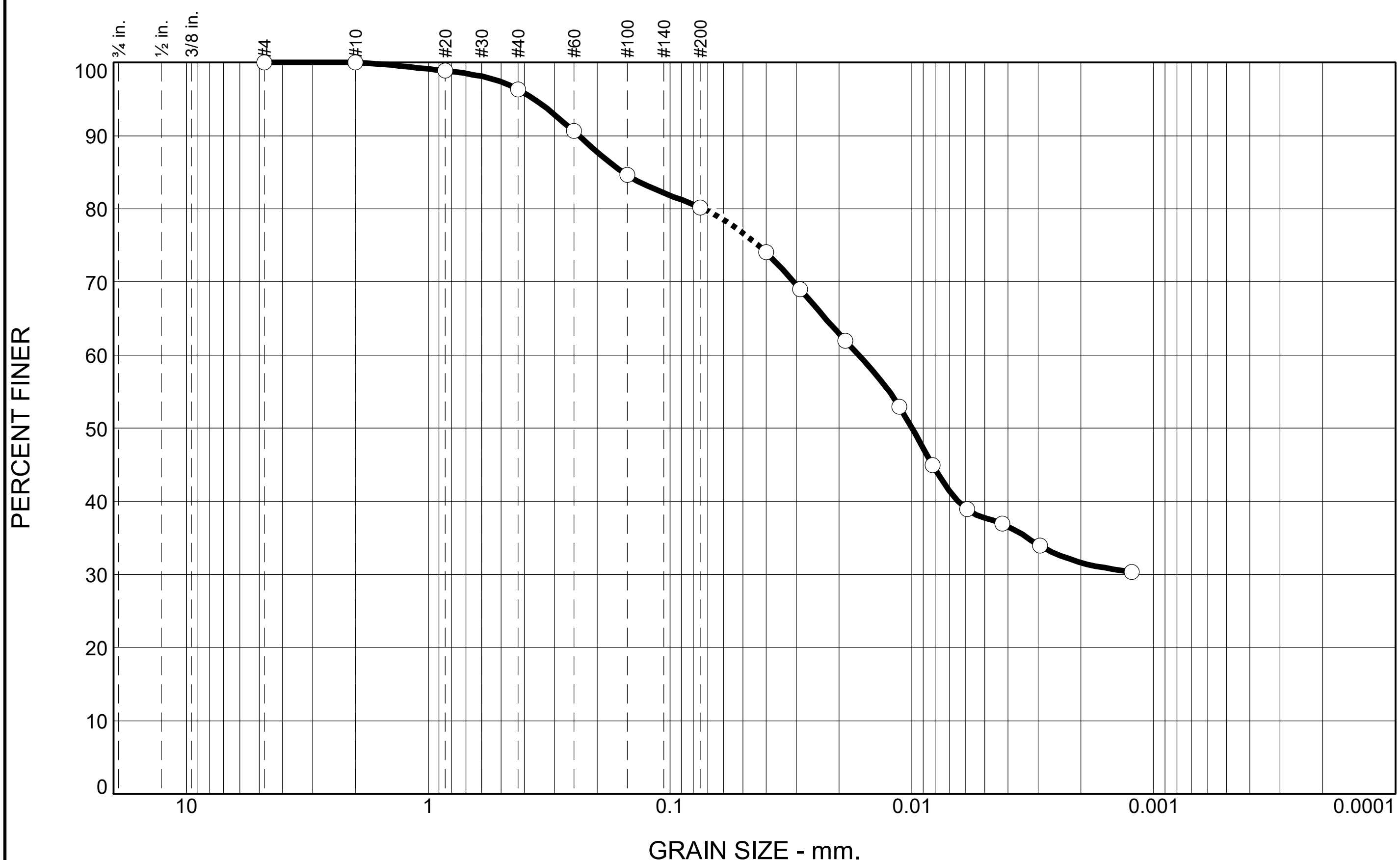
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	3.7	16.1	42.5	37.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	98.9		
#40	96.3		
#60	90.6		
#100	84.6		
#200	80.2		
0.0401 mm.	74.0		
0.0290 mm.	69.0		
0.0189 mm.	62.0		
0.0113 mm.	53.0		
0.0082 mm.	44.9		
0.0059 mm.	38.9		
0.0042 mm.	36.9		
0.0030 mm.	33.9		
0.0012 mm.	30.4		

* (no specification provided)

Soil Description

GRAY AND DARK BROWN LEAN CLAY WITH SAND

Atterberg Limits

PL= 14 LL= 36 PI= 22

Coefficients

D_{90}= 0.2379 D_{85}= 0.1563 D_{60}= 0.0166
D_{50}= 0.0100 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

F.M.=0.25

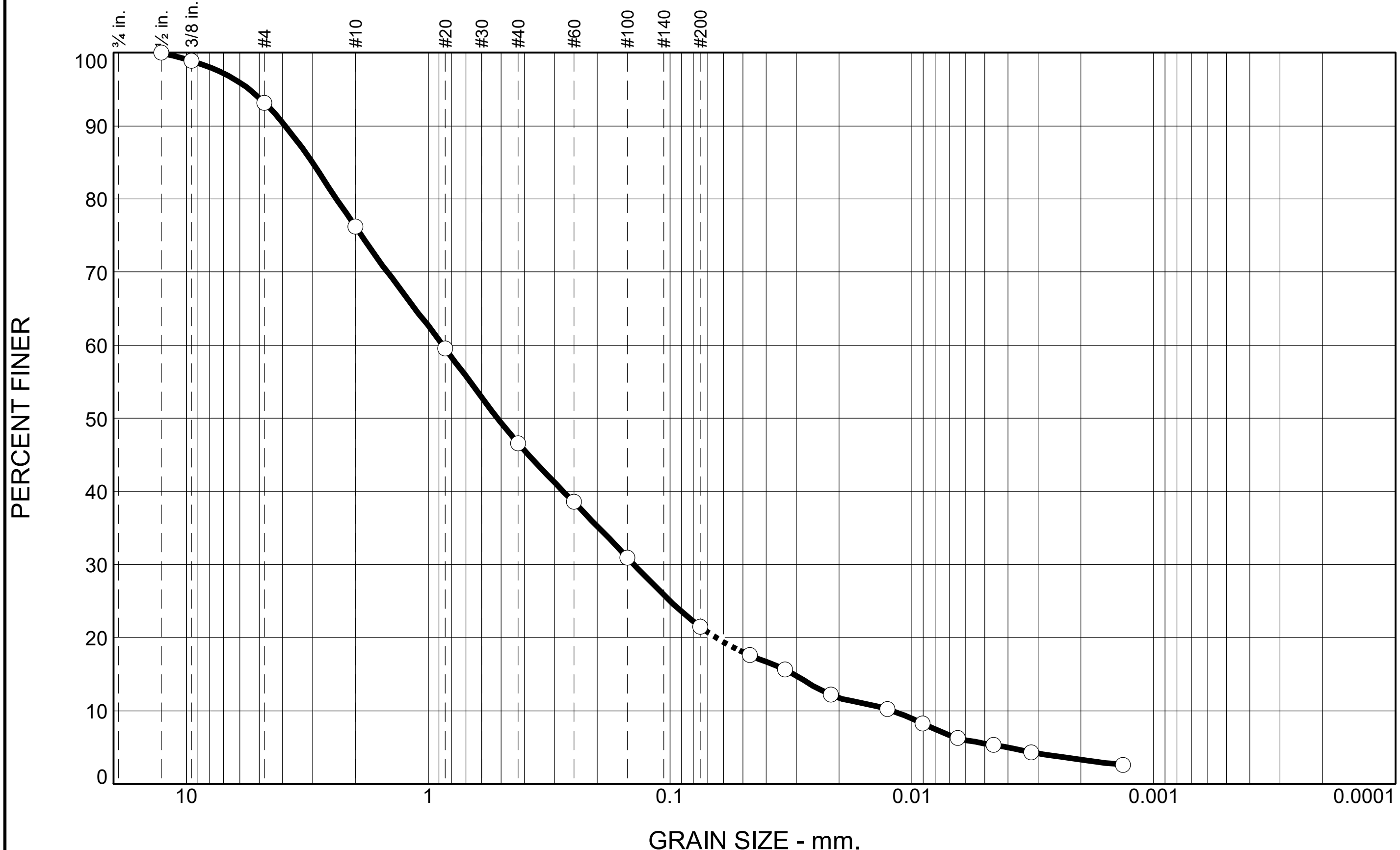
Source of Sample: XPW-02 **Depth:** 16.5'-17.0'
Sample Number: 1545 **Date:** 3-16-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.8	17.0	29.6	25.1	16.0	5.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.9		
#4	93.2		
#10	76.2		
#20	59.5		
#40	46.6		
#60	38.6		
#100	30.9		
#200	21.5		
0.0468 mm.	17.6		
0.0335 mm.	15.6		
0.0217 mm.	12.2		
0.0127 mm.	10.2		
0.0091 mm.	8.3		
0.0065 mm.	6.3		
0.0046 mm.	5.3		
0.0032 mm.	4.3		
0.0013 mm.	2.6		

* (no specification provided)

Soil Description

DARK BROWNISH GRAY SILTY SAND

Atterberg Limits

PL= 27 LL= 33 PI= 6

Coefficients

D_{90}= 3.8998 D_{85}= 3.0199 D_{60}= 0.8711
D_{50}= 0.5157 D_{30}= 0.1410 D_{15}= 0.0309
D_{10}= 0.0121 C_u= 72.20 C_c= 1.89

Classification

USCS= SM AASHTO= A-1-b

Remarks

F.M.=2.37

Source of Sample: XPW-03 **Depth:** 6.0'-6.5'
Sample Number: 1355

Date: 3-16-21

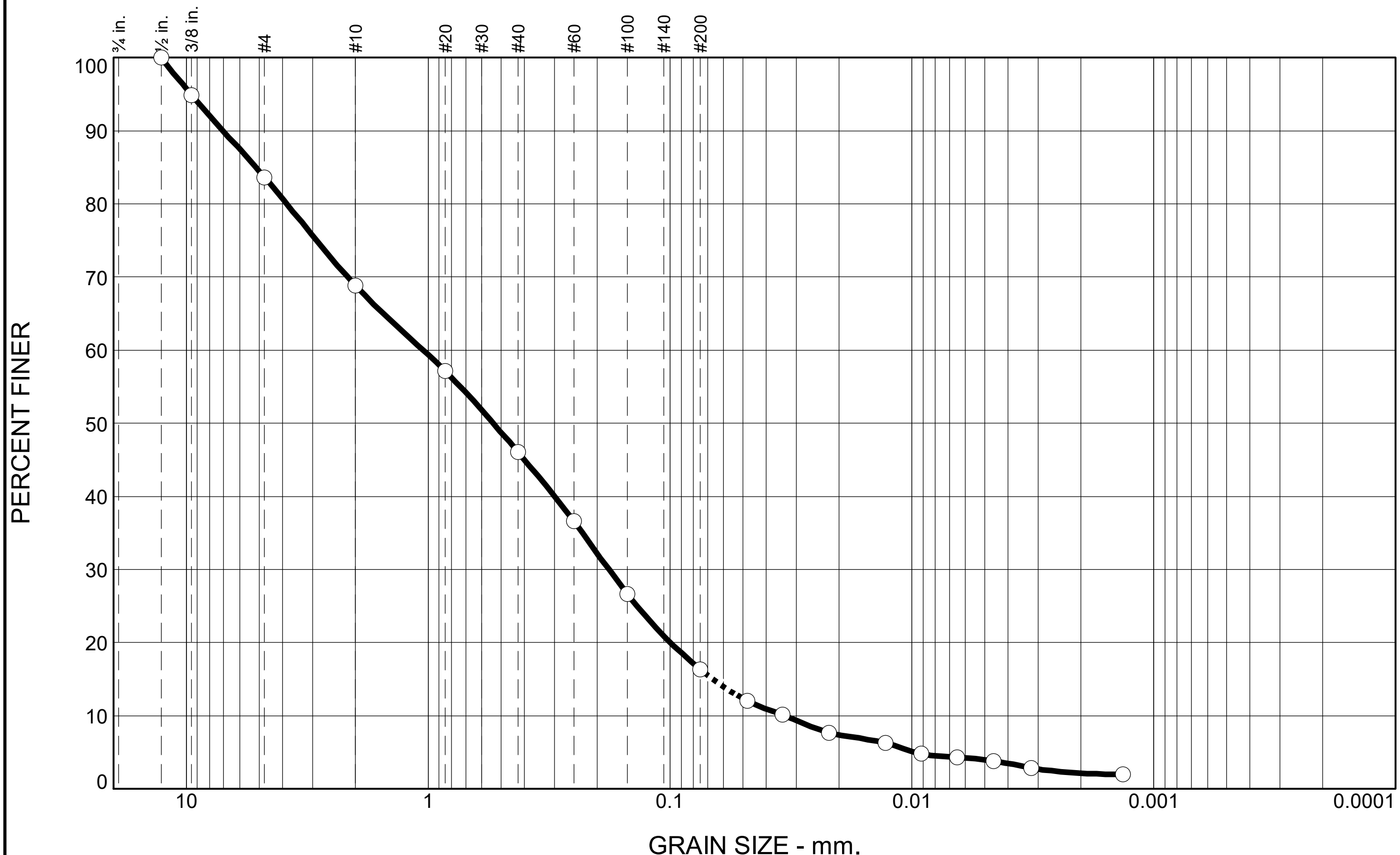
Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.4	14.8	22.7	29.8	12.3	4.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	94.9		
#4	83.6		
#10	68.8		
#20	57.1		
#40	46.1		
#60	36.6		
#100	26.6		
#200	16.3		
0.0480 mm.	12.0		
0.0343 mm.	10.1		
0.0220 mm.	7.7		
0.0128 mm.	6.2		
0.0091 mm.	4.8		
0.0065 mm.	4.3		
0.0046 mm.	3.8		
0.0032 mm.	2.9		
0.0013 mm.	2.0		

* (no specification provided)

Soil Description

BROWNISH GRAY SILTY SAND WITH GRAVEL

Atterberg Limits

PL= 19 LL= 12 PI= NP

Coefficients

D_{90}= 7.0585 D_{85}= 5.1581 D_{60}= 1.0482
D_{50}= 0.5380 D_{30}= 0.1789 D_{15}= 0.0667
D_{10}= 0.0337 C_u= 31.15 C_c= 0.91

Classification

USCS= SM AASHTO= A-1-b

Remarks

F.M.=2.70

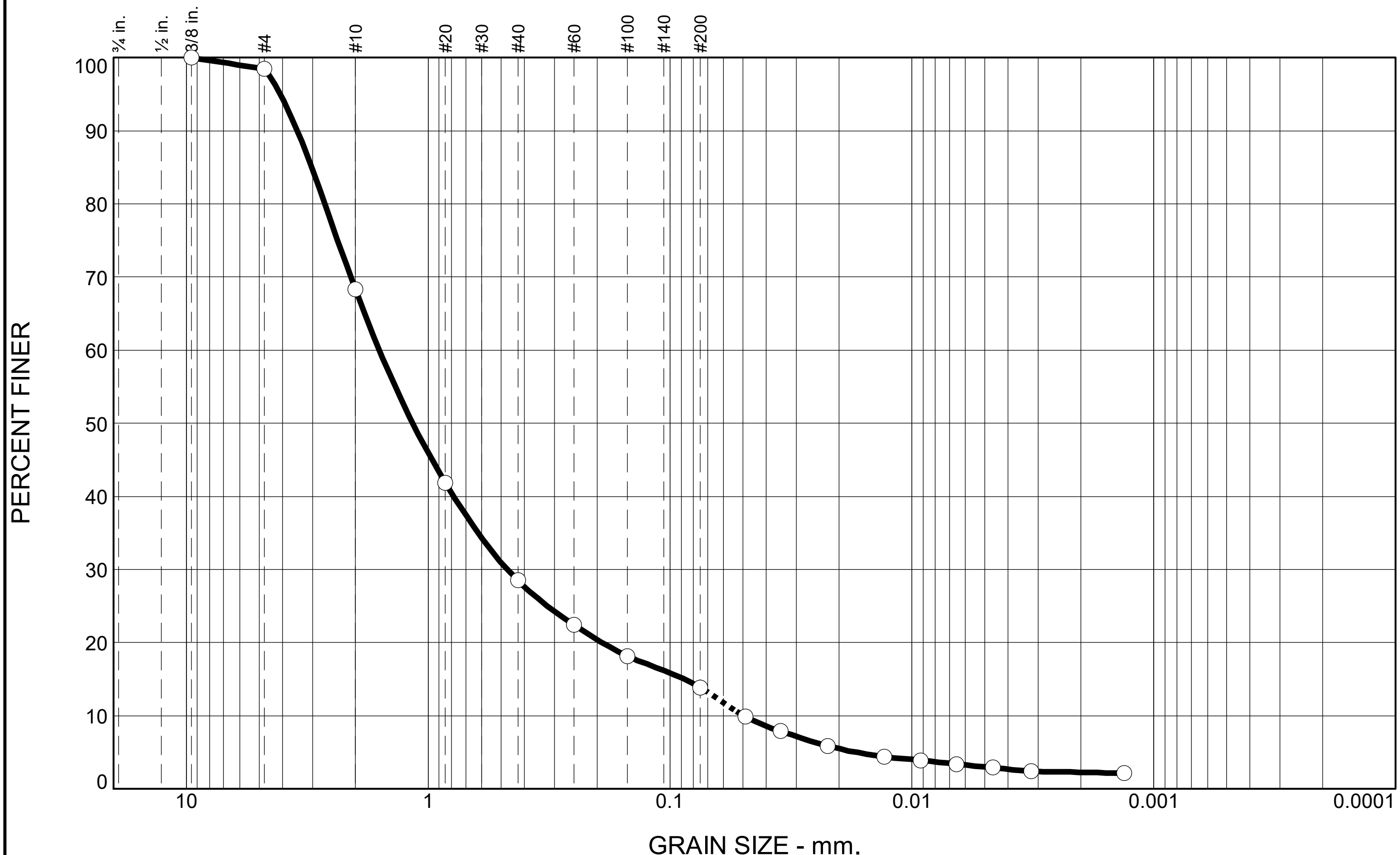
Source of Sample: XPW-03 **Depth:** 15.5'-16.0'
Sample Number: 1315 **Date:** 3-11-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.6	30.1	39.8	14.6	10.9	3.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	98.4		
#10	68.3		
#20	41.9		
#40	28.5		
#60	22.4		
#100	18.2		
#200	13.9		
0.0487 mm.	9.9		
0.0348 mm.	7.9		
0.0223 mm.	5.9		
0.0130 mm.	4.4		
0.0092 mm.	3.9		
0.0065 mm.	3.4		
0.0046 mm.	2.9		
0.0032 mm.	2.4		
0.0013 mm.	2.1		

* (no specification provided)

Soil Description

GRAY SILTY SAND

Atterberg Limits

PL= 38 LL= 41 PI= 3

Coefficients

D_{90}= 3.4781 D_{85}= 3.0339 D_{60}= 1.5927
D_{50}= 1.1581 D_{30}= 0.4698 D_{15}= 0.0872
D_{10}= 0.0496 C_u= 32.14 C_c= 2.80

Classification

USCS= SM AASHTO= A-1-b

Remarks

F.M.=2.99

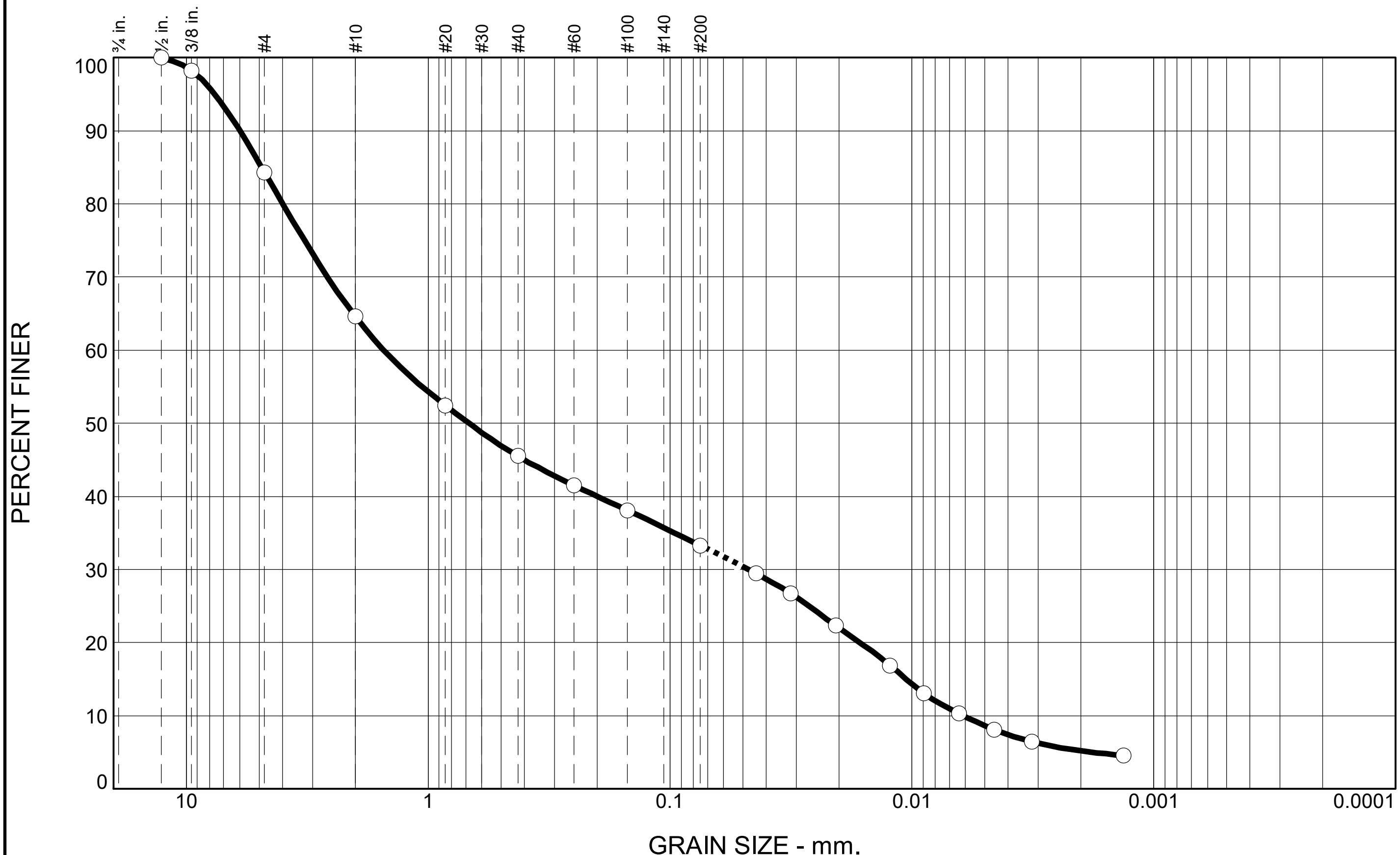
Source of Sample: XPW-04 **Depth:** 6.5'-7.0'
Sample Number: 1000 **Date:** 3-16-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION
Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Particle Size Analysis of Soils ASTM D6913 and D7928



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.7	19.7	19.1	12.2	24.7	8.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	98.2		
#4	84.3		
#10	64.6		
#20	52.4		
#40	45.5		
#60	41.5		
#100	38.1		
#200	33.3		
0.0441 mm.	29.5		
0.0318 mm.	26.7		
0.0207 mm.	22.3		
0.0123 mm.	16.9		
0.0089 mm.	13.0		
0.0064 mm.	10.3		
0.0046 mm.	8.1		
0.0032 mm.	6.5		
0.0013 mm.	4.5		

* (no specification provided)

Soil Description

DARK BROWNISH GRAY SILTY SAND WITH GRAVEL

Atterberg Limits

PL= 42 LL= 46 PI= 4

Coefficients

D_{90}= 6.0007 D_{85}= 4.8822 D_{60}= 1.5250
D_{50}= 0.6794 D_{30}= 0.0473 D_{15}= 0.0106
D_{10}= 0.0061 C_u= 248.95 C_c= 0.24

Classification

USCS= SM AASHTO= A-2-5(0)

Remarks

F.M.=2.64

Source of Sample: XPW-04 **Depth:** 15.5'-16.0'
Sample Number: 1020 **Date:** 3-16-21

Terracon

Client: RAMBOLL ENVIRON US CORP.
Project: NEWTON POWER STATION

Project No: 11215019 **Figure**

Tested By: SJH **Checked By:** WPQ

Terracon

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible-Wall Permeameter
ASTM D5084

Terracon
Consulting Engineers & Scientists

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP.**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-11

TIME SAMPLED: 8:05

DEPTH: 10.0'-12.0'

CLASSIFICATION BROWN SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	111.7	112.0
WATER CONTENT (%)	17.8	17.7
DIAMETER (cm)	7.131	7.163
LENGTH (cm)	10.248	10.130
B VALUE PARAMETER:	0.99	
HYDRAULIC GRADIENT (MAXIMUM)	19.49	
PERCENT SATURATION	99.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	8.57E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP.**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-11

TIME SAMPLED: 10:50

DEPTH: 60.5'-61.0'

CLASSIFICATION GRAYISH BROWN LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	110.5	117.8
WATER CONTENT (%)	17.8	15.6
DIAMETER (cm)	6.070	5.968
LENGTH (cm)	14.172	13.755
B VALUE PARAMETER:	0.99	
HYDRAULIC GRADIENT (MAXIMUM)	16.57	
PERCENT SATURATION	99.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	1.87E-07	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP.**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-11

TIME SAMPLED: 11:15

DEPTH: 80.0'-82.0'

CLASSIFICATION DARK GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	116.1	117.2
WATER CONTENT (%)	16.5	16.0
DIAMETER (cm)	7.258	7.230
LENGTH (cm)	10.762	10.739
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	18.56	
PERCENT SATURATION	99.2	
HYDRAULIC CONDUCTIVITY k (cm/sec)	2.94E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Consulting Engineers & Scientists

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO.	**11215019**	**4/9/2021**
PROJECT NAME:	**NEWTON POWER STATION**	
CLIENT:	**RAMBOLL ENVIRON US CORP**	
LOCATION :	**NEWTON, IL**	

SUMMARY OF TEST RESULTS

BORING NO.	APW-12
TIME SAMPLED:	8:20
DEPTH:	20.0'-22.0'
CLASSIFICATION	BROWN AND RUST BROWN CLAYEY SAND - ROOTS NOTED

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	118.3	120.4
WATER CONTENT (%)	15.1	14.5
DIAMETER (cm)	7.256	7.229
LENGTH (cm)	8.539	8.448
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	23.39	
PERCENT SATURATION	99.6	
HYDRAULIC CONDUCTIVITY k (cm/sec)	1.07E-07	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-12

TIME SAMPLED: 8:45

DEPTH: 26.0'-26.5'

CLASSIFICATION BROWN SILTY SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	113.0	114.8
WATER CONTENT (%)	8.4	16.3
DIAMETER (cm)	6.163	6.121
LENGTH (cm)	15.243	15.219
B VALUE PARAMETER:	0.95	
HYDRAULIC GRADIENT (MAXIMUM)	3.88	
PERCENT SATURATION	98.4	
HYDRAULIC CONDUCTIVITY k (cm/sec)	8.43E-06	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-12

TIME SAMPLED: 12:45

DEPTH: 85.0'-87.0'

CLASSIFICATION DARK GRAY LEAN CLAY WITH SAND - SILT POCKETS NOTED

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	116.4	118.0
WATER CONTENT (%)	14.4	15.9
DIAMETER (cm)	7.234	7.202
LENGTH (cm)	7.464	7.431
B VALUE PARAMETER:	0.95	
HYDRAULIC GRADIENT (MAXIMUM)	22.05	
PERCENT SATURATION	99.8	
HYDRAULIC CONDUCTIVITY k (cm/sec)	2.36E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAN=MBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-13

TIME SAMPLED: 8:45

DEPTH: 85.0'-87.0'

CLASSIFICATION DARK GRAY AND GRAY POORLY GRADED SAND WITH SILT

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	87.1	89.2
WATER CONTENT (%)	21.2	32.0
DIAMETER (cm)	7.090	7.039
LENGTH (cm)	9.808	9.718
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	6.03	
PERCENT SATURATION	99.7	
HYDRAULIC CONDUCTIVITY k (cm/sec)	9.63E-05	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-13

TIME SAMPLED: 13:45

DEPTH: 61.0'-61.5'

CLASSIFICATION BROWN SILTY SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	114.3	117.3
WATER CONTENT (%)	14.5	15.4
DIAMETER (cm)	6.038	6.126
LENGTH (cm)	10.971	10.386
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	5.39	
PERCENT SATURATION	99.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	2.18E-04	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group | **192 Exchange Blvd** | **Glendale Heights, Illinois 60139** | **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-14

TIME SAMPLED: 9:55

DEPTH: 45.0'-47.0'

CLASSIFICATION BROWN SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	119.6	120.3
WATER CONTENT (%)	12.4	14.2
DIAMETER (cm)	7.380	7.372
LENGTH (cm)	10.775	10.736
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	18.54	
PERCENT SATURATION	100.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	9.65E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Terracon
Consulting Engineers & Scientists

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-14

TIME SAMPLED: 10:35

DEPTH: 56.0'-56.5'

CLASSIFICATION GRAY AND BROWNISH GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	104.6	107.9
WATER CONTENT (%)	18.0	20.7
DIAMETER (cm)	6.049	6.023
LENGTH (cm)	9.965	9.749
B VALUE PARAMETER:	0.97	
HYDRAULIC GRADIENT (MAXIMUM)	20.05	
PERCENT SATURATION	99.6	
HYDRAULIC CONDUCTIVITY k (cm/sec)	2.74E-07	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Terracon
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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-15

TIME SAMPLED: 10:05

DEPTH: 20.0'-22.0'

CLASSIFICATION BROWN SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	109.8	109.9
WATER CONTENT (%)	18.5	19.0
DIAMETER (cm)	7.189	7.201
LENGTH (cm)	8.227	8.190
B VALUE PARAMETER:	0.95	
HYDRAULIC GRADIENT (MAXIMUM)	24.28	
PERCENT SATURATION	97.7	
HYDRAULIC CONDUCTIVITY k (cm/sec)	3.21E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-15

TIME SAMPLED: 7:55

DEPTH: 101.0'-101.5'

CLASSIFICATION GRAY SILTY SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	116.4	122.2
WATER CONTENT (%)	12.1	13.4
DIAMETER (cm)	5.990	5.964
LENGTH (cm)	10.539	10.126
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	8.95	
PERCENT SATURATION	97.6	
HYDRAULIC CONDUCTIVITY k (cm/sec)	3.50E-06	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Terracon
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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-15

TIME SAMPLED: 9:05

DEPTH: 105.0'-107.0'

CLASSIFICATION DARK GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	107.8	109.3
WATER CONTENT (%)	19.1	19.6
DIAMETER (cm)	7.178	7.136
LENGTH (cm)	5.565	5.551
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	29.58	
PERCENT SATURATION	99.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	8.20E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group 192 Exchange Blvd Glendale Heights, Illinois 60139 Ph. (630) 717-4263

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. APW-17

TIME SAMPLED: 9:45

DEPTH: 40.0'-42.0'

CLASSIFICATION GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	108.8	109.5
WATER CONTENT (%)	16.6	19.6
DIAMETER (cm)	7.262	7.262
LENGTH (cm)	9.605	9.545
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	28.12	
PERCENT SATURATION	98.4	
HYDRAULIC CONDUCTIVITY k (cm/sec)	3.34E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRN US CORP**
LOCATION : **NEWTON , IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-300

TIME SAMPLED: 8:25

DEPTH: 50.0'-52.0'

CLASSIFICATION GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	122.7	123.5
WATER CONTENT (%)	12.9	13.3
DIAMETER (cm)	7.242	7.217
LENGTH (cm)	10.288	10.288
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	19.42	
PERCENT SATURATION	99.1	
HYDRAULIC CONDUCTIVITY k (cm/sec)	7.29E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON , IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-300

TIME SAMPLED: 9:05

DEPTH: 61.5'-62.0'

CLASSIFICATION GRAYISH BROWN SILTY SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	109.6	113.2
WATER CONTENT (%)	13.6	17.7
DIAMETER (cm)	5.903	5.916
LENGTH (cm)	7.615	7.338
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	26.23	
PERCENT SATURATION	99.7	
HYDRAULIC CONDUCTIVITY k (cm/sec)	1.85E-05	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-300

TIME SAMPLED: 9:20

DEPTH: 62.0'-62.5'

CLASSIFICATION GRAYISH BROWN SANDY SILTY CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	124.6	128.9
WATER CONTENT (%)	11.1	13.3
DIAMETER (cm)	6.067	6.043
LENGTH (cm)	13.366	13.026
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	7.06	
PERCENT SATURATION	119.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	4.32E-06	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-300

TIME SAMPLED: 13:50

DEPTH: 105.0'-107.0'

CLASSIFICATION DARK GRAY SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	116.4	116.5
WATER CONTENT (%)	14.1	16.4
DIAMETER (cm)	7.328	7.336
LENGTH (cm)	7.558	7.534
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	26.43	
PERCENT SATURATION	98.8	
HYDRAULIC CONDUCTIVITY k (cm/sec)	4.28E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO.	SB-301
TIME SAMPLED:	13:30
DEPTH:	48.0'-50.0'
CLASSIFICATION	BROWN AND GRAY SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	117.3	117.7
WATER CONTENT (%)	14.1	15.8
DIAMETER (cm)	7.204	7.230
LENGTH (cm)	10.348	10.239
B VALUE PARAMETER:	0.99	
HYDRAULIC GRADIENT (MAXIMUM)	19.30	
PERCENT SATURATION	99.6	
HYDRAULIC CONDUCTIVITY k (cm/sec)	6.63E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-301

TIME SAMPLED: 16:00

DEPTH: 68.5'-69.0'

CLASSIFICATION GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	121.3	124.0
WATER CONTENT (%)	13.1	13.4
DIAMETER (cm)	6.062	6.049
LENGTH (cm)	8.581	8.434
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	23.28	
PERCENT SATURATION	99.2	
HYDRAULIC CONDUCTIVITY k (cm/sec)	4.05E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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TERRACON PROJECT NO.	**11215019**	**4/9/2021**
PROJECT NAME:	**NEWTON POWER STATION**	
CLIENT:	**RAMBOLL ENVIRON US CORP**	
LOCATION :	**NEWTON, IL**	

SUMMARY OF TEST RESULTS

BORING NO.	SB-301
TIME SAMPLED:	9:46
DEPTH:	98.0'-100.0'
CLASSIFICATION	DARK BROWN TO DARK GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	118.2	119.1
WATER CONTENT (%)	15.7	15.9
DIAMETER (cm)	7.200	7.196
LENGTH (cm)	9.694	9.629
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	16.98	
PERCENT SATURATION	102.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	6.13E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. SB-301

TIME SAMPLED: 9:46

DEPTH: 98.0'-100.0'

CLASSIFICATION DARK BROWN TO DARK GRAY LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	118.2	119.1
WATER CONTENT (%)	15.7	15.9
DIAMETER (cm)	7.200	7.196
LENGTH (cm)	9.694	9.629
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	16.98	
PERCENT SATURATION	102.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	6.13E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Terracon Consulting Engineers & Scientists
Laboratory Services Group 192 Exchange Blvd Glendale Heights, Illinois 60139 Ph. (630) 717-4263

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO.	XPW-01
TIME SAMPLED:	8:40
DEPTH:	15.0'-15.5'
CLASSIFICATION	GRAY AND BROWN SANDY LEAN CLAY
NOTE:	SAMPLE DISTURBED, SAND LAYERS NOTED

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	84.4	85.6
WATER CONTENT (%)	12.6	31.3
DIAMETER (cm)	6.152	6.120
LENGTH (cm)	15.217	15.168
B VALUE PARAMETER:	0.96	
HYDRAULIC GRADIENT (MAXIMUM)	13.13	
PERCENT SATURATION	86.1	
HYDRAULIC CONDUCTIVITY k (cm/sec)	1.58E-05	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
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CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. XPW-02

TIME SAMPLED: 15:30

DEPTH: 7.5'-8.0'

CLASSIFICATION VERY DARK GRAY TO GRAY AND BROWN SANDY LEAN CLAY

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	92.9	98.3
WATER CONTENT (%)	29.1	26.1
DIAMETER (cm)	6.069	6.042
LENGTH (cm)	12.025	11.469
B VALUE PARAMETER:	0.98	
HYDRAULIC GRADIENT (MAXIMUM)	13.69	
PERCENT SATURATION	99.5	
HYDRAULIC CONDUCTIVITY k (cm/sec)	6.07E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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HYDRAULIC CONDUCTIVITY DETERMINATION
ASTM D 5084, METHOD C
RISING TAILWATER LEVEL

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. XPW-02

TIME SAMPLED: 15:45

DEPTH: 16.0'-16.5'

CLASSIFICATION GRAY AND DARK BROWN LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	103.7	106.6
WATER CONTENT (%)	21.8	20.9
DIAMETER (cm)	6.002	5.979
LENGTH (cm)	11.395	11.179
B VALUE PARAMETER:	0.97	
HYDRAULIC GRADIENT (MAXIMUM)	17.53	
PERCENT SATURATION	98.2	
HYDRAULIC CONDUCTIVITY k (cm/sec)	7.38E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON , IL**

SUMMARY OF TEST RESULTS

BORING NO. XPW-02

TIME SAMPLED: 15:45

DEPTH: 16.0'-16.5'

CLASSIFICATION GRAY AND DARK BROWN LEAN CLAY WITH SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	103.7	106.6
WATER CONTENT (%)	21.8	20.9
DIAMETER (cm)	6.002	5.979
LENGTH (cm)	11.395	11.179
B VALUE PARAMETER:	0.97	
HYDRAULIC GRADIENT (MAXIMUM)	17.53	
PERCENT SATURATION	98.2	
HYDRAULIC CONDUCTIVITY k (cm/sec)	7.38E-08	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

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TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO. XPW-04

TIME SAMPLED: 10:00

DEPTH: 7.0'-7.5'

CLASSIFICATION GRAY SILTY SAND

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	73.9	75.6
WATER CONTENT (%)	31.1	45.1
DIAMETER (cm)	6.133	6.116
LENGTH (cm)	15.283	15.019
B VALUE PARAMETER:	0.95	
HYDRAULIC GRADIENT (MAXIMUM)	6.17	
PERCENT SATURATION	99.7	
HYDRAULIC CONDUCTIVITY k (cm/sec)	1.61E-04	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

TERRACON PROJECT NO. **11215019** **4/9/2021**
PROJECT NAME: **NEWTON POWER STATION**
CLIENT: **RAMBOLL ENVIRON US CORP**
LOCATION : **NEWTON, IL**

SUMMARY OF TEST RESULTS

BORING NO.	XPW-04
TIME SAMPLED:	10:20
DEPTH:	16.0'-16.5'
CLASSIFICATION	DARK BROWN GRAY SILTY SAND WITH GRAVEL

	INITIAL	FINAL
DRY UNIT WEIGHT (pcf)	80.8	84.8
WATER CONTENT (%)	31.1	35.6
DIAMETER (cm)	6.118	6.068
LENGTH (cm)	14.041	13.607
B VALUE PARAMETER:	0.95	
HYDRAULIC GRADIENT (MAXIMUM)	6.72	
PERCENT SATURATION	97.9	
HYDRAULIC CONDUCTIVITY k (cm/sec)	7.83E-05	

SPECIMEN PHOTO

(Percent saturation calculation is based on final measurements and a measured specific gravity.)

Deaired water was used as the liquid permeant.

Permeability of Granular Soils (Constant Head)
ASTM D2434

PERMEABILITY OF GRANULAR SOILS
CONSTANT HEAD METHOD IN RIGID WALL PERMEAMETER
ASTM D 2434

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

PROJECT NO.:	11215019
PROJECT:	NEWTON POWER STATION
DATE:	3/18/2021

SAMPLE INFORMATION

BORING NO.	APW-17
TIME SAMPLED:	10:45
DEPTH:	70.5'-71.0'
CLASSIFICATION	GRAY WELL GRADED SAND WITH SILT

	INITIAL
DRY UNIT WEIGHT (pcf)	110.2
WATER CONTENT (%)	7.8
DIAMETER (cm)	2.57
LENGTH (cm)	11.85

SPECIMEN PHOTO

SUMMARY OF TEST RESULTS

HYDRAULIC GRADIENT	1.3
HEAD HEIGHT (cm)	15.00
VOID RATIO	0.577
HYDRAULIC CONDUCTIVITY k (cm/sec)	**7.21E-04**

Terracon
Consulting Engineers & Scientists

PERMEABILITY OF GRANULAR SOILS
CONSTANT HEAD METHOD IN RIGID WALL PERMEAMETER
ASTM D 2434

Laboratory Services Group **192 Exchange Blvd** **Glendale Heights, Illinois 60139** **Ph. (630) 717-4263**

PROJECT NO.:	11215019
PROJECT:	NEWTON POWER STATION
DATE:	3/18/2021

SAMPLE INFORMATION

BORING NO.	APW-17
TIME SAMPLED:	12:00
DEPTH:	91.0'-91.5'
CLASSIFICATION	GRAY WELL GRADED SAND WITH SILT

	INITIAL
DRY UNIT WEIGHT (pcf)	116.8
WATER CONTENT (%)	6.1
DIAMETER (cm)	2.57
LENGTH (cm)	11.85

SPECIMEN PHOTO

SUMMARY OF TEST RESULTS

HYDRAULIC GRADIENT	1.3
HEAD HEIGHT (cm)	15.00
VOID RATIO	0.488
HYDRAULIC CONDUCTIVITY k (cm/sec)	**6.39E-04**

PERMEABILITY OF GRANULAR SOILS
CONSTANT HEAD METHOD IN RIGID WALL PERMEAMETER
ASTM D 2434

Laboratory Services Group | **192 Exchange Blvd** | **Glendale Heights, Illinois 60139** | **Ph. (630) 717-4263**

PROJECT NO.:	11215019
PROJECT:	NEWTON POWER STATION
DATE:	3/18/2021

SAMPLE INFORMATION

BORING NO.	XPW-03
TIME SAMPLED:	12:55
DEPTH:	5.5'-6.0'
CLASSIFICATION	DARK BROWNISH GRAY SILTY SAND

	INITIAL
DRY UNIT WEIGHT (pcf)	75.3
WATER CONTENT (%)	17.4
DIAMETER (cm)	2.57
LENGTH (cm)	11.85

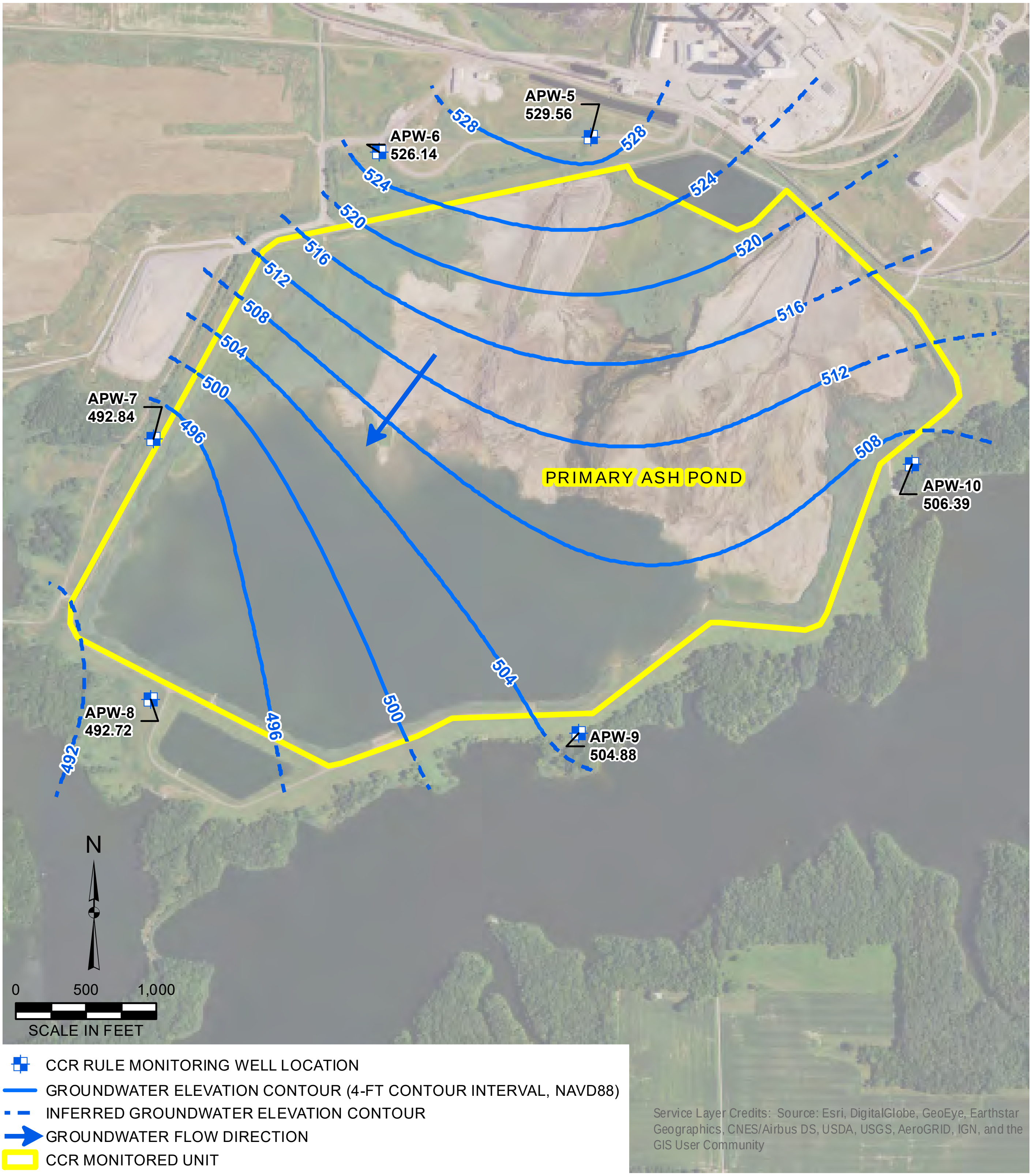
SPECIMEN PHOTO

SUMMARY OF TEST RESULTS

HYDRAULIC GRADIENT	1.3
HEAD HEIGHT (cm)	15.00
VOID RATIO	1.202
HYDRAULIC CONDUCTIVITY k (cm/sec)	**1.34E-03**

APPENDIX E
GROUNDWATER CONTOUR MAPS AND ELEVATIONS

GROUNDWATER CONTOUR MAPS



CCR RULE MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (4-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT

DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/7/17

NEWTON PRIMARY ASH POND (UNIT ID: 501)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 1: DECEMBER 14, 2015

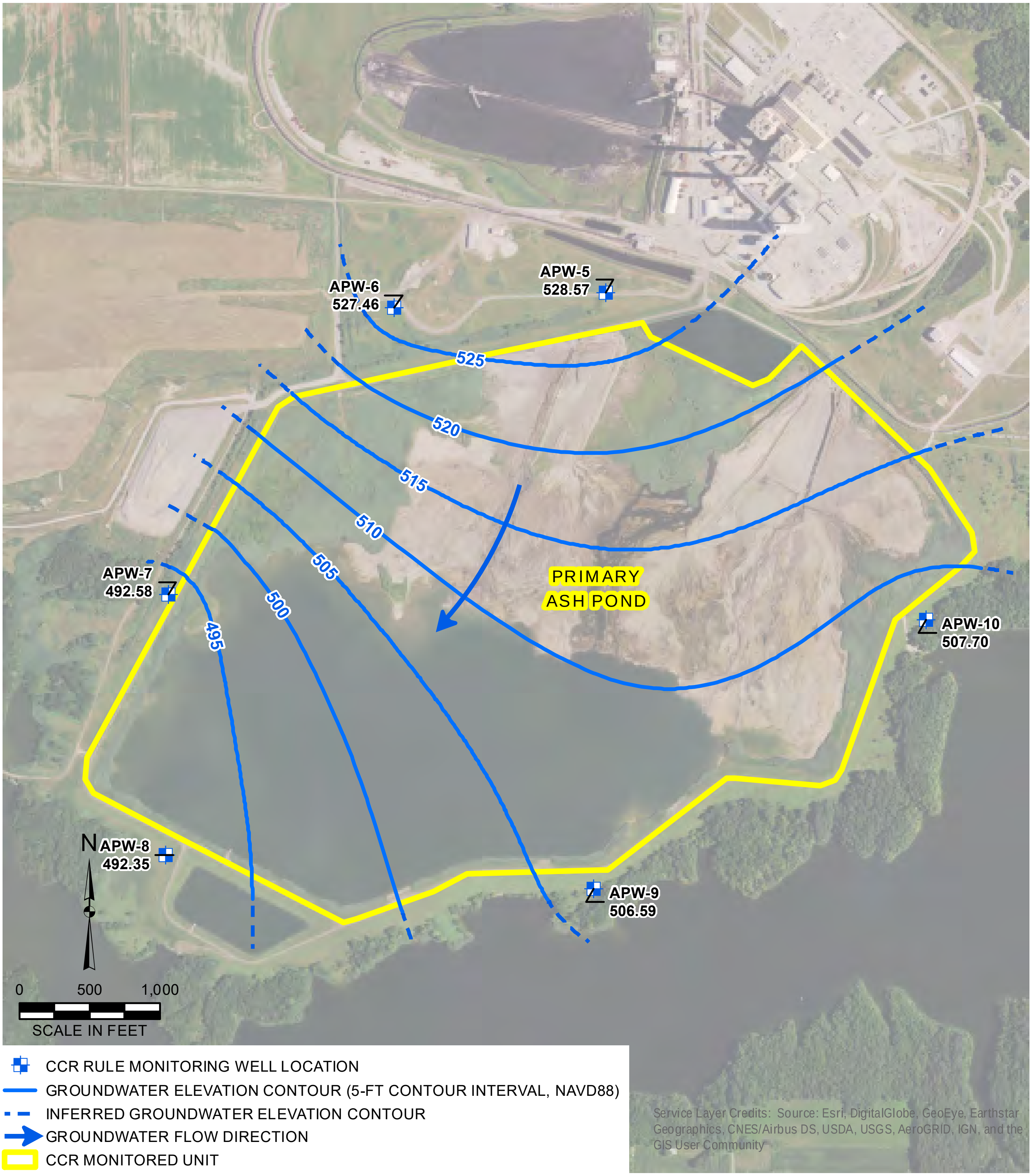
DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

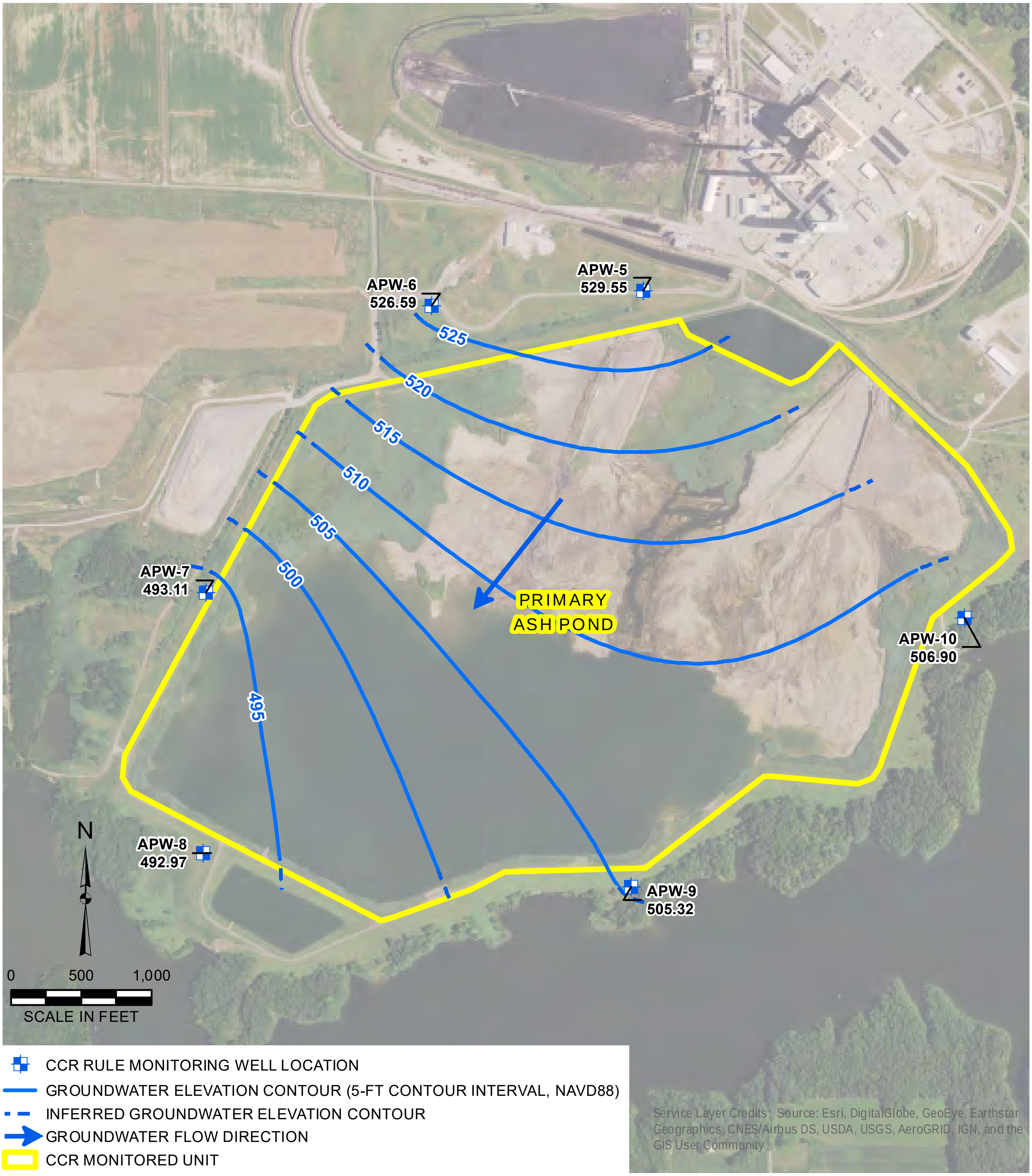
Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_01\R1_NewtonPAP_GW_Contours.mxd Author: sstolz; Date/Time: 3/2/2017, 3:09:40 PM



CCR RULE MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_02\R2_NewtonPAP_GW_Contours.mxd Author: sstolz; Date/Time: 3/2/2017, 6:15:37 PM

DRAWN BY/DATE: SDS 1/23/17 REVIEWED BY/DATE: TBN 1/25/17 APPROVED BY/DATE: JJW 2/8/17	**NEWTON PRIMARY ASH POND (UNIT ID: 501) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 2: JANUARY 18, 2016** DYNEGY CCR RULE GROUNDWATER MONITORING NEWTON POWER STATION NEWTON, ILLINOIS	PROJECT NO: 2285 FIGURE NO: 1 Natural Resource Technology AN OBG COMPANY



DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

NEWTON PRIMARY ASH POND (UNIT ID: 501)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 3: APRIL 25, 2016

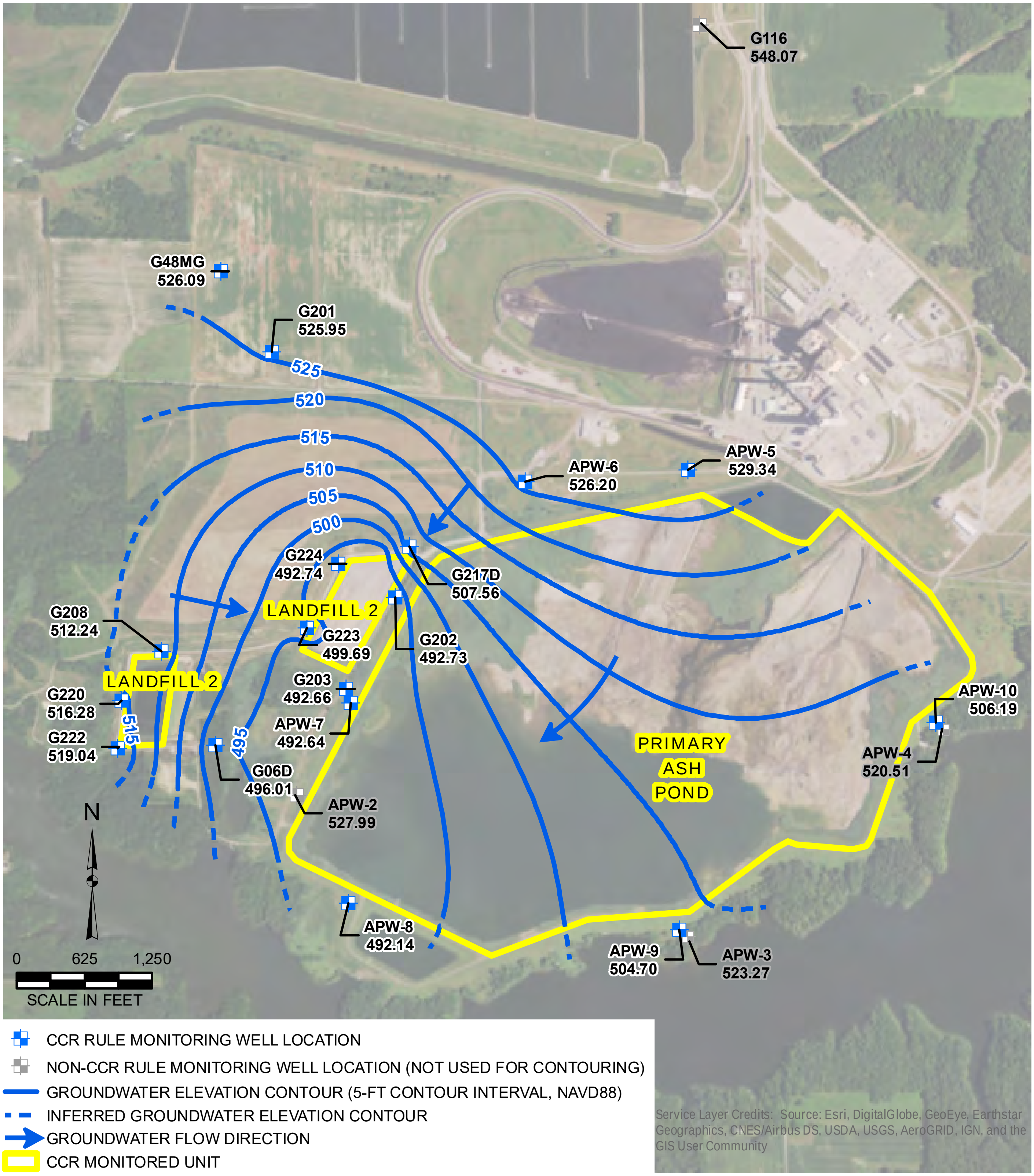
DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_03\R3_NewtonPAP_GW_Contours.mxd Author: sstolz; Date/Time: 3/3/2017, 1:12:20 PM



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DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

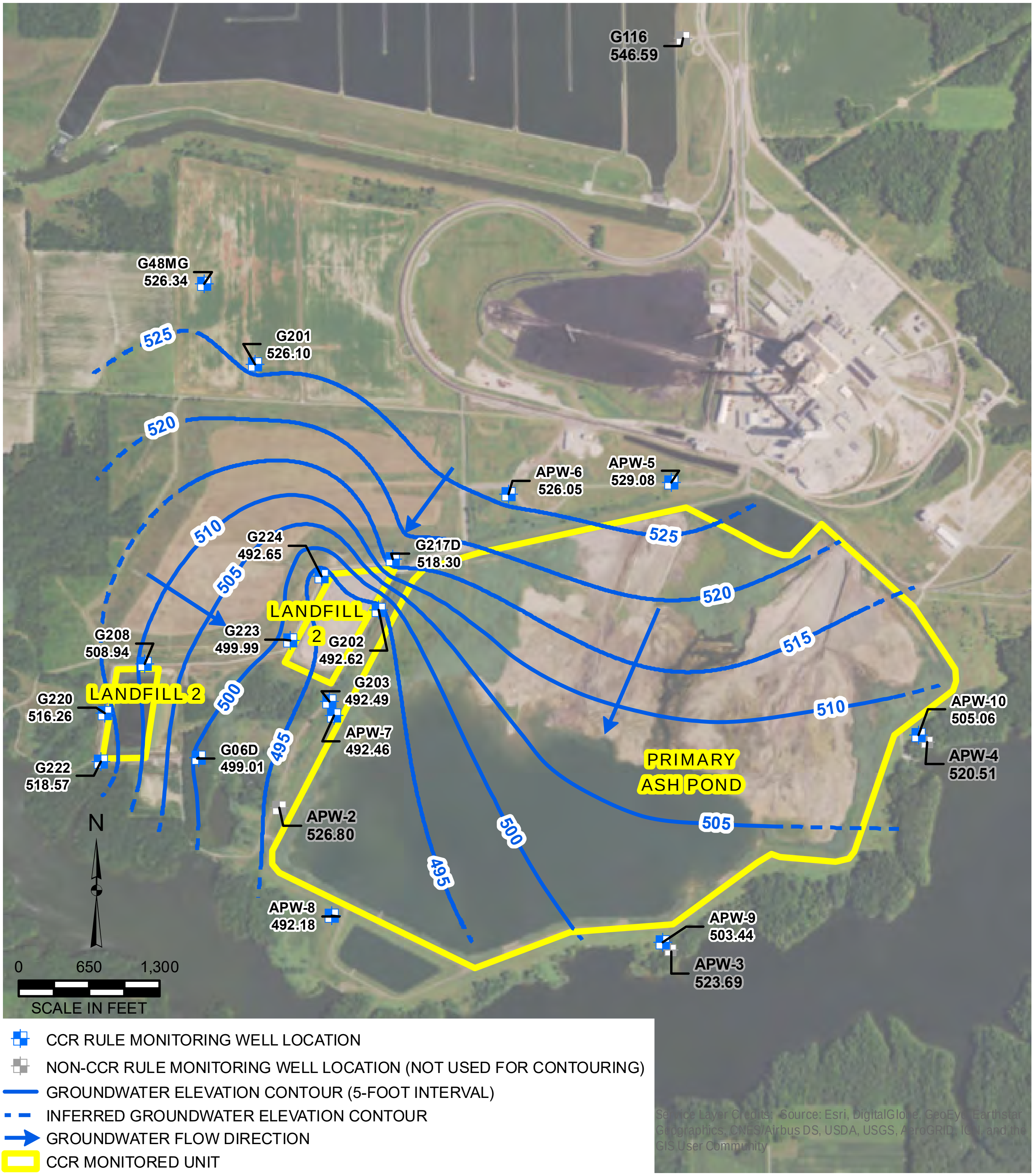
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND NEWTON LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: JULY 25, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

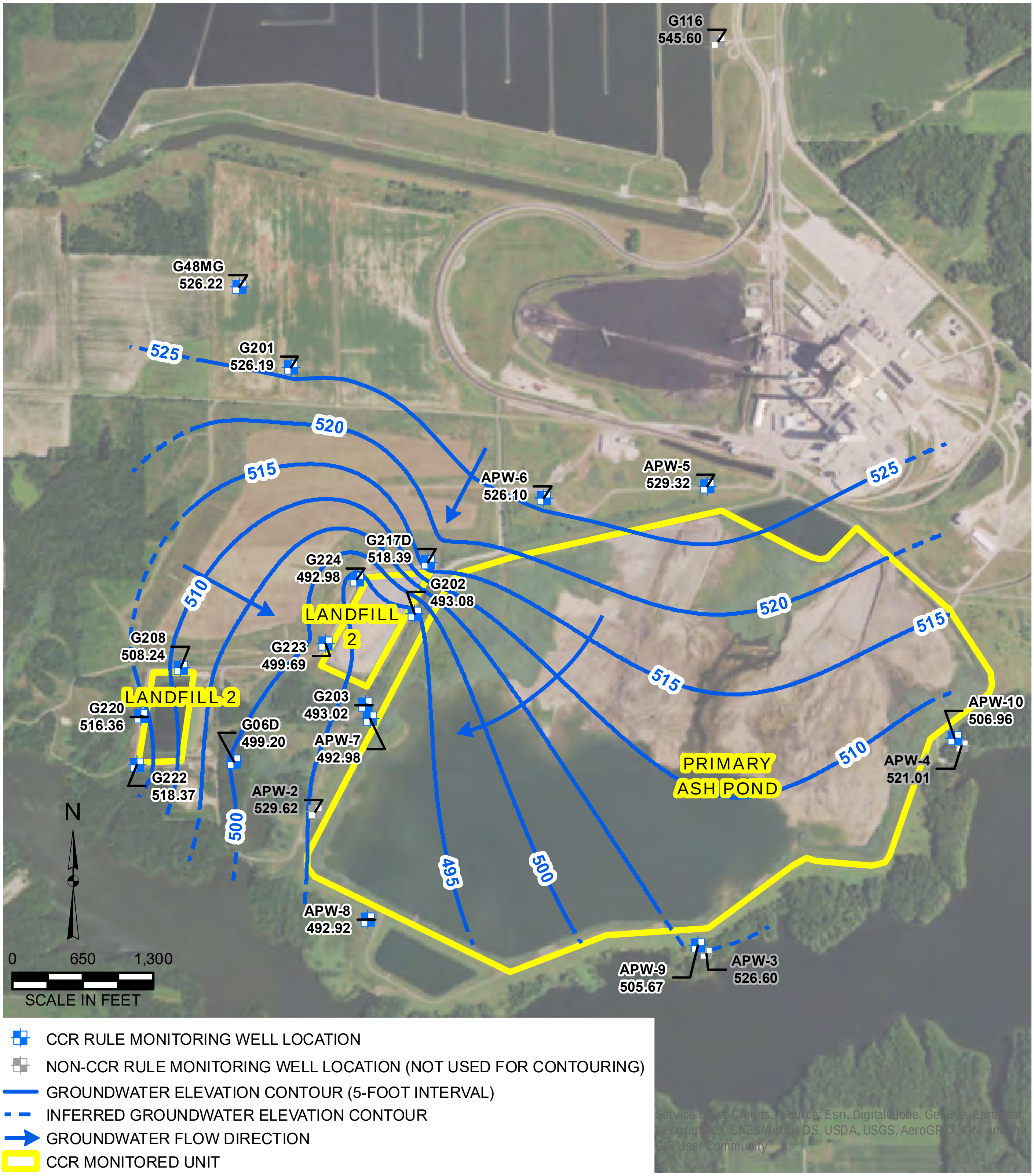
FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



DRAWN BY/DATE: SDS 3/6/17 REVIEWED BY/DATE: TBN 3/6/17 APPROVED BY/DATE: JJW 8/30/17	**NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)** **UPPERMOST AQUIFER UNIT** **GROUNDWATER ELEVATION CONTOUR MAP** **ROUND 5: OCTOBER 17, 2016** DYNEGY CCR RULE GROUNDWATER MONITORING NEWTON POWER STATION NEWTON, ILLINOIS	PROJECT NO: 2285 FIGURE NO: 1 Natural Resource Technology AN OBG COMPANY

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_05\R5_Newton_GW_Contours.mxd Author: stolzsd; Date/Time: 9/1/2017, 4:39:30 PM



DRAWN BY/DATE:
SDS 3/6/17
REVIEWED BY/DATE:
TBN 3/6/17
APPROVED BY/DATE:
JJW 8/30/17

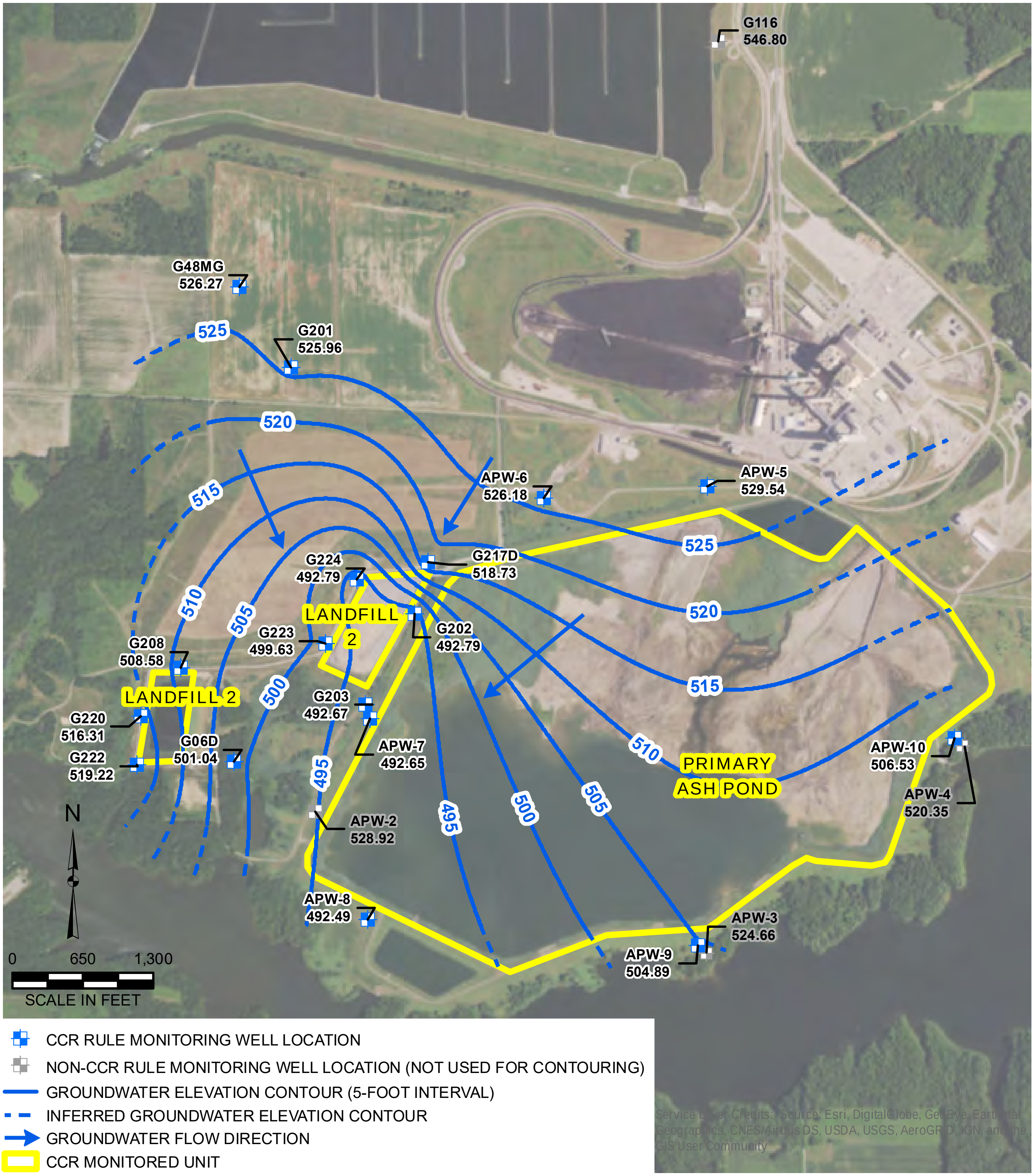
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 6: JANUARY 16, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION (NOT USED FOR CONTOURING)

GROUNDWATER ELEVATION CONTOUR (5-FOOT INTERVAL)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

DRAWN BY/DATE:
SDS 7/10/17
REVIEWED BY/DATE:
TBN 7/10/17
APPROVED BY/DATE:
JJW 8/30/17

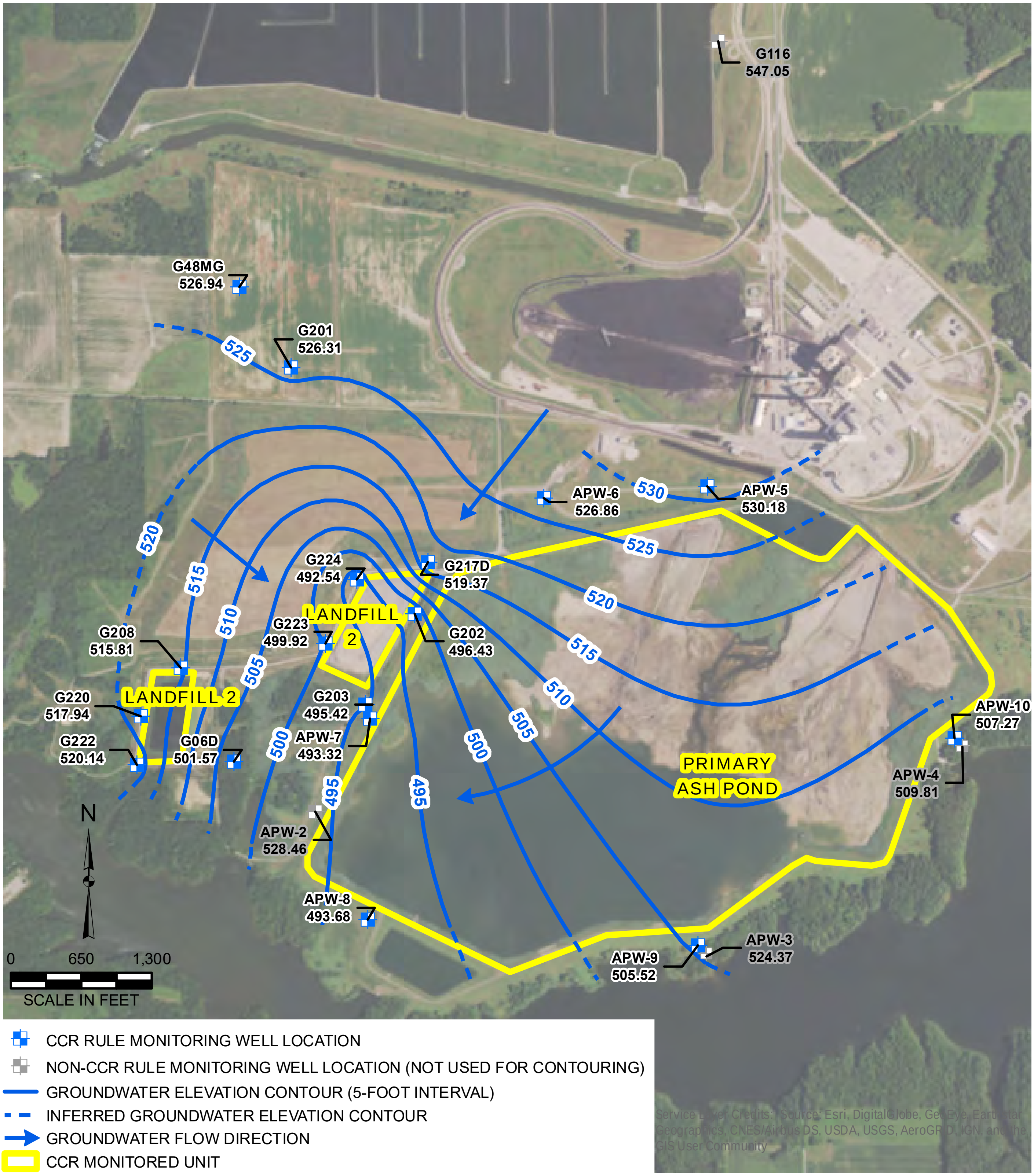
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: APRIL 17, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



DRAWN BY/DATE:
SDS 8/12/17
REVIEWED BY/DATE:
TBN 8/12/17
APPROVED BY/DATE:
JJW 8/30/17

NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 8: JUNE 12, 2017
DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502) GROUNDWATER ELEVATION CONTOUR MAP NOVEMBER 14, 2017

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW

CCR MONITORED UNIT

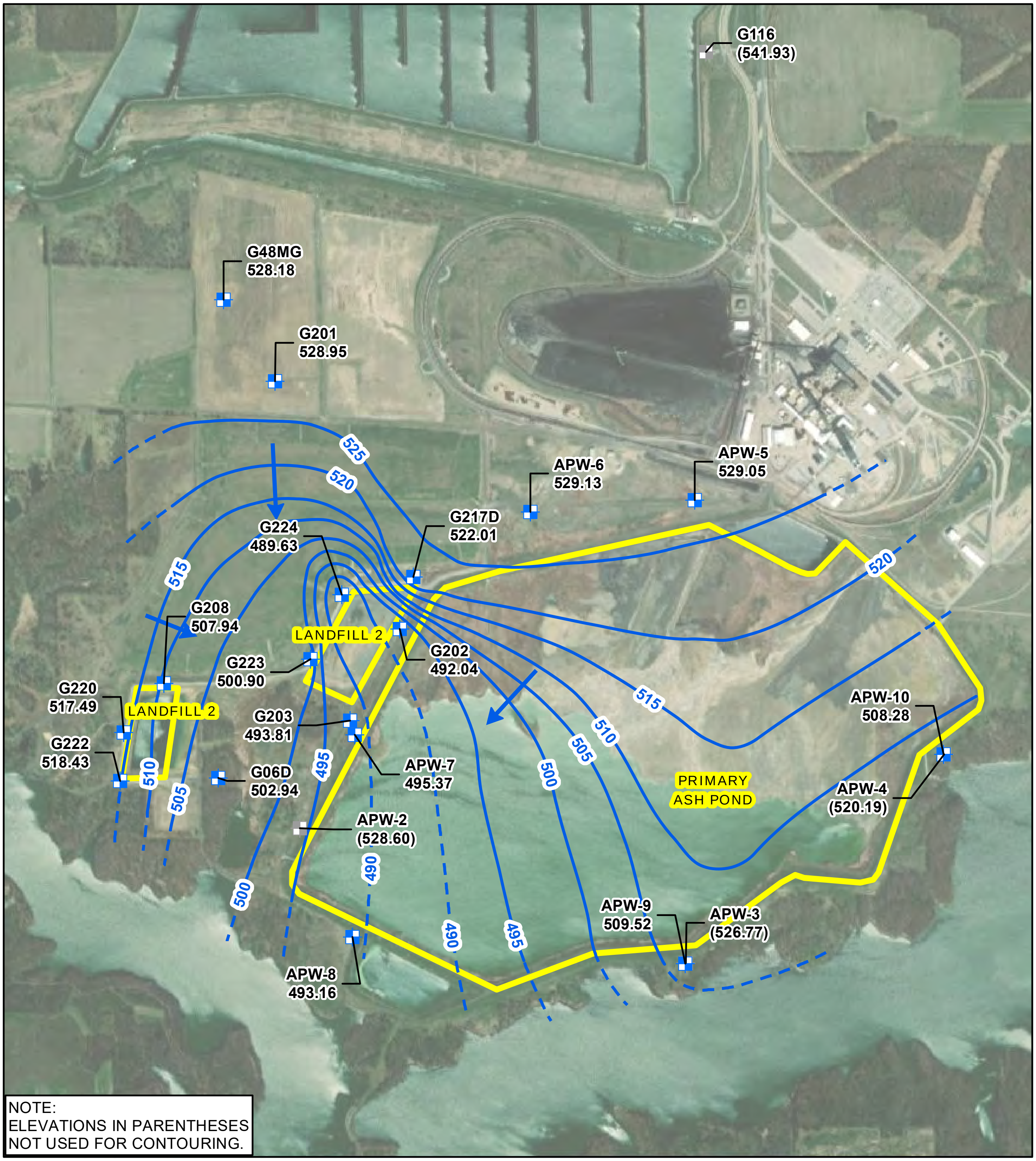
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502) GROUNDWATER ELEVATION CONTOUR MAP MAY 17, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW
- CCR MONITORED UNIT

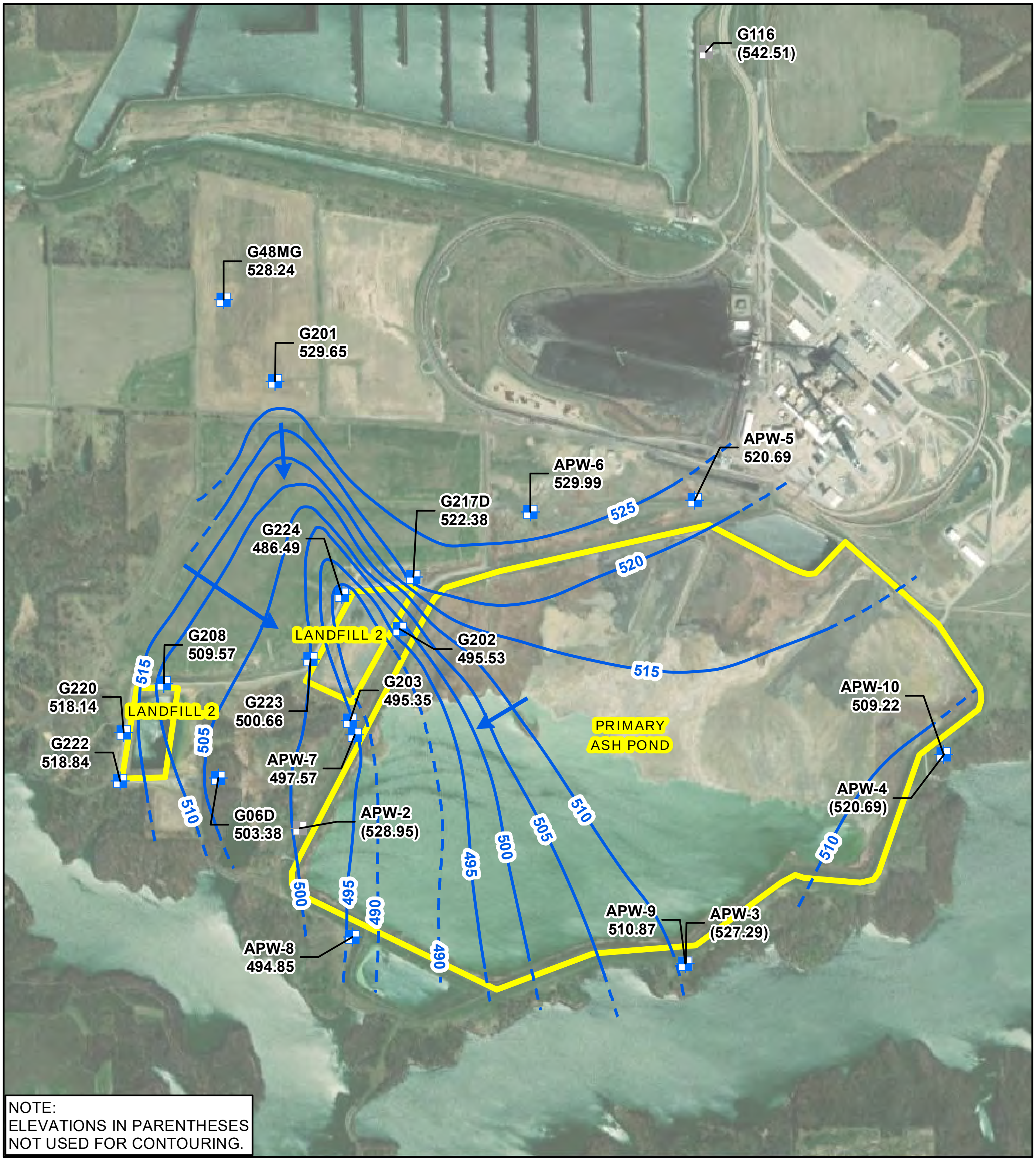
NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 14, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 8, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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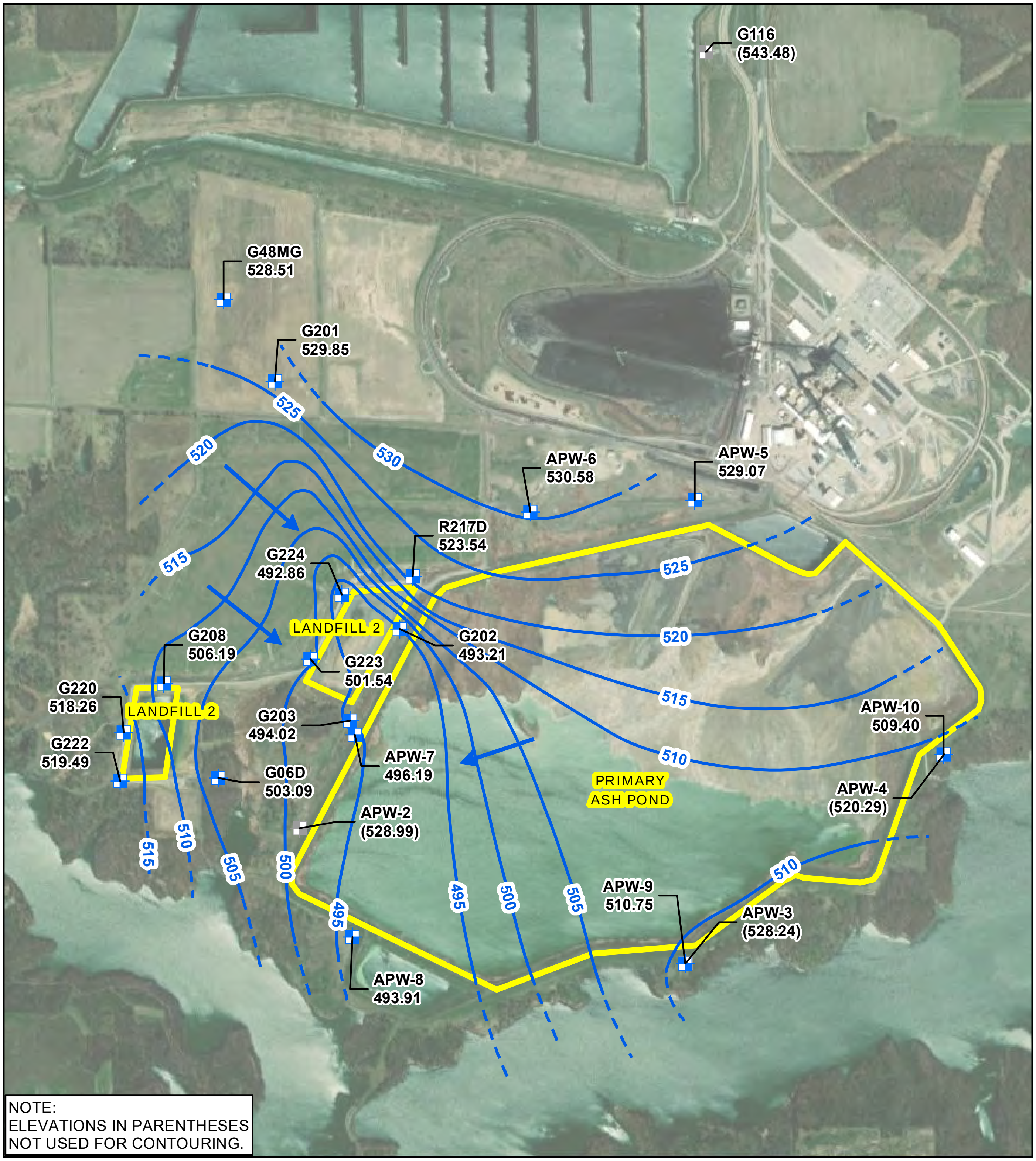


CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

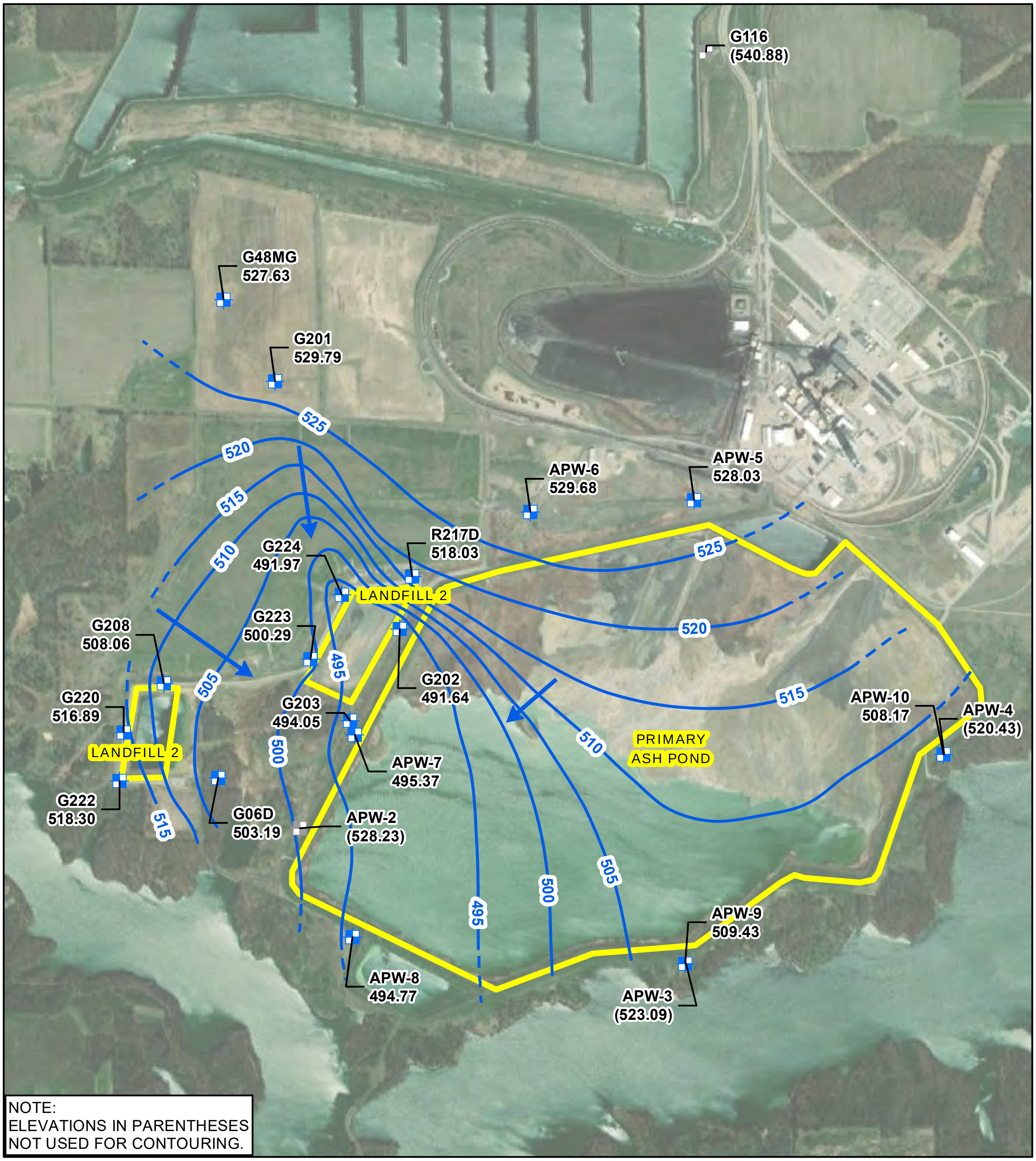
NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 18, 2019

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

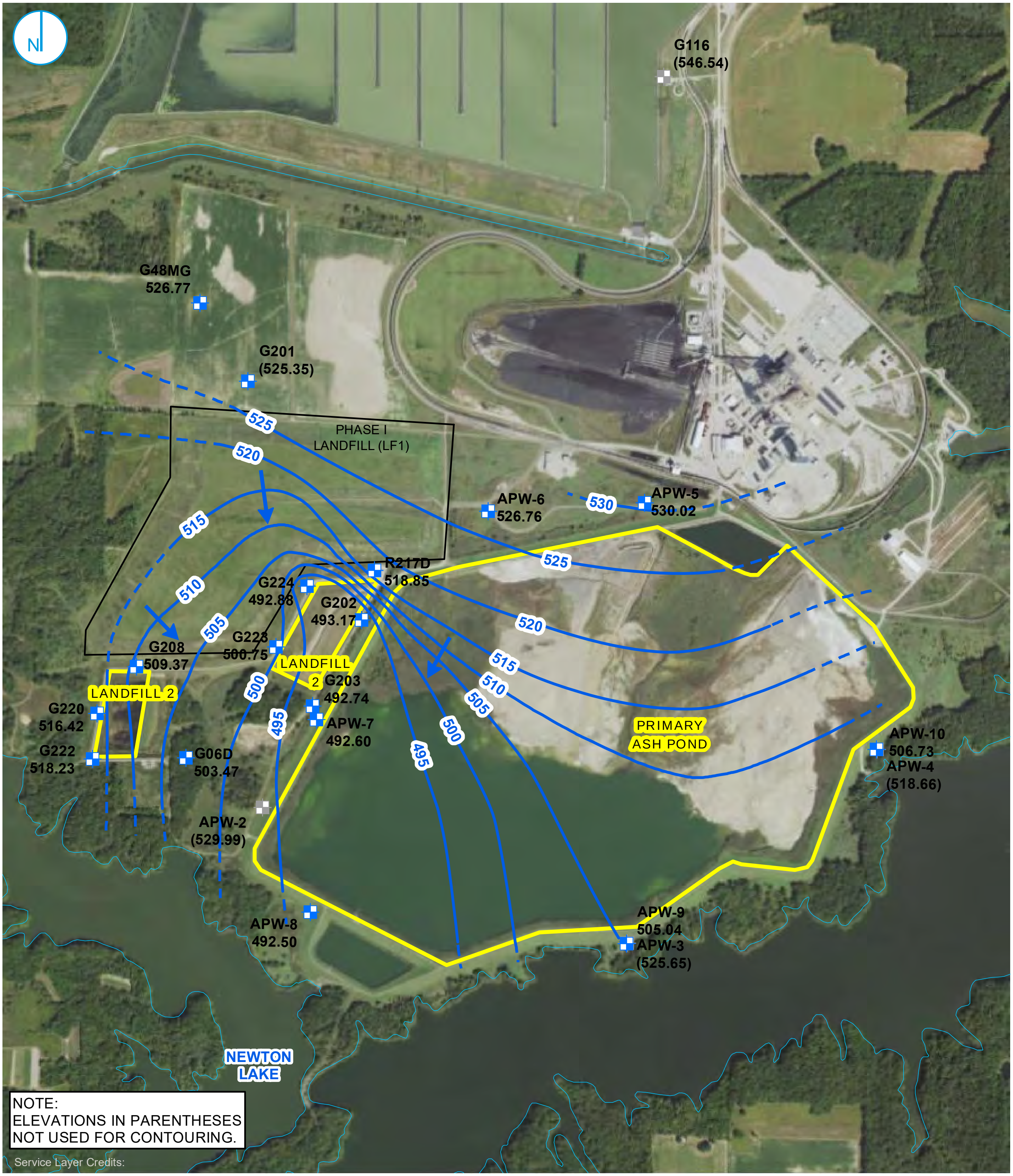
NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 21, 2019

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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PROJECT: 169000XXXX | DATED: 8/14/2020 | DESIGNER: STOLZSD

- CCR RULE MONITORING WELL
- NON-CCR RULE MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FEATURE
- CCR MONITORED UNIT
- NON-CCR UNIT

0 650 1,300 Feet

GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 3, 2020

NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
NEWTON POWER STATION
NEWTON, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATION RESULTS

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW02	10/07/2015	524.93
APW02	12/14/2015	528.13
APW02	07/25/2016	527.99
APW02	10/17/2016	526.80
APW02	01/16/2017	529.62
APW02	04/17/2017	528.92
APW02	06/12/2017	528.46
APW02	11/14/2017	528.98
APW02	05/17/2018	529.03
APW02	08/14/2018	528.60
APW02	11/08/2018	528.95
APW02	02/18/2019	528.99
APW02	08/21/2019	528.23
APW02	02/03/2020	529.99
APW02	07/27/2020	529.01
APW02	10/22/2020	528.20
APW02	02/04/2021	530.41
APW02	02/15/2021	529.17
APW02	02/17/2021	529.17
APW02	03/09/2021	529.13
APW02	03/10/2021	529.13
APW02	03/29/2021	529.99
APW02	03/30/2021	529.99
APW02	04/27/2021	528.63
APW02	04/29/2021	529.37
APW02	05/24/2021	528.50
APW02	05/25/2021	528.49
APW02	06/15/2021	528.15
APW02	06/16/2021	528.15
APW02	06/24/2021	527.93
APW02	06/30/2021	526.56
APW02	07/14/2021	528.58
APW02	07/15/2021	528.53
APW02	08/02/2021	528.44
APW03	10/07/2015	520.82
APW03	12/14/2015	525.99
APW03	10/17/2016	523.69
APW03	01/16/2017	526.60
APW03	04/17/2017	524.66
APW03	06/12/2017	524.37
APW03	07/25/2017	523.27
APW03	11/14/2017	526.05
APW03	05/17/2018	526.06
APW03	08/14/2018	526.77
APW03	11/08/2018	527.29

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW03	02/18/2019	528.24
APW03	08/21/2019	523.09
APW03	02/03/2020	525.65
APW03	07/27/2020	525.19
APW03	10/22/2020	523.49
APW03	02/04/2021	526.54
APW03	02/15/2021	523.58
APW03	02/18/2021	523.58
APW03	03/09/2021	524.93
APW03	03/10/2021	524.93
APW03	03/29/2021	526.00
APW03	03/31/2021	526.00
APW03	04/27/2021	524.25
APW03	04/29/2021	524.93
APW03	05/25/2021	523.85
APW03	06/15/2021	523.41
APW03	06/17/2021	523.41
APW03	06/24/2021	523.18
APW03	06/30/2021	523.07
APW03	07/14/2021	523.70
APW03	07/15/2021	523.71
APW03	08/02/2021	523.92
APW04	10/07/2015	518.82
APW04	12/14/2015	521.12
APW04	10/17/2016	520.51
APW04	01/16/2017	521.01
APW04	04/17/2017	520.35
APW04	06/12/2017	509.81
APW04	07/25/2017	520.51
APW04	11/14/2017	520.31
APW04	05/17/2018	520.07
APW04	08/14/2018	520.19
APW04	11/08/2018	520.69
APW04	02/18/2019	520.29
APW04	08/21/2019	520.43
APW04	02/03/2020	518.66
APW04	07/27/2020	520.41
APW04	10/22/2020	520.08
APW04	02/04/2021	520.64
APW04	02/15/2021	518.19
APW04	02/18/2021	518.19
APW04	03/09/2021	519.50
APW04	03/11/2021	519.50
APW04	03/29/2021	520.34
APW04	03/31/2021	520.34

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW04	04/27/2021	519.87
APW04	04/29/2021	520.51
APW04	05/24/2021	519.72
APW04	05/25/2021	519.73
APW04	06/15/2021	519.68
APW04	06/17/2021	519.71
APW04	06/24/2021	519.64
APW04	06/30/2021	519.69
APW04	07/14/2021	519.99
APW04	07/15/2021	520.02
APW04	08/02/2021	520.00
APW05	12/14/2015	529.56
APW05	01/18/2016	528.57
APW05	04/25/2016	529.55
APW05	07/25/2016	529.34
APW05	10/17/2016	529.08
APW05	01/16/2017	529.32
APW05	04/17/2017	529.54
APW05	06/12/2017	530.18
APW05	11/14/2017	528.57
APW05	05/17/2018	529.06
APW05	08/14/2018	529.05
APW05	11/08/2018	530.19
APW05	02/18/2019	529.07
APW05	08/21/2019	528.03
APW05	02/03/2020	530.02
APW05	06/11/2020	529.71
APW05	07/27/2020	529.77
APW05	10/22/2020	529.54
APW05	02/04/2021	530.11
APW05	02/09/2021	530.11
APW05	02/15/2021	529.83
APW05	02/17/2021	529.83
APW05	03/09/2021	529.61
APW05	03/10/2021	529.61
APW05	03/29/2021	529.68
APW05	03/30/2021	529.68
APW05	04/27/2021	529.73
APW05	04/28/2021	529.72
APW05	05/24/2021	530.82
APW05	05/25/2021	529.51
APW05	06/15/2021	529.42
APW05	06/17/2021	529.43
APW05	06/24/2021	529.38
APW05	06/30/2021	529.38

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW05	07/14/2021	529.33
APW05	07/15/2021	529.40
APW05	08/02/2021	529.28
APW05S	02/04/2021	534.37
APW05S	02/15/2021	533.90
APW05S	02/17/2021	533.90
APW05S	03/09/2021	533.71
APW05S	03/10/2021	533.71
APW05S	03/29/2021	533.91
APW05S	04/27/2021	533.56
APW05S	04/29/2021	533.74
APW05S	05/25/2021	533.23
APW05S	06/15/2021	532.54
APW05S	06/17/2021	532.53
APW05S	06/24/2021	531.93
APW05S	06/30/2021	531.68
APW05S	07/14/2021	532.16
APW05S	07/15/2021	532.31
APW06	12/14/2015	526.14
APW06	01/18/2016	527.46
APW06	04/25/2016	526.59
APW06	07/25/2016	526.20
APW06	10/17/2016	526.05
APW06	01/16/2017	526.10
APW06	04/17/2017	526.18
APW06	06/12/2017	526.86
APW06	11/14/2017	525.40
APW06	05/17/2018	526.39
APW06	08/14/2018	529.13
APW06	11/08/2018	529.99
APW06	02/18/2019	530.58
APW06	08/21/2019	529.68
APW06	02/03/2020	526.76
APW06	06/11/2020	526.74
APW06	07/27/2020	526.78
APW06	10/22/2020	526.37
APW06	02/04/2021	526.82
APW06	02/09/2021	526.82
APW06	02/15/2021	526.48
APW06	02/17/2021	526.48
APW06	03/09/2021	526.46
APW06	03/10/2021	526.46
APW06	03/29/2021	526.49
APW06	03/30/2021	526.49
APW06	04/27/2021	526.68

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW06	04/29/2021	526.90
APW06	05/24/2021	537.51
APW06	05/25/2021	526.54
APW06	06/15/2021	526.45
APW06	06/16/2021	526.45
APW06	06/24/2021	526.42
APW06	06/30/2021	526.38
APW06	07/14/2021	526.31
APW06	07/15/2021	526.41
APW06	08/02/2021	526.31
APW07	12/14/2015	492.84
APW07	01/18/2016	492.58
APW07	04/25/2016	493.11
APW07	07/25/2016	492.64
APW07	10/17/2016	492.46
APW07	01/16/2017	492.98
APW07	04/17/2017	492.65
APW07	06/12/2017	493.32
APW07	11/14/2017	491.34
APW07	05/17/2018	491.73
APW07	08/14/2018	495.37
APW07	11/08/2018	497.57
APW07	02/18/2019	496.19
APW07	08/21/2019	495.37
APW07	02/03/2020	492.60
APW07	06/11/2020	491.90
APW07	07/27/2020	491.97
APW07	10/22/2020	491.50
APW07	02/04/2021	492.72
APW07	02/10/2021	492.72
APW07	02/15/2021	492.16
APW07	03/09/2021	491.93
APW07	03/29/2021	492.17
APW07	04/27/2021	492.19
APW07	05/24/2021	491.88
APW07	06/15/2021	491.85
APW07	06/24/2021	491.75
APW07	07/14/2021	491.77
APW07	08/02/2021	492.27
APW08	12/14/2015	492.72
APW08	01/18/2016	492.35
APW08	04/25/2016	492.97
APW08	07/25/2016	492.14
APW08	10/17/2016	492.18
APW08	01/16/2017	492.92

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW08	04/17/2017	492.49
APW08	06/12/2017	493.68
APW08	11/14/2017	491.77
APW08	05/17/2018	492.22
APW08	08/14/2018	493.16
APW08	11/08/2018	494.85
APW08	02/18/2019	493.91
APW08	08/21/2019	494.77
APW08	02/03/2020	492.50
APW08	06/11/2020	491.65
APW08	07/27/2020	491.82
APW08	10/22/2020	491.28
APW08	02/04/2021	492.46
APW08	02/10/2021	492.46
APW08	02/15/2021	491.90
APW08	03/09/2021	491.72
APW08	03/29/2021	491.93
APW08	04/27/2021	491.98
APW08	05/24/2021	491.68
APW08	06/15/2021	491.64
APW08	06/24/2021	491.56
APW08	07/14/2021	491.61
APW08	08/02/2021	491.59
APW09	12/14/2015	504.88
APW09	01/18/2016	506.59
APW09	04/25/2016	505.32
APW09	07/25/2016	504.70
APW09	10/17/2016	503.44
APW09	01/16/2017	505.67
APW09	04/17/2017	504.89
APW09	06/12/2017	505.52
APW09	11/14/2017	504.77
APW09	05/17/2018	505.34
APW09	08/14/2018	509.52
APW09	11/08/2018	510.87
APW09	02/18/2019	510.75
APW09	08/21/2019	509.43
APW09	02/03/2020	505.04
APW09	06/11/2020	504.64
APW09	07/27/2020	505.31
APW09	10/22/2020	503.83
APW09	02/04/2021	505.69
APW09	02/11/2021	505.69
APW09	02/15/2021	504.93
APW09	03/09/2021	505.10

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW09	03/29/2021	505.23
APW09	04/27/2021	504.74
APW09	05/24/2021	504.72
APW09	06/15/2021	504.63
APW09	06/24/2021	504.48
APW09	07/14/2021	505.24
APW09	08/02/2021	504.77
APW10	12/14/2015	506.39
APW10	01/18/2016	507.70
APW10	04/25/2016	506.90
APW10	07/25/2016	506.19
APW10	10/17/2016	505.06
APW10	01/16/2017	506.96
APW10	04/17/2017	506.53
APW10	06/12/2017	507.27
APW10	11/14/2017	506.18
APW10	05/17/2018	506.25
APW10	08/14/2018	508.28
APW10	11/08/2018	509.22
APW10	02/18/2019	509.40
APW10	08/21/2019	508.17
APW10	02/03/2020	506.73
APW10	06/11/2020	506.31
APW10	07/27/2020	506.76
APW10	10/22/2020	505.44
APW10	02/04/2021	507.12
APW10	02/11/2021	507.12
APW10	02/15/2021	506.65
APW10	03/09/2021	506.84
APW10	03/29/2021	506.94
APW10	04/27/2021	506.53
APW10	05/24/2021	506.35
APW10	06/15/2021	506.26
APW10	06/17/2021	506.31
APW10	06/24/2021	506.12
APW10	06/30/2021	506.05
APW10	07/14/2021	506.59
APW10	07/29/2021	506.48
APW10	08/02/2021	506.37
APW11	02/04/2021	514.71
APW11	02/15/2021	514.13
APW11	02/18/2021	514.13
APW11	03/09/2021	514.49
APW11	03/29/2021	514.55
APW11	04/27/2021	487.33

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW11	04/28/2021	514.50
APW11	05/24/2021	514.16
APW11	06/15/2021	514.02
APW11	06/16/2021	514.02
APW11	06/24/2021	513.90
APW11	06/30/2021	513.86
APW11	07/14/2021	513.96
APW11	07/15/2021	514.00
APW12	02/04/2021	533.12
APW12	02/15/2021	532.41
APW12	02/17/2021	532.41
APW12	03/09/2021	532.48
APW12	03/29/2021	532.91
APW12	04/27/2021	532.12
APW12	04/28/2021	532.31
APW12	05/24/2021	531.87
APW12	05/25/2021	531.82
APW12	06/15/2021	531.53
APW12	06/16/2021	528.83
APW12	06/24/2021	531.37
APW12	06/30/2021	531.28
APW12	07/14/2021	531.29
APW12	07/15/2021	531.34
APW13	02/04/2021	506.52
APW13	02/15/2021	505.94
APW13	02/22/2021	505.94
APW13	03/09/2021	506.06
APW13	03/10/2021	506.06
APW13	03/29/2021	506.10
APW13	03/31/2021	506.10
APW13	04/27/2021	505.69
APW13	04/29/2021	505.97
APW13	05/24/2021	505.62
APW13	05/25/2021	505.78
APW13	06/15/2021	505.44
APW13	06/17/2021	505.44
APW13	06/24/2021	505.27
APW13	06/30/2021	505.20
APW13	07/14/2021	505.63
APW13	07/15/2021	505.73
APW14	02/04/2021	506.29
APW14	02/15/2021	505.55
APW14	02/22/2021	505.55
APW14	03/09/2021	505.69
APW14	03/10/2021	505.69

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW14	03/29/2021	505.76
APW14	03/31/2021	505.76
APW14	04/27/2021	505.29
APW14	04/28/2021	505.37
APW14	05/24/2021	505.30
APW14	05/25/2021	505.41
APW14	06/15/2021	514.14
APW14	06/17/2021	505.16
APW14	06/24/2021	505.00
APW14	06/30/2021	504.93
APW14	07/14/2021	505.62
APW14	07/15/2021	505.63
APW15	02/04/2021	500.60
APW15	02/15/2021	500.54
APW15	02/23/2021	500.54
APW15	03/09/2021	501.19
APW15	03/10/2021	501.19
APW15	03/29/2021	501.88
APW15	03/31/2021	501.88
APW15	04/27/2021	502.40
APW15	04/28/2021	502.44
APW15	05/24/2021	502.69
APW15	06/15/2021	502.71
APW15	06/17/2021	502.77
APW15	06/24/2021	502.75
APW15	06/30/2021	502.76
APW15	07/14/2021	502.81
APW16	02/04/2021	492.13
APW16	02/15/2021	491.48
APW16	02/23/2021	491.48
APW16	03/09/2021	491.41
APW16	03/10/2021	491.41
APW16	03/29/2021	491.62
APW16	03/30/2021	491.62
APW16	04/27/2021	491.49
APW16	04/28/2021	491.49
APW16	05/24/2021	491.29
APW16	06/15/2021	491.23
APW16	06/16/2021	491.23
APW16	06/24/2021	491.17
APW16	06/30/2021	491.06
APW16	07/14/2021	491.20
APW16	07/15/2021	491.21
APW17	02/04/2021	492.56
APW17	02/15/2021	492.02

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW17	02/23/2021	492.02
APW17	03/09/2021	491.74
APW17	03/10/2021	491.74
APW17	03/29/2021	491.95
APW17	03/30/2021	491.95
APW17	04/27/2021	491.87
APW17	04/29/2021	492.19
APW17	05/24/2021	491.69
APW17	06/15/2021	491.57
APW17	06/16/2021	491.57
APW17	06/24/2021	491.52
APW17	06/30/2021	491.42
APW17	07/14/2021	491.58
APW17	07/15/2021	491.59
APW18	02/04/2021	492.73
APW18	02/15/2021	492.20
APW18	02/23/2021	492.20
APW18	03/09/2021	491.92
APW18	03/10/2021	491.92
APW18	03/29/2021	492.14
APW18	03/30/2021	492.14
APW18	04/27/2021	492.06
APW18	04/29/2021	492.37
APW18	05/24/2021	491.97
APW18	06/15/2021	491.82
APW18	06/16/2021	491.84
APW18	06/24/2021	491.76
APW18	06/30/2021	491.67
APW18	07/14/2021	491.76
APW18	07/15/2021	491.85
G48MG	12/14/2015	526.29
G48MG	01/18/2016	525.50
G48MG	04/25/2016	526.21
G48MG	07/25/2016	526.09
G48MG	10/17/2016	526.34
G48MG	01/16/2017	526.22
G48MG	04/17/2017	526.27
G48MG	06/12/2017	526.94
G48MG	11/14/2017	525.55
G48MG	05/17/2018	527.32
G48MG	08/14/2018	528.18
G48MG	11/08/2018	528.24
G48MG	02/18/2019	528.51
G48MG	08/21/2019	527.63
G48MG	02/03/2020	526.77

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G48MG	06/11/2020	526.32
G48MG	07/27/2020	526.54
G48MG	10/22/2020	526.31
G48MG	02/04/2021	526.83
G48MG	02/10/2021	526.83
G48MG	02/15/2021	526.30
G48MG	03/09/2021	526.15
G48MG	03/29/2021	526.35
G48MG	04/27/2021	526.56
G48MG	05/24/2021	526.40
G48MG	06/15/2021	526.42
G48MG	06/24/2021	539.15
G48MG	07/14/2021	526.32
G48MG	08/02/2021	526.35
G202	01/14/2015	492.88
G202	04/21/2015	493.71
G202	07/15/2015	494.53
G202	10/06/2015	492.29
G202	12/14/2015	492.94
G202	01/18/2016	496.48
G202	01/20/2016	492.80
G202	04/25/2016	493.23
G202	04/28/2016	493.46
G202	07/25/2016	492.73
G202	07/27/2016	493.28
G202	10/17/2016	492.62
G202	10/19/2016	492.72
G202	01/16/2017	493.08
G202	01/18/2017	493.42
G202	04/17/2017	492.79
G202	04/20/2017	493.45
G202	06/12/2017	496.43
G202	08/02/2017	493.09
G202	11/14/2017	491.83
G202	11/15/2017	492.29
G202	02/22/2018	494.31
G202	05/17/2018	492.39
G202	05/23/2018	492.87
G202	08/14/2018	492.04
G202	08/21/2018	492.55
G202	11/08/2018	495.53
G202	11/14/2018	496.05
G202	02/18/2019	493.21
G202	02/21/2019	496.68
G202	05/21/2019	492.70

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G202	08/21/2019	491.64
G202	08/22/2019	492.13
G202	02/03/2020	493.17
G202	07/28/2020	492.09
G202	10/22/2020	491.67
G202	02/04/2021	492.90
G202	02/08/2021	492.85
G202	03/09/2021	492.08
G202	03/29/2021	492.47
G202	04/27/2021	492.30
G202	05/24/2021	502.48
G202	06/15/2021	492.01
G202	06/24/2021	491.99
G202	07/14/2021	492.05
G203	01/14/2015	492.91
G203	04/21/2015	493.70
G203	07/15/2015	494.18
G203	10/06/2015	506.02
G203	12/16/2015	492.72
G203	01/18/2016	495.02
G203	01/20/2016	492.74
G203	04/25/2016	493.16
G203	04/28/2016	493.44
G203	07/25/2016	492.66
G203	07/27/2016	493.17
G203	10/17/2016	492.49
G203	10/19/2016	492.64
G203	01/16/2017	493.02
G203	01/19/2017	493.56
G203	04/17/2017	492.67
G203	04/20/2017	493.31
G203	06/12/2017	495.42
G203	08/02/2017	492.96
G203	11/14/2017	490.99
G203	11/15/2017	491.46
G203	02/22/2018	496.37
G203	05/17/2018	492.26
G203	05/23/2018	492.73
G203	08/14/2018	493.81
G203	08/21/2018	494.30
G203	11/08/2018	495.35
G203	11/14/2018	496.00
G203	02/18/2019	494.02
G203	02/21/2019	494.50
G203	05/21/2019	493.10

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G203	08/21/2019	494.05
G203	08/22/2019	494.54
G203	02/03/2020	492.74
G203	05/21/2020	491.49
G203	07/27/2020	491.99
G203	10/22/2020	491.63
G203	02/04/2021	492.84
G203	02/08/2021	492.73
G203	03/09/2021	492.10
G203	03/29/2021	492.33
G203	05/24/2021	501.18
G203	06/15/2021	491.99
G203	06/24/2021	491.93
G203	07/14/2021	491.92
G203	08/02/2021	491.95
G208	01/14/2015	513.98
G208	04/21/2015	514.82
G208	07/15/2015	514.55
G208	10/06/2015	513.51
G208	12/14/2015	513.41
G208	01/18/2016	514.11
G208	01/19/2016	515.99
G208	04/25/2016	507.69
G208	04/28/2016	508.77
G208	07/25/2016	512.24
G208	07/29/2016	513.14
G208	10/17/2016	508.94
G208	10/25/2016	509.54
G208	01/16/2017	508.24
G208	01/24/2017	509.27
G208	04/17/2017	508.58
G208	04/20/2017	509.15
G208	06/12/2017	515.81
G208	08/03/2017	511.82
G208	11/14/2017	512.07
G208	11/17/2017	512.48
G208	02/22/2018	509.43
G208	05/17/2018	507.59
G208	05/23/2018	508.02
G208	08/14/2018	507.94
G208	08/20/2018	508.43
G208	11/08/2018	509.57
G208	11/13/2018	510.19
G208	02/18/2019	508.19
G208	02/20/2019	508.68

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G208	05/22/2019	509.50
G208	08/21/2019	508.06
G208	08/22/2019	508.55
G208	02/03/2020	509.37
G208	05/20/2020	510.57
G208	07/27/2020	508.69
G208	10/22/2020	509.96
G208	02/04/2021	509.91
G208	02/09/2021	509.82
G208	02/15/2021	504.88
G208	03/09/2021	528.57
G208	03/29/2021	509.53
G208	04/27/2021	510.25
G208	05/24/2021	510.44
G208	06/15/2021	506.19
G208	06/24/2021	507.44
G208	07/14/2021	508.84
G208	08/02/2021	509.68
G217S	01/14/2015	531.59
G217S	04/21/2015	532.93
G217S	07/14/2015	528.58
G217S	10/07/2015	530.44
G217S	01/20/2016	531.63
G217S	04/26/2016	532.84
G217S	07/26/2016	531.14
G217S	10/19/2016	530.90
G217S	01/18/2017	531.47
G217S	04/18/2017	532.00
G217S	08/02/2017	531.46
G217S	11/28/2017	530.70
G217S	02/21/2018	533.36
G217S	05/23/2018	530.75
G217S	08/22/2018	533.49
G217S	11/16/2018	533.75
G217S	02/21/2019	535.19
G217S	05/23/2019	535.44
G217S	08/23/2019	530.94
G217S	07/27/2020	530.95
G217S	10/22/2020	530.14
G217S	02/04/2021	532.08
G217S	02/15/2021	531.41
G217S	03/09/2021	531.50
G217S	03/29/2021	532.14
G217S	04/27/2021	531.48
G217S	05/24/2021	531.26

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G217S	06/15/2021	531.16
G217S	06/24/2021	531.48
G217S	07/14/2021	530.77
G217S	08/02/2021	531.18
G217D	12/14/2015	518.26
G217D	01/18/2016	518.86
G217D	04/25/2016	518.70
G217D	07/25/2016	507.56
G217D	10/17/2016	518.30
G217D	01/16/2017	518.39
G217D	04/17/2017	518.73
G217D	06/12/2017	519.37
G222	01/14/2015	518.19
G222	04/21/2015	519.68
G222	07/15/2015	520.13
G222	10/06/2015	518.71
G222	12/14/2015	516.93
G222	01/18/2016	516.75
G222	01/19/2016	520.02
G222	04/25/2016	517.61
G222	04/28/2016	518.78
G222	07/25/2016	519.04
G222	07/28/2016	519.51
G222	10/17/2016	518.57
G222	10/25/2016	518.61
G222	01/16/2017	518.37
G222	01/24/2017	519.07
G222	04/17/2017	519.22
G222	04/25/2017	520.00
G222	06/12/2017	520.14
G222	08/02/2017	519.66
G222	11/14/2017	517.84
G222	11/15/2017	518.18
G222	02/20/2018	519.16
G222	05/17/2018	517.88
G222	05/22/2018	518.34
G222	08/14/2018	518.43
G222	08/16/2018	518.93
G222	11/08/2018	518.84
G222	11/12/2018	519.42
G222	02/18/2019	519.49
G222	02/20/2019	519.98
G222	05/22/2019	520.72
G222	08/21/2019	518.30
G222	02/03/2020	518.23

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G222	05/20/2020	520.24
G222	07/27/2020	519.20
G222	10/22/2020	518.18
G222	02/04/2021	518.42
G222	02/09/2021	518.33
G222	02/15/2021	517.25
G222	03/09/2021	518.78
G222	03/29/2021	519.17
G222	04/27/2021	519.73
G222	05/24/2021	519.66
G222	06/15/2021	519.44
G222	06/24/2021	519.57
G222	07/14/2021	519.45
G222	08/02/2021	519.09
G223	01/14/2015	499.35
G223	04/21/2015	500.45
G223	07/15/2015	499.77
G223	10/06/2015	500.15
G223	12/14/2015	500.21
G223	01/18/2016	498.87
G223	01/20/2016	499.89
G223	04/25/2016	499.88
G223	04/28/2016	500.33
G223	07/25/2016	499.69
G223	07/28/2016	500.65
G223	10/17/2016	499.99
G223	10/20/2016	500.21
G223	01/16/2017	499.69
G223	01/24/2017	500.40
G223	04/17/2017	499.63
G223	04/26/2017	500.80
G223	06/12/2017	499.92
G223	08/03/2017	500.40
G223	11/14/2017	498.51
G223	11/28/2017	498.95
G223	02/20/2018	502.87
G223	05/17/2018	499.01
G223	05/23/2018	495.64
G223	08/14/2018	500.90
G223	08/21/2018	501.42
G223	11/08/2018	500.66
G223	11/13/2018	501.54
G223	02/18/2019	501.54
G223	02/21/2019	502.05
G223	05/22/2019	504.22

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G223	08/21/2019	500.29
G223	08/22/2019	500.80
G223	02/03/2020	500.75
G223	05/20/2020	500.97
G223	07/27/2020	500.50
G223	10/22/2020	500.55
G223	02/04/2021	500.95
G223	02/08/2021	500.91
G223	02/15/2021	500.22
G223	03/09/2021	500.22
G223	03/29/2021	500.40
G223	04/27/2021	500.70
G223	05/24/2021	500.60
G223	06/15/2021	500.44
G223	06/24/2021	500.51
G223	07/14/2021	500.40
G223	08/02/2021	500.53
G224	01/14/2015	493.02
G224	04/21/2015	493.99
G224	07/14/2015	492.79
G224	10/06/2015	492.68
G224	12/14/2015	492.96
G224	01/18/2016	492.12
G224	01/21/2016	492.70
G224	04/25/2016	493.24
G224	04/28/2016	493.70
G224	07/25/2016	492.74
G224	07/28/2016	492.41
G224	10/17/2016	492.65
G224	10/20/2016	492.15
G224	01/16/2017	492.98
G224	01/24/2017	493.71
G224	04/17/2017	492.79
G224	04/20/2017	493.55
G224	06/12/2017	492.54
G224	08/02/2017	493.10
G224	11/14/2017	491.90
G224	11/15/2017	492.41
G224	02/20/2018	495.01
G224	05/17/2018	492.11
G224	05/23/2018	492.66
G224	08/14/2018	489.63
G224	08/21/2018	493.21
G224	11/08/2018	486.49
G224	11/15/2018	486.96

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TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G224	02/18/2019	492.86
G224	02/21/2019	493.43
G224	05/22/2019	493.43
G224	08/21/2019	491.97
G224	08/22/2019	492.46
G224	02/03/2020	492.88
G224	05/21/2020	492.78
G224	07/27/2020	492.11
G224	10/22/2020	491.63
G224	02/04/2021	492.84
G224	02/09/2021	492.80
G224	02/15/2021	492.16
G224	03/09/2021	492.07
G224	03/29/2021	492.33
G224	04/27/2021	492.31
G224	05/24/2021	492.04
G224	06/15/2021	492.04
G224	06/24/2021	491.99
G224	07/14/2021	491.99
G224	08/02/2021	491.95
R202	05/21/2020	492.85
R202	02/08/2021	493.31
R217D	11/14/2017	517.88
R217D	11/28/2017	518.07
R217D	02/21/2018	521.40
R217D	05/17/2018	517.74
R217D	05/23/2018	517.82
R217D	08/14/2018	522.01
R217D	08/22/2018	522.14
R217D	11/08/2018	522.38
R217D	11/16/2018	522.14
R217D	02/18/2019	523.54
R217D	02/21/2019	523.68
R217D	05/23/2019	527.35
R217D	08/21/2019	518.03
R217D	02/03/2020	518.85
R217D	05/20/2020	519.36
R217D	07/27/2020	518.82
R217D	10/22/2020	518.53
R217D	02/04/2021	518.79
R217D	02/08/2021	518.79
R217D	02/15/2021	518.70
R217D	03/09/2021	518.63
R217D	03/29/2021	518.82
R217D	04/27/2021	518.82

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
R217D	05/24/2021	518.68
R217D	06/15/2021	518.63
R217D	06/24/2021	518.61
R217D	07/14/2021	518.61
R217D	08/02/2021	518.56
XPW01	02/04/2021	546.73
XPW01	02/15/2021	539.56
XPW01	02/17/2021	539.56
XPW01	03/09/2021	539.75
XPW01	03/29/2021	539.85
XPW01	03/30/2021	539.85
XPW01	04/27/2021	539.38
XPW01	04/28/2021	539.31
XPW01	05/24/2021	539.26
XPW01	06/15/2021	539.65
XPW01	06/24/2021	539.35
XPW01	07/14/2021	539.85
XPW02	02/04/2021	546.49
XPW02	02/15/2021	546.49
XPW02	02/17/2021	546.49
XPW02	03/09/2021	545.83
XPW02	03/29/2021	546.69
XPW02	03/30/2021	546.69
XPW02	04/27/2021	545.15
XPW02	04/28/2021	545.14
XPW02	05/24/2021	545.92
XPW02	06/15/2021	545.31
XPW02	06/24/2021	544.91
XPW02	07/14/2021	545.96
XPW03	02/04/2021	544.43
XPW03	02/15/2021	544.13
XPW03	02/17/2021	544.13
XPW03	03/09/2021	544.28
XPW03	03/29/2021	544.16
XPW03	03/30/2021	544.16
XPW03	04/27/2021	543.39
XPW03	04/28/2021	543.43
XPW03	05/24/2021	543.77
XPW03	06/15/2021	543.43
XPW03	06/24/2021	543.31
XPW03	07/14/2021	543.99
XPW04	02/04/2021	542.52
XPW04	02/15/2021	542.21
XPW04	02/17/2021	542.21
XPW04	03/09/2021	542.30

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

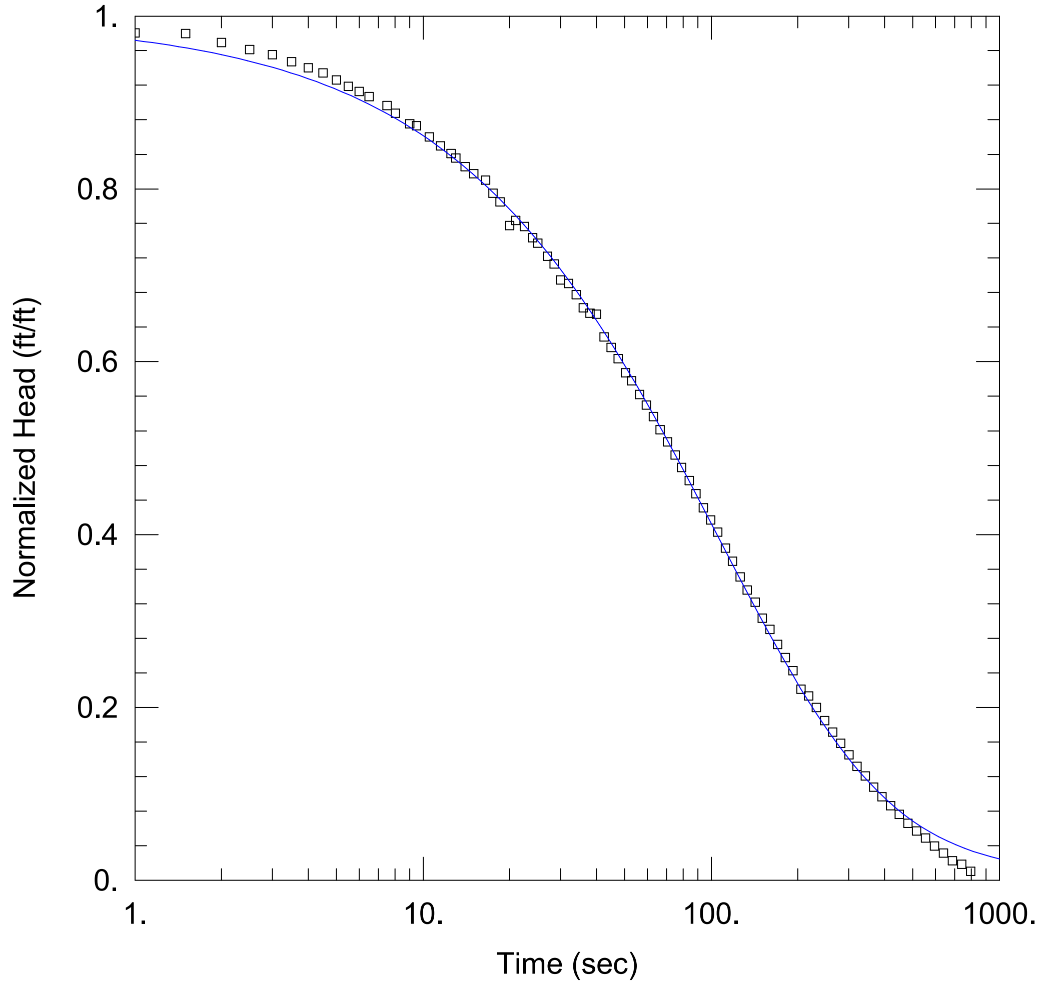
Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
XPW04	03/29/2021	542.33
XPW04	04/27/2021	541.98
XPW04	04/28/2021	542.03
XPW04	05/24/2021	542.03
XPW04	06/15/2021	541.91
XPW04	06/24/2021	541.80
XPW04	07/14/2021	542.27
XSG01	02/15/2021	536.17
XSG01	03/09/2021	536.17
XSG01	03/29/2021	536.17
XSG01	07/14/2021	535.40
SG02	02/15/2021	504.42
SG02	03/09/2021	504.84
SG02	03/29/2021	504.72

Notes:
ft NAVD88 = feet relative to the North American Vertical Datum 1988, GEOID 12A

generated 10/05/2021, 4:09:16 PM CDT

APPENDIX F
HYDRAULIC CONDUCTIVITY TEST DATA

2021 HYDRAULIC CONDUCTIVITY TEST DATA



APW-5S FH1

Data Set: \...\NEW_APW-5S FH1_07202021.aqt
Date: 10/21/21 Time: 14:56:12

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 0.986 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.087 cm^2/sec S = 0.000403

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.087	cm^2/sec
S	0.000403	

K = T/b = 0.000892 cm/sec
Ss = S/b = 0.0001259 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.08962	0.02397	+/- 0.04765	3.739	cm^2/sec

S	0.0003389	0.000496	+/- 0.0009861	0.6832

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0009188 cm/sec
Ss = S/b = 0.0001059 1/ft

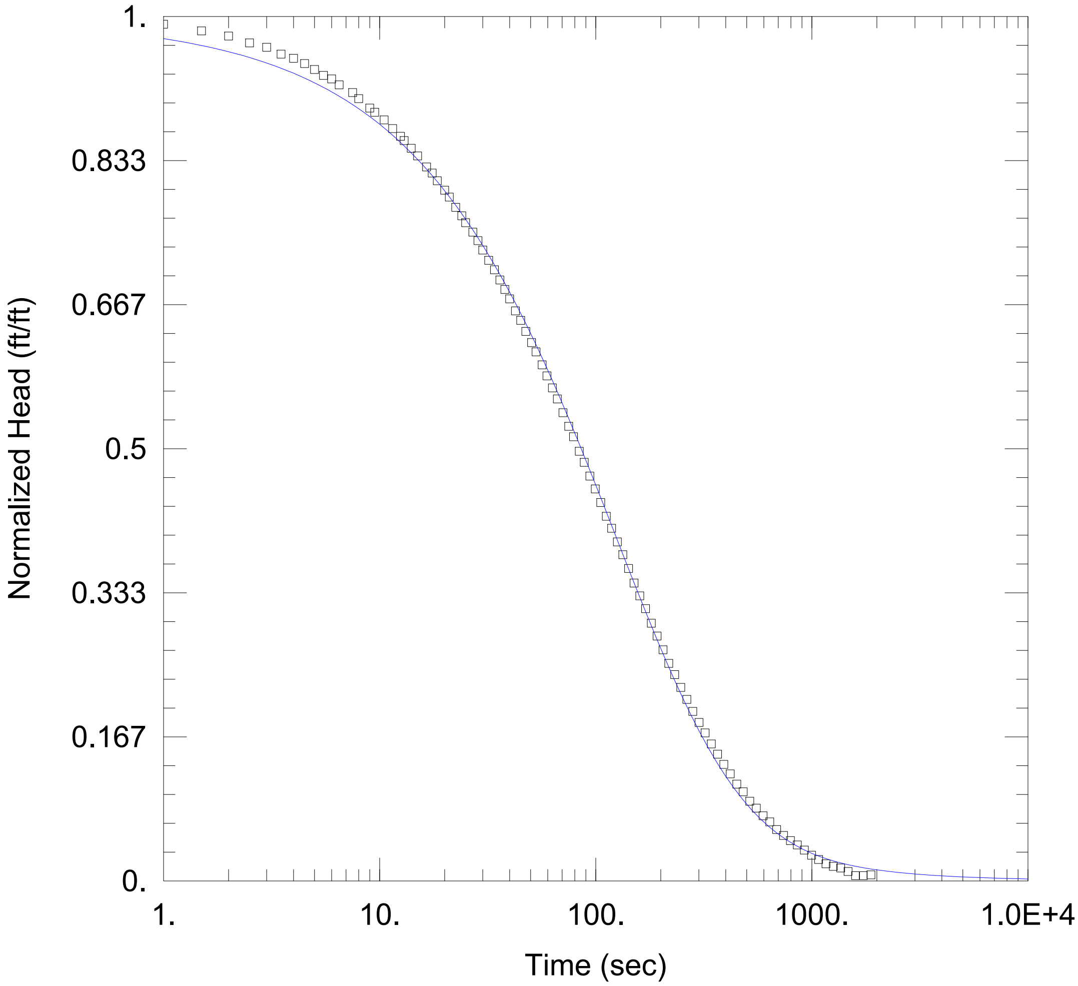
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares..... 0.9777 ft^2
Variance.................. 0.01124 ft^2
Std. Deviation......... 0.106 ft
Mean......................... 0.01073 ft
No. of Residuals..... 89
No. of Estimates..... 2



APW-5S FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.01 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.086 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0718 cm^2/sec
S = 0.000454

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
21.	0.799	419.5	0.125
22.5	0.787	449.5	0.113
24.	0.777	481.5	0.104
25.	0.769	516.5	0.093
27.	0.758	554.	0.085
28.5	0.748	595.	0.076
30.	0.737	639.5	0.069
32.	0.725	687.5	0.06
34.	0.714	739.5	0.053
36.	0.702	796.	0.047
38.	0.691	857.5	0.042
40.	0.68	924.	0.036
42.5	0.666	997.	0.03
45.	0.655	1076.	0.025
47.5	0.642	1162.5	0.02
50.5	0.629	1257.	0.017
53.	0.618	1360.	0.015
56.5	0.603	1472.5	0.011
59.5	0.59	1595.5	0.006
63.	0.576	1730.	0.006
66.5	0.563	1877.5	0.007

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0718	cm^2/sec
S	0.000454	

K = T/b = 0.0007361 cm/sec
Ss = S/b = 0.0001419 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.07177	0.01724	+/- 0.03421	4.163	cm^2/sec
S	0.0004536	0.0005595	+/- 0.00111	0.8107	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0007359 cm/sec
Ss = S/b = 0.0001418 1/ft

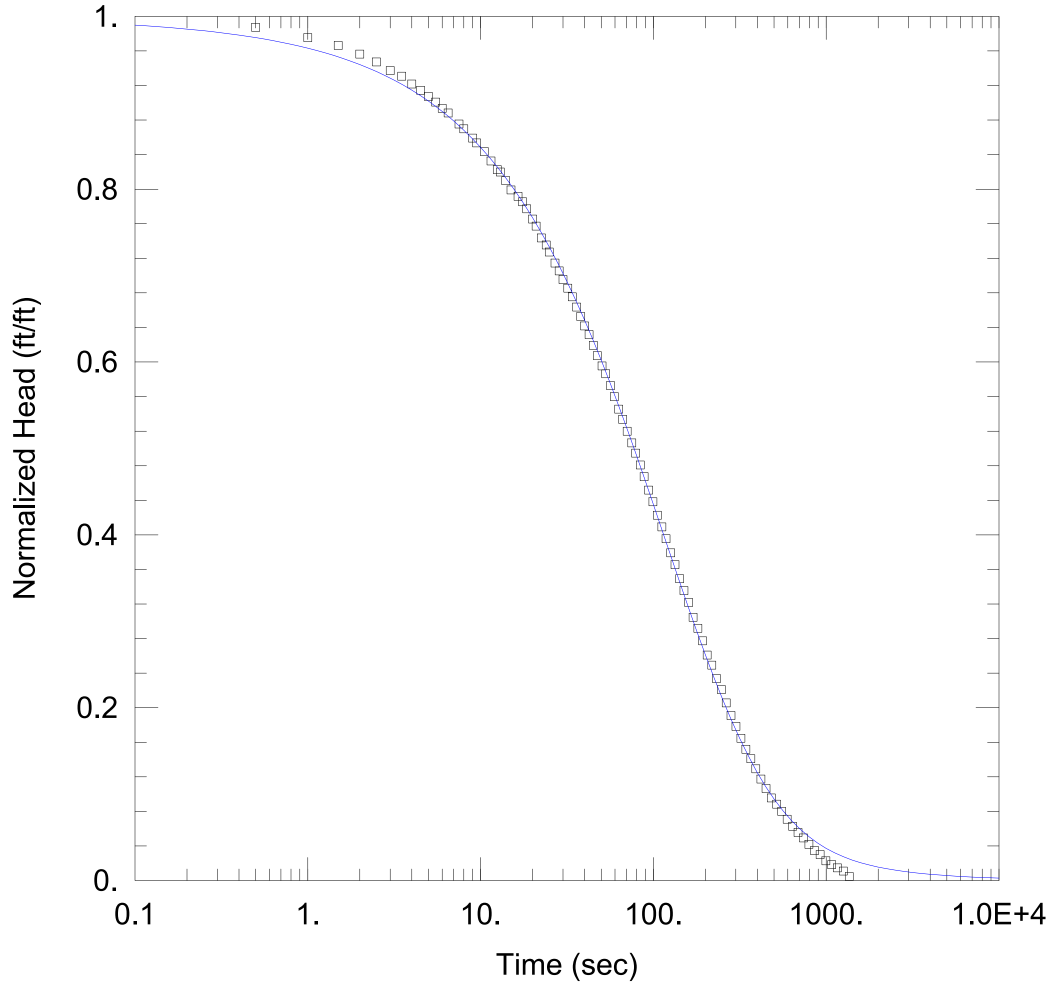
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 1.028 ft^2
Variance . . . . 0.01049 ft^2



APW-5S RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.1 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0591 cm^2/sec
S = 0.00178

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
20.	0.842	366.5	0.155
21.	0.833	392.	0.142
22.5	0.818	419.5	0.129
24.	0.809	449.5	0.117
25.	0.8	481.5	0.105
27.	0.786	516.5	0.097
28.5	0.776	554.	0.088
30.	0.765	595.	0.078
32.	0.754	639.5	0.069
34.	0.743	687.5	0.061
36.	0.73	739.5	0.054
38.	0.718	796.	0.046
40.	0.706	857.5	0.038
42.5	0.695	924.	0.033
45.	0.681	997.	0.025
47.5	0.668	1076.	0.02
50.5	0.655	1162.5	0.016
53.	0.645	1257.	0.012
56.5	0.63	1360.	0.005
59.5	0.616		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0591	cm^2/sec
S	0.00178	

K = T/b = 0.0006059 cm/sec
Ss = S/b = 0.0005562 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.05907	0.01974	+/- 0.03919	2.992	cm^2/sec
S	0.001784	0.002265	+/- 0.004496	0.7877	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0006056 cm/sec
Ss = S/b = 0.0005575 1/ft

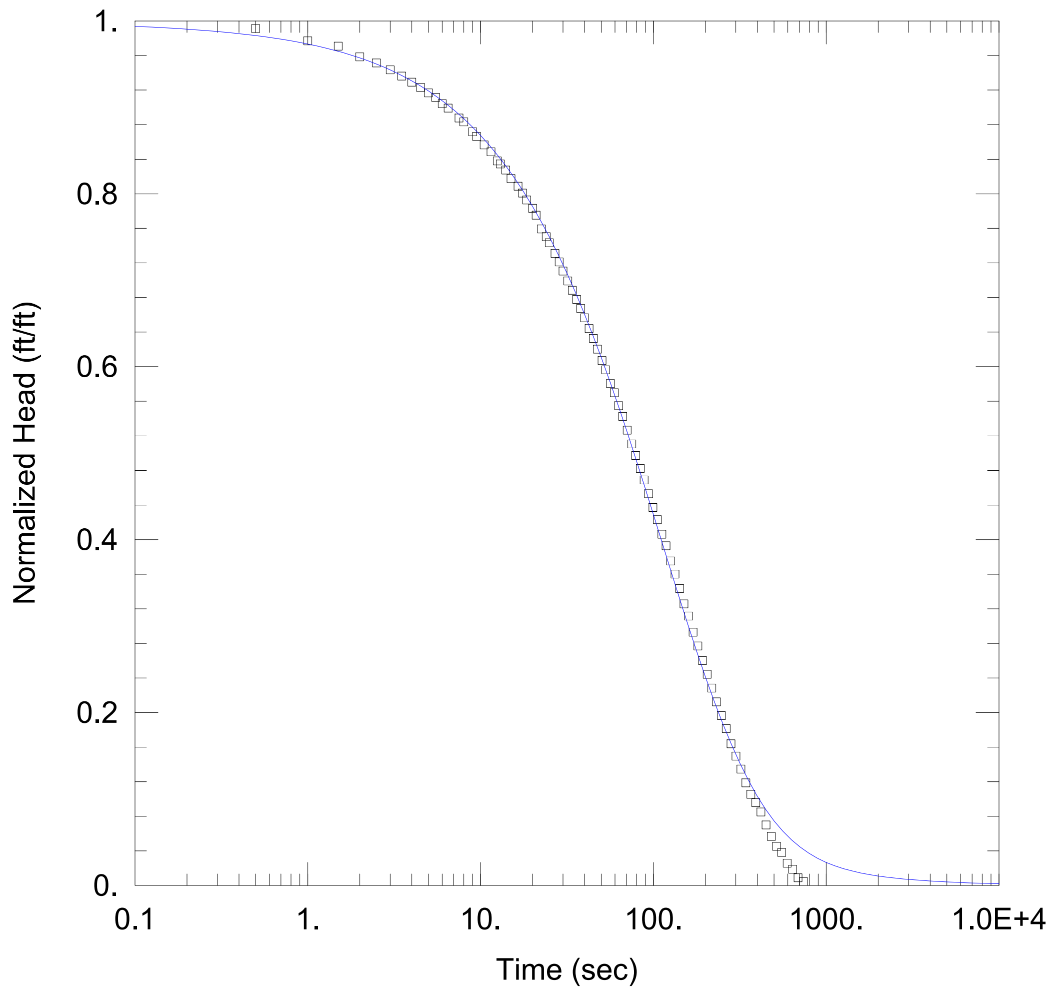
Parameter Correlations

	T	S
T	1.00	-0.96
S	-0.96	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 2.725 ft^2
Variance . . . . 0.02869 ft^2
Std. Deviation . . . . 0.1694 ft



APW-5S RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.13 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0825 cm^2/sec
S = 0.000391

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
20.	0.885	281.5	0.185
21.	0.876	300.5	0.169
22.5	0.858	321.	0.152
24.	0.848	343.	0.134
25.	0.84	366.5	0.119
27.	0.826	392.	0.108
28.5	0.815	419.5	0.096
30.	0.803	449.5	0.079
32.	0.79	481.5	0.064
34.	0.778	516.5	0.051
36.	0.766	554.	0.043
38.	0.754	595.	0.029
40.	0.742	639.5	0.021
42.5	0.728	687.5	0.01
45.	0.715	739.5	0.005
47.5	0.701		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0825	cm^2/sec
S	0.000391	

K = T/b = 0.0008458 cm/sec
Ss = S/b = 0.0001222 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.08245	0.03155	+/- 0.06271	2.614	cm^2/sec
S	0.0003915	0.0007946	+/- 0.00158	0.4927	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0008454 cm/sec
Ss = S/b = 0.0001223 1/ft

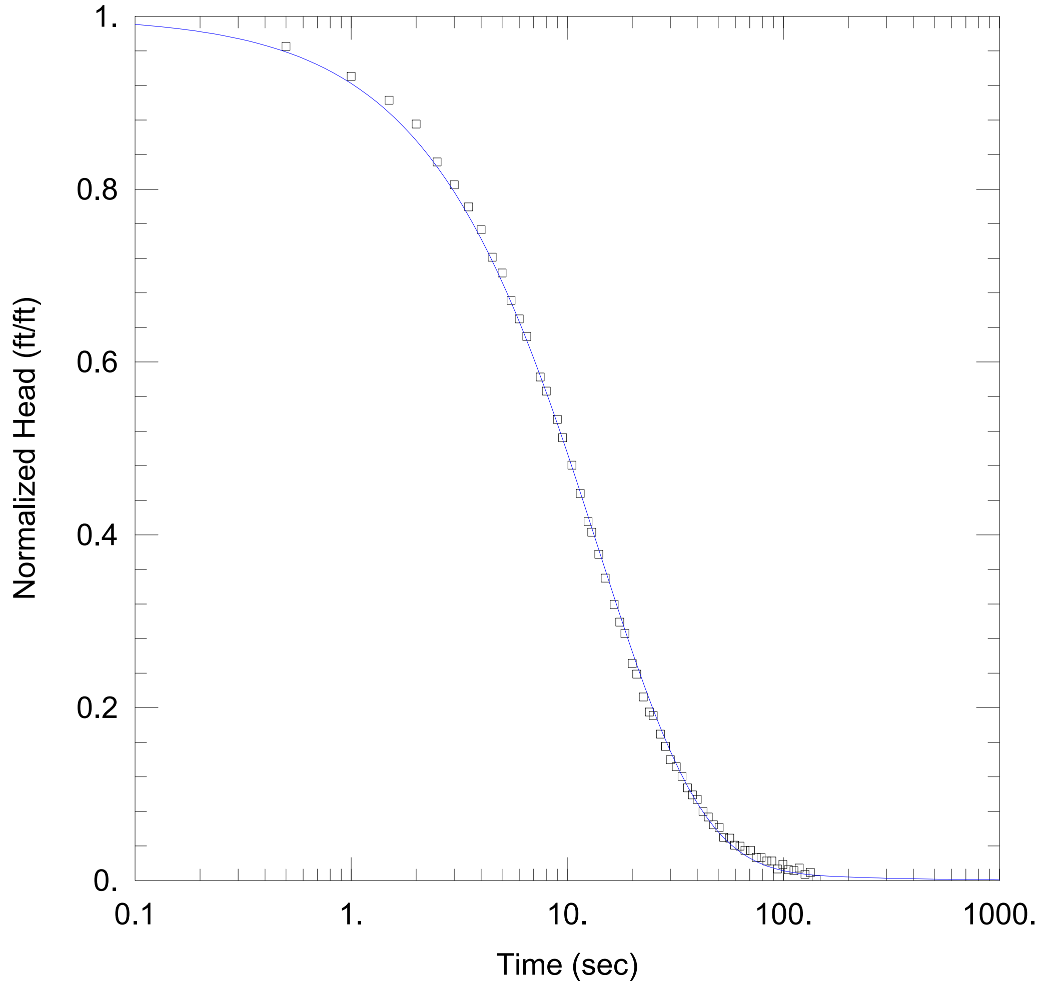
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 2.682 ft^2
Variance . . . . 0.03083 ft^2
Std. Deviation . . . . 0.1756 ft
Mean . . . . -0.02888 ft
No. of Residuals 89
No. of Estimates 2



APW-11 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11)

Initial Displacement: 0.98 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.37 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

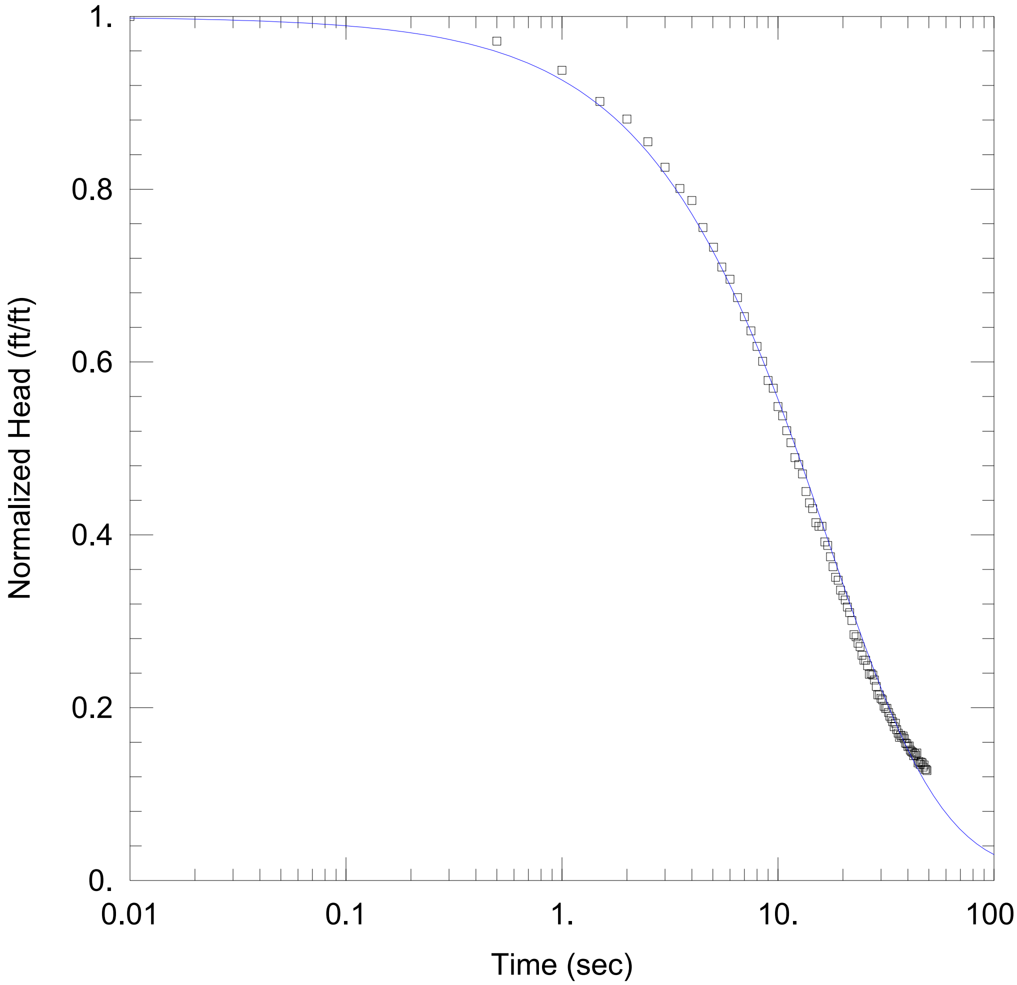
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0078 cm/sec
Kz/Kr = 1.

Ss = 1.09E-9 ft^{-1}



APW-11 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

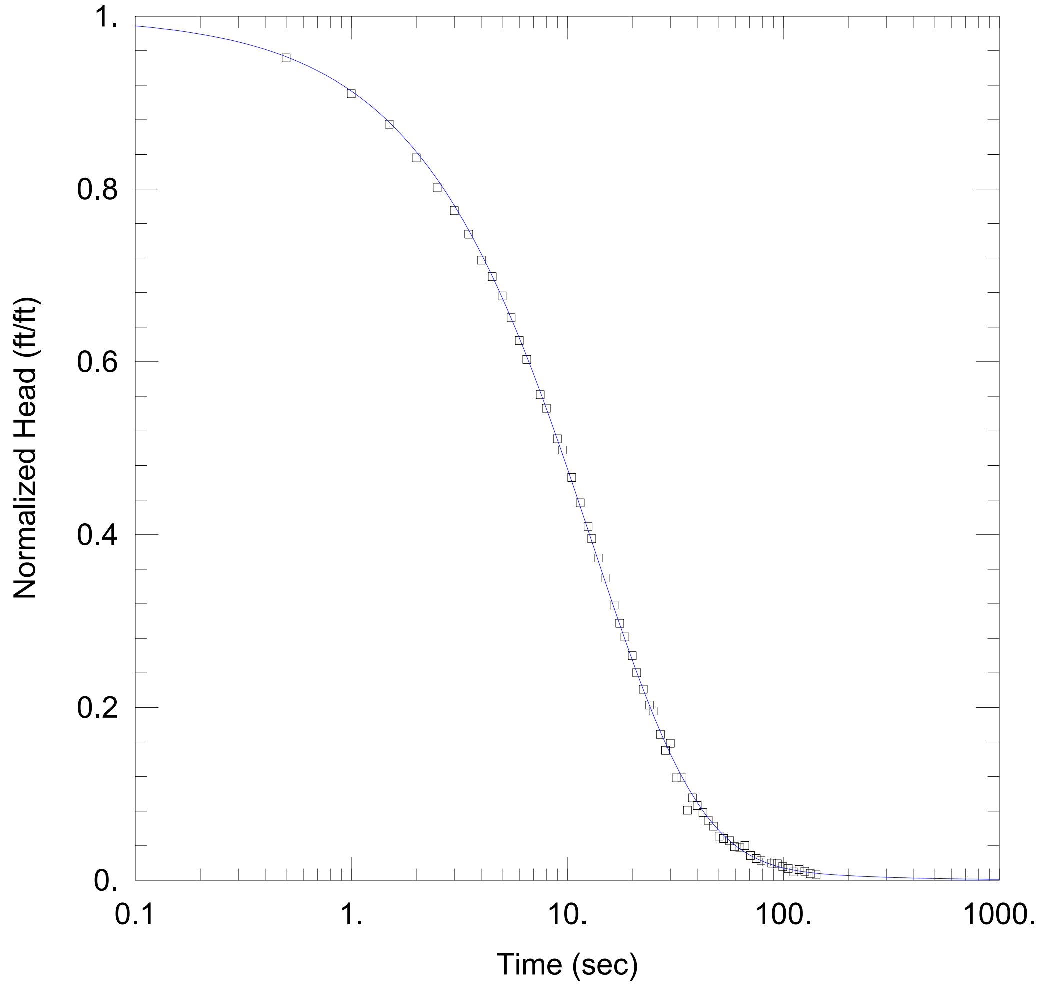
WELL DATA (APW-11)

Initial Displacement: 1.22 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft
Static Water Column Height: 43.53 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.00351 cm/sec
Ss = 6.23E-6 ft^{-1}
Kz/Kr = 1.



APW-11 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11)

Initial Displacement: 1.47 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.48 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

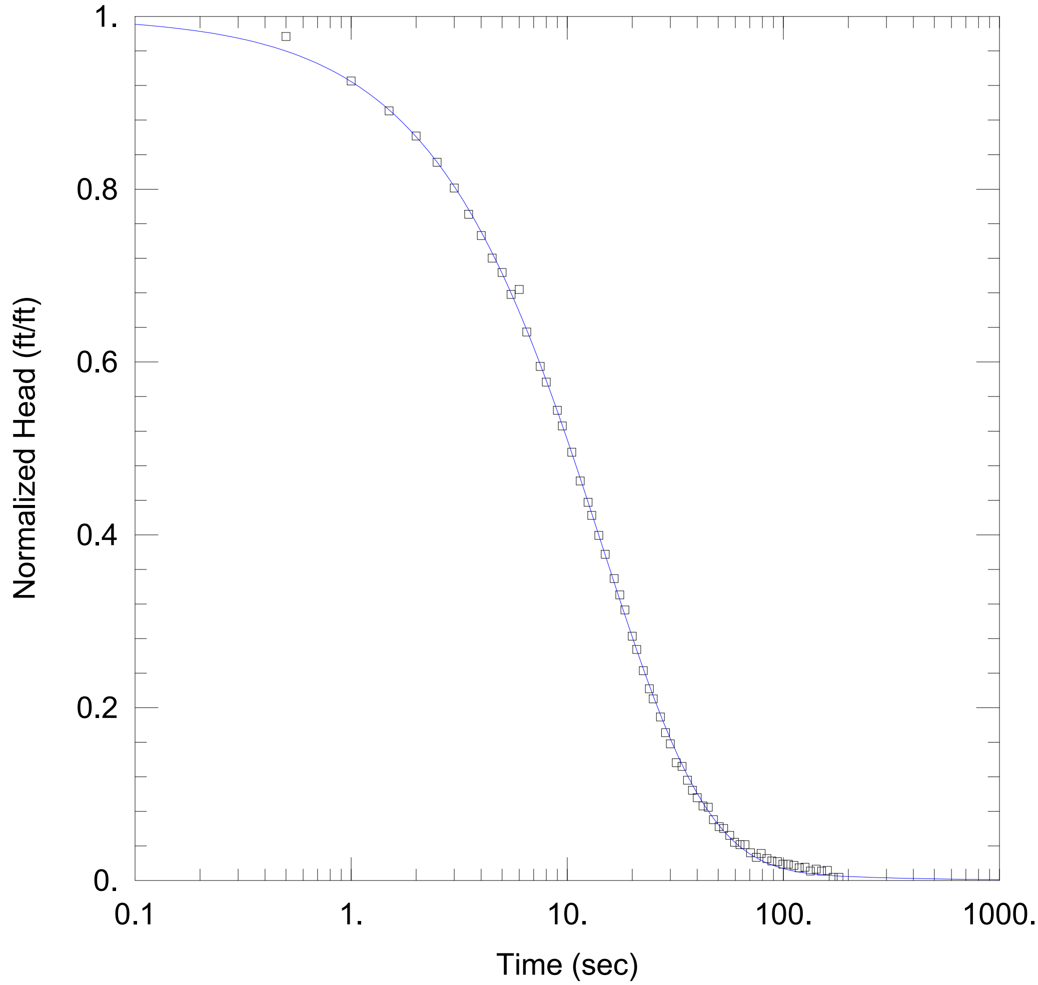
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00588 cm/sec
Kz/Kr = 1.

Ss = 3.02E-7 ft^{-1}



APW-11 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11 RH02)

Initial Displacement: 1.38 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.53 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

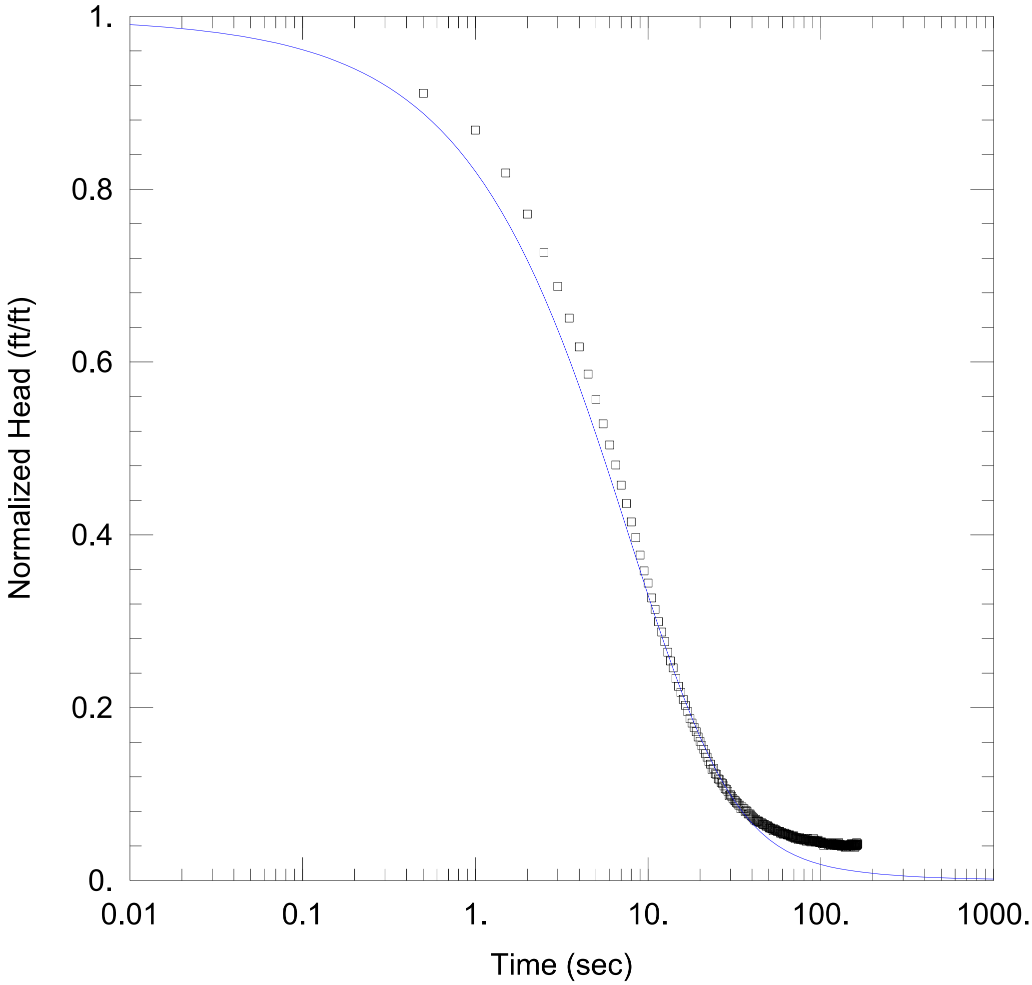
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00676 cm/sec
Kz/Kr = 1.

Ss = 6.55E-9 ft^{-1}



APW-12 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: 0.988 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.086 ft
Static Water Column Height: 19.03 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.05 cm^2/sec
S = 0.000733

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
75.5	0.049	160.5	0.041
76.	0.047	161.	0.04
76.5	0.047	161.5	0.043
77.	0.047	162.	0.04
77.5	0.048	162.5	0.041
78.	0.047	163.	0.041
78.5	0.047	163.5	0.041
79.	0.047	164.	0.042
79.5	0.046		

SOLUTION

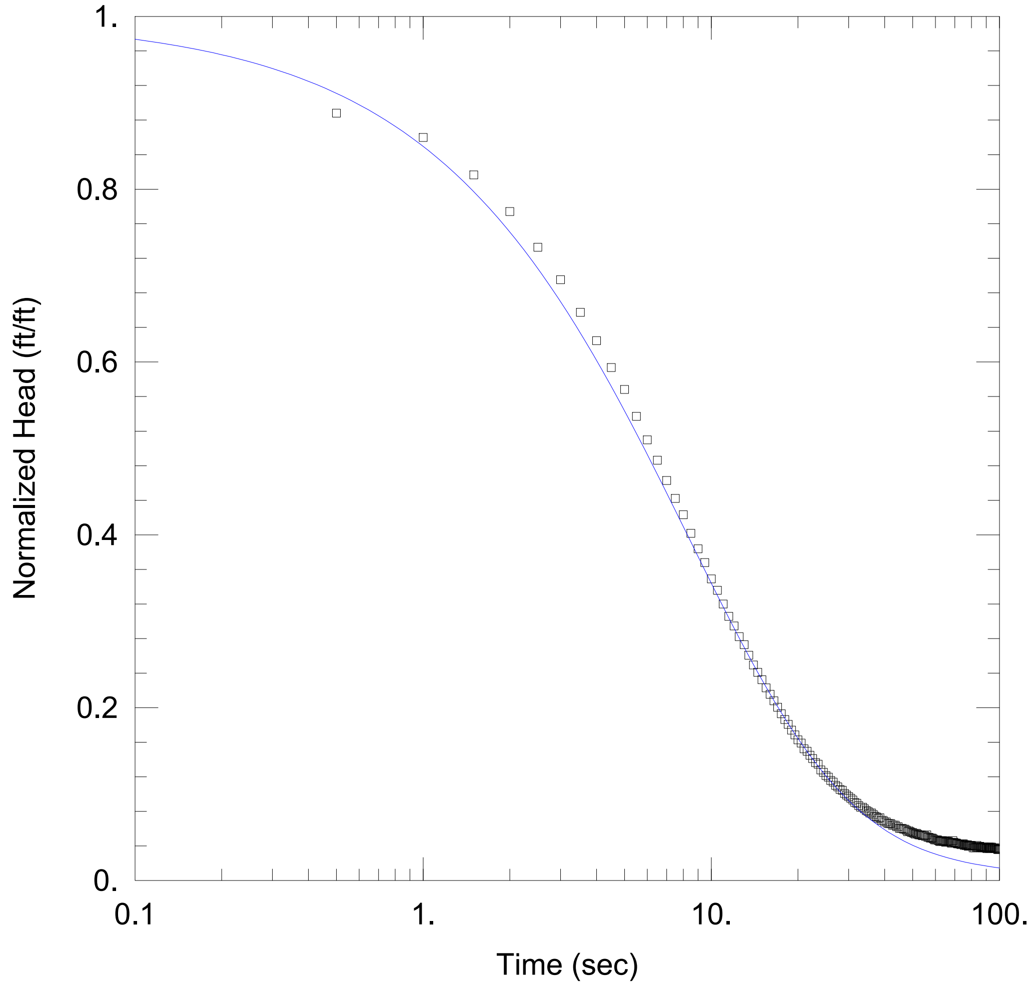
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.05	cm^2/sec
S	0.000733	

K = T/b = 0.009843 cm/sec
Ss = S/b = 0.0002094 1/ft



APW-12 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: 1.063 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 19.06 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.35 cm^2/sec
S = 0.000108

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
40.	0.072	94.5	0.04
40.5	0.072	95.	0.04
41.	0.07	95.5	0.04
41.5	0.07	96.	0.04
42.	0.07	96.5	0.039
42.5	0.068	97.	0.039
43.	0.068	97.5	0.039
43.5	0.068	98.	0.04
44.	0.066	98.5	0.038
44.5	0.066	99.	0.038
45.	0.064	99.5	0.038
45.5	0.064	100.	0.039
46.	0.064	100.5	0.036
46.5	0.063	101.	0.038

SOLUTION

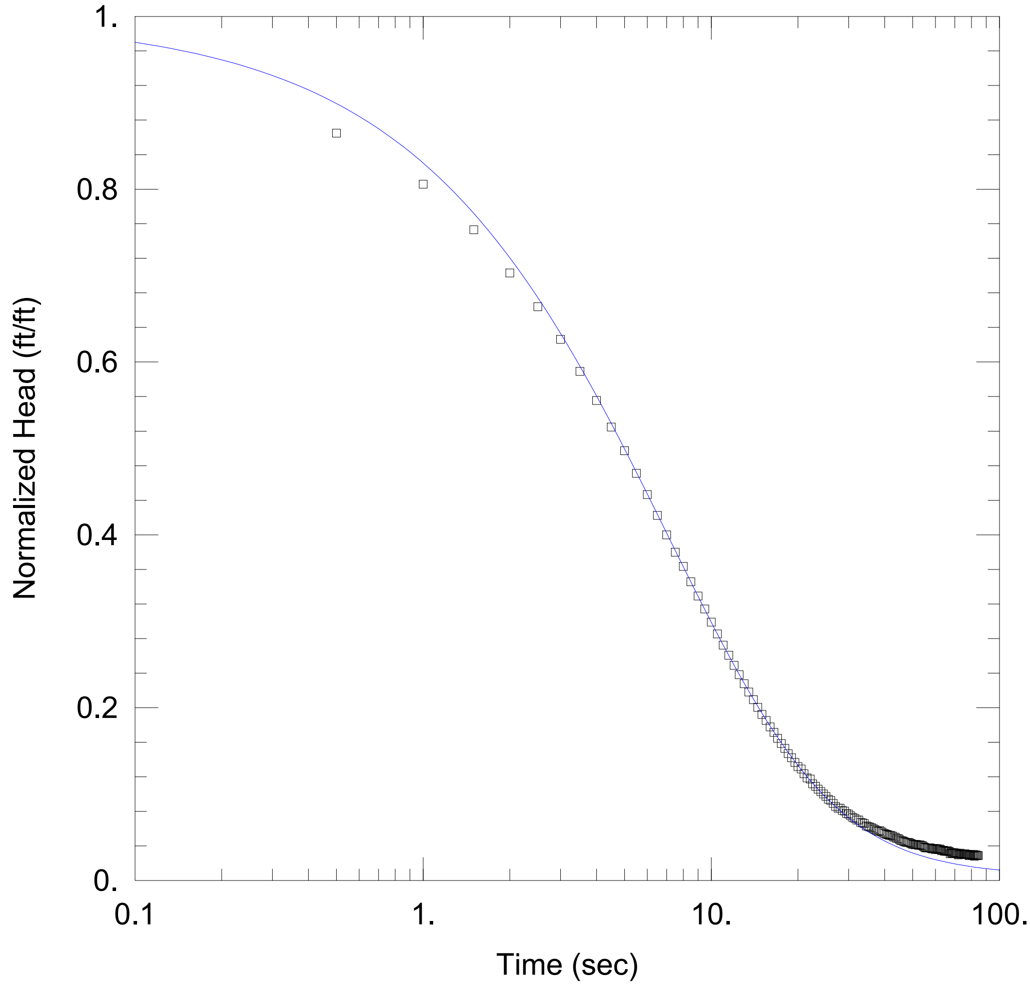
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.35	cm^2/sec
S	0.000108	

K = T/b = 0.01265 cm/sec
Ss = S/b = 3.086E-5 1/ft



APW-12 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: -1.458 ft
Static Water Column Height: 19.06 ft
Total Well Penetration Depth: 3.5 ft
Screen Length: 3.5 ft
Casing Radius: 0.08625 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.57 cm^2/sec
S = 0.000114

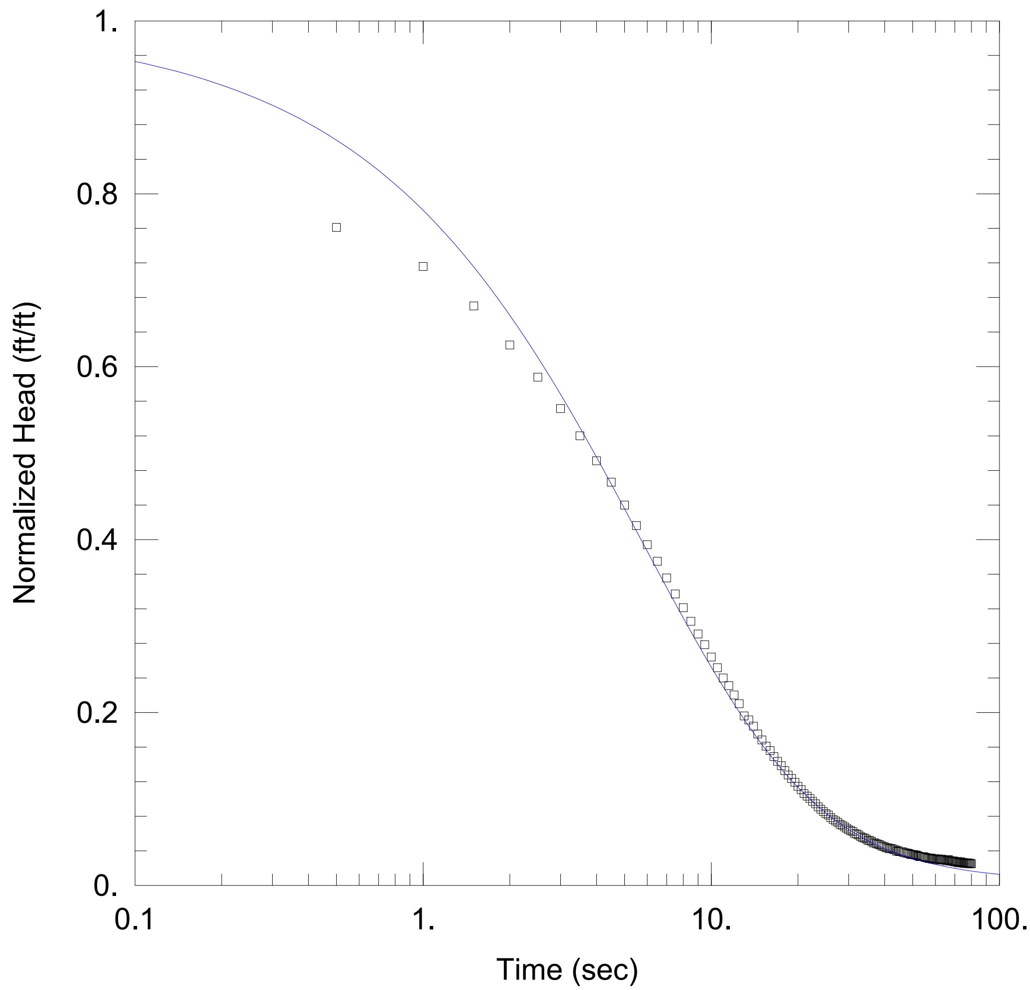
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.57	cm^2/sec
S	0.000114	

K = T/b = 0.01472 cm/sec
Ss = S/b = 3.257E-5 1/ft



APW-12 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: -1.771 ft
Static Water Column Height: 19.06 ft
Total Well Penetration Depth: 3.5 ft
Screen Length: 3.5 ft
Casing Radius: 0.08625 ft
Well Radius: 0.25 ft

SOLUTION

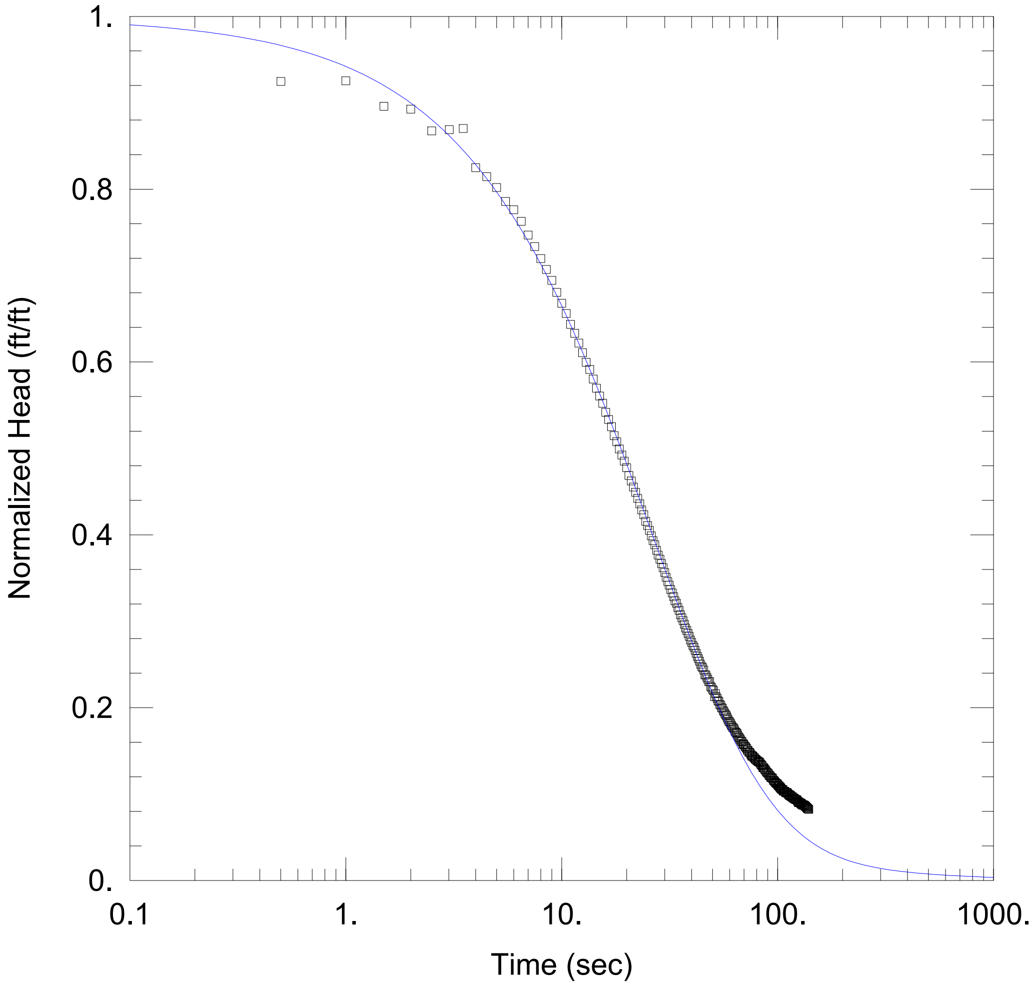
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.433 cm^2/sec
S = 0.000733

Estimated Parameters

Parameter	Estimate	
T	1.433	cm^2/sec
S	0.000733	

K = T/b = 0.01343 cm/sec
Ss = S/b = 0.0002094 1/ft



APW-13 FH-01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: 1.434 ft
Total Well Penetration Depth: 5.9 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 34.23 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

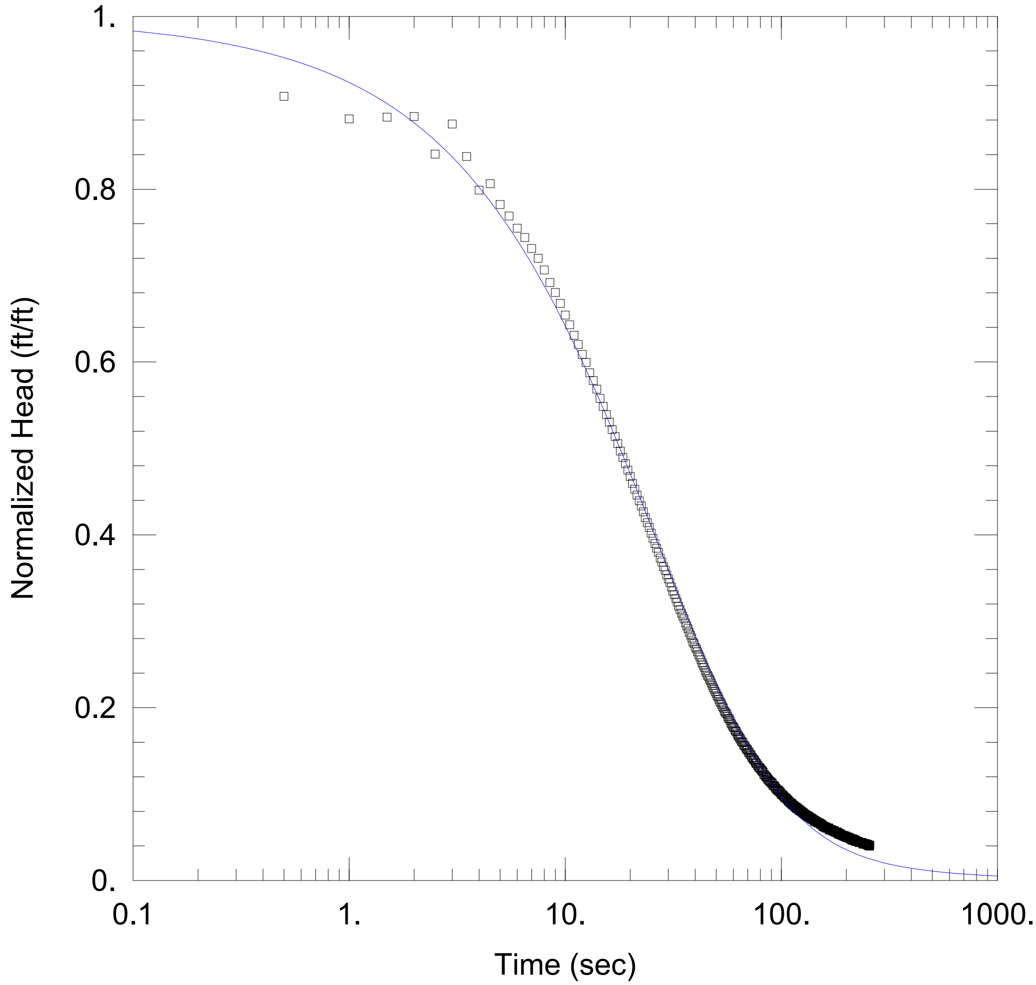
SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.475 cm^2/sec
S = 4.47E-5

S	4.47E-5

K = T/b = 0.002106 cm/sec
Ss = S/b = 6.041E-6 1/ft



APW-13 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: 1.493 ft
Static Water Column Height: 34.26 ft
Total Well Penetration Depth: 5.9 ft
Screen Length: 5. ft
Casing Radius: 0.086 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.329 cm^2/sec
S = 0.000562

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
106.	0.141	238.5	0.064
106.5	0.14	239.	0.063
107.	0.139	239.5	0.064
107.5	0.138	240.	0.063
108.	0.137	240.5	0.064
108.5	0.137	241.	0.063
109.	0.136	241.5	0.063
109.5	0.135	242.	0.063
110.	0.134	242.5	0.064
110.5	0.134	243.	0.063
111.	0.134	243.5	0.063
111.5	0.132	244.	0.064
112.	0.133	244.5	0.063
112.5	0.131	245.	0.063
113.	0.13	245.5	0.063
113.5	0.13	246.	0.062
114.	0.13	246.5	0.063
114.5	0.129	247.	0.063
115.	0.129	247.5	0.063
115.5	0.127	248.	0.062
116.	0.127	248.5	0.062
116.5	0.126	249.	0.063
117.	0.127	249.5	0.062
117.5	0.124	250.	0.062
118.	0.125	250.5	0.061
118.5	0.125	251.	0.062
119.	0.125	251.5	0.062
119.5	0.123	252.	0.06
120.	0.123	252.5	0.061
120.5	0.123	253.	0.061
121.	0.121	253.5	0.06
121.5	0.121	254.	0.061
122.	0.122	254.5	0.061
122.5	0.12	255.	0.061
123.	0.12	255.5	0.06
123.5	0.119	256.	0.059
124.	0.119	256.5	0.061
124.5	0.119	257.	0.061

SOLUTION

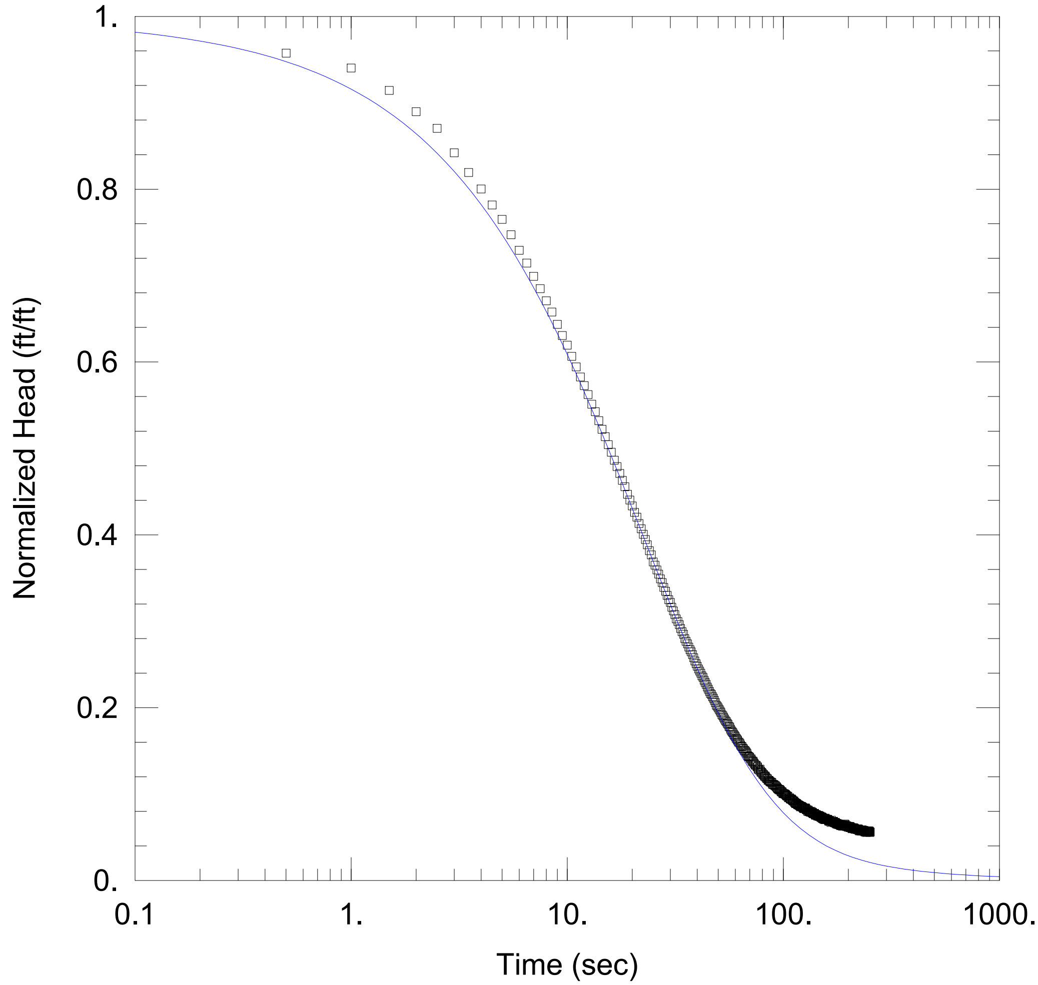
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.329	cm^2/sec
S	0.000562	

K = T/b = 0.001459 cm/sec
Ss = S/b = 7.595E-5 1/ft



APW-13 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: -1.622 ft
Static Water Column Height: 34.22 ft
Total Well Penetration Depth: 5.9 ft
Screen Length: 5. ft
Casing Radius: 0.086 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.384 cm^2/sec
S = 0.000541

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
106.5	-0.155	236.5	-0.093
107.	-0.155	237.	-0.094
107.5	-0.153	237.5	-0.093
108.	-0.153	238.	-0.092
108.5	-0.152	238.5	-0.091
109.	-0.153	239.	-0.092
109.5	-0.152	239.5	-0.092
110.	-0.151	240.	-0.091
110.5	-0.15	240.5	-0.092
111.	-0.149	241.	-0.092
111.5	-0.149	241.5	-0.093
112.	-0.149	242.	-0.092
112.5	-0.147	242.5	-0.09
113.	-0.146	243.	-0.092
113.5	-0.146	243.5	-0.092
114.	-0.144	244.	-0.091
114.5	-0.145	244.5	-0.093
115.	-0.145	245.	-0.091
115.5	-0.144	245.5	-0.093
116.	-0.143	246.	-0.093
116.5	-0.142	246.5	-0.092
117.	-0.142	247.	-0.092
117.5	-0.142	247.5	-0.093
118.	-0.141	248.	-0.092
118.5	-0.141	248.5	-0.092
119.	-0.14	249.	-0.092
119.5	-0.14	249.5	-0.093
120.	-0.138	250.	-0.092
120.5	-0.139	250.5	-0.092
121.	-0.139	251.	-0.091
121.5	-0.139	251.5	-0.09
122.	-0.138	252.	-0.091
122.5	-0.138	252.5	-0.091

SOLUTION

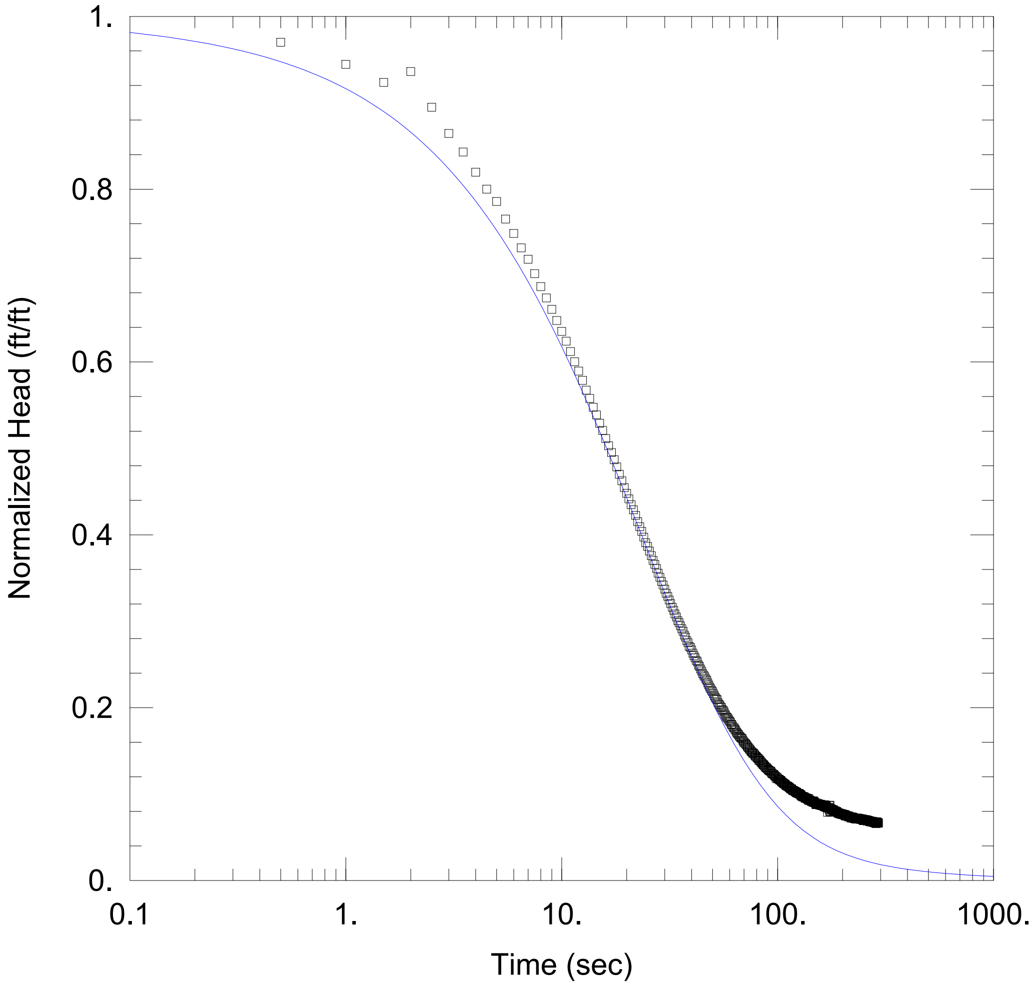
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.384	cm^2/sec
S	0.000541	

K = T/b = 0.001702 cm/sec
Ss = S/b = 7.311E-5 1/ft



APW-13 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: -1.676 ft
Static Water Column Height: 34.26 ft
Total Well Penetration Depth: 5.9 ft
Screen Length: 5. ft
Casing Radius: 0.086 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.353 cm^2/sec
S = 0.000661

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
140.	-0.157	290.5	-0.111
140.5	-0.156	291.	-0.112
141.	-0.155	291.5	-0.113
141.5	-0.155	292.	-0.112
142.	-0.155	292.5	-0.111
142.5	-0.155	293.	-0.112
143.	-0.154	293.5	-0.111
143.5	-0.153		

SOLUTION

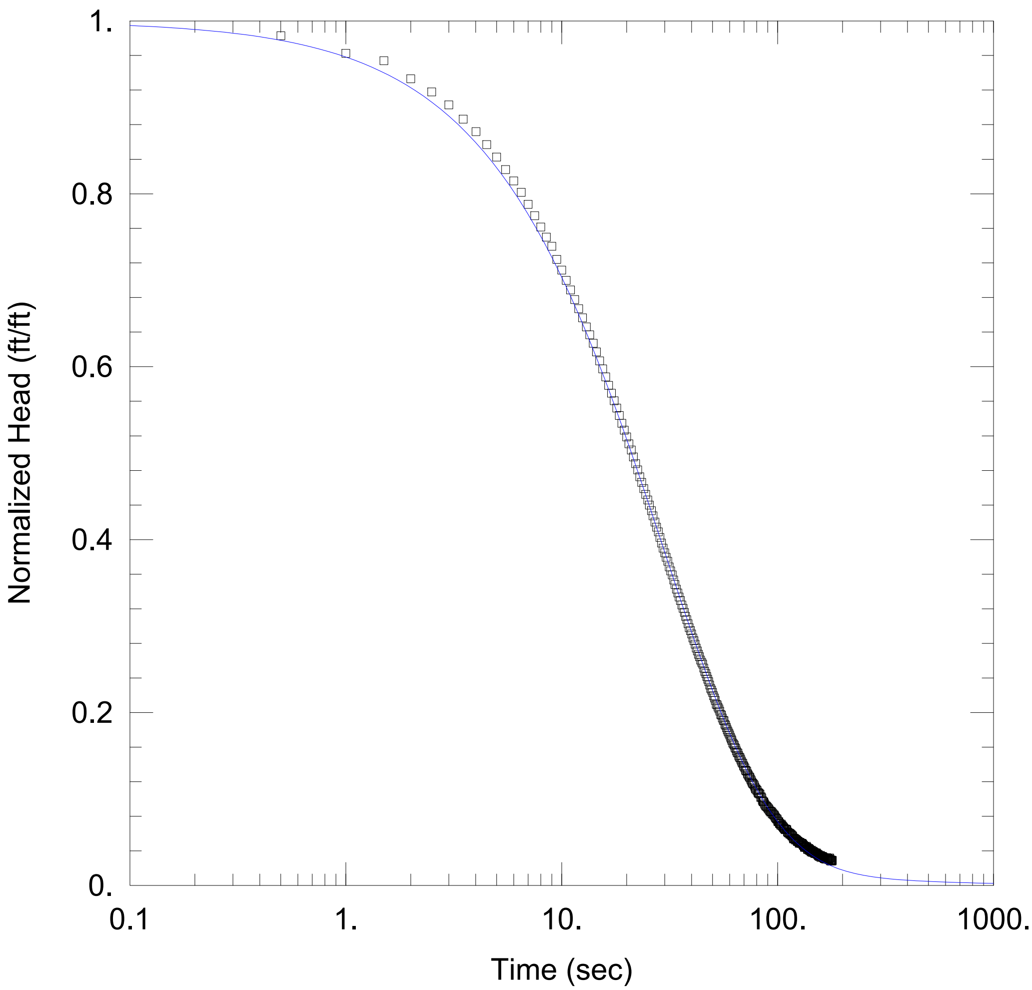
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.353	cm^2/sec
S	0.000661	

K = T/b = 0.001565 cm/sec
Ss = S/b = 8.932E-5 1/ft



APW-14 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.523 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.72 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

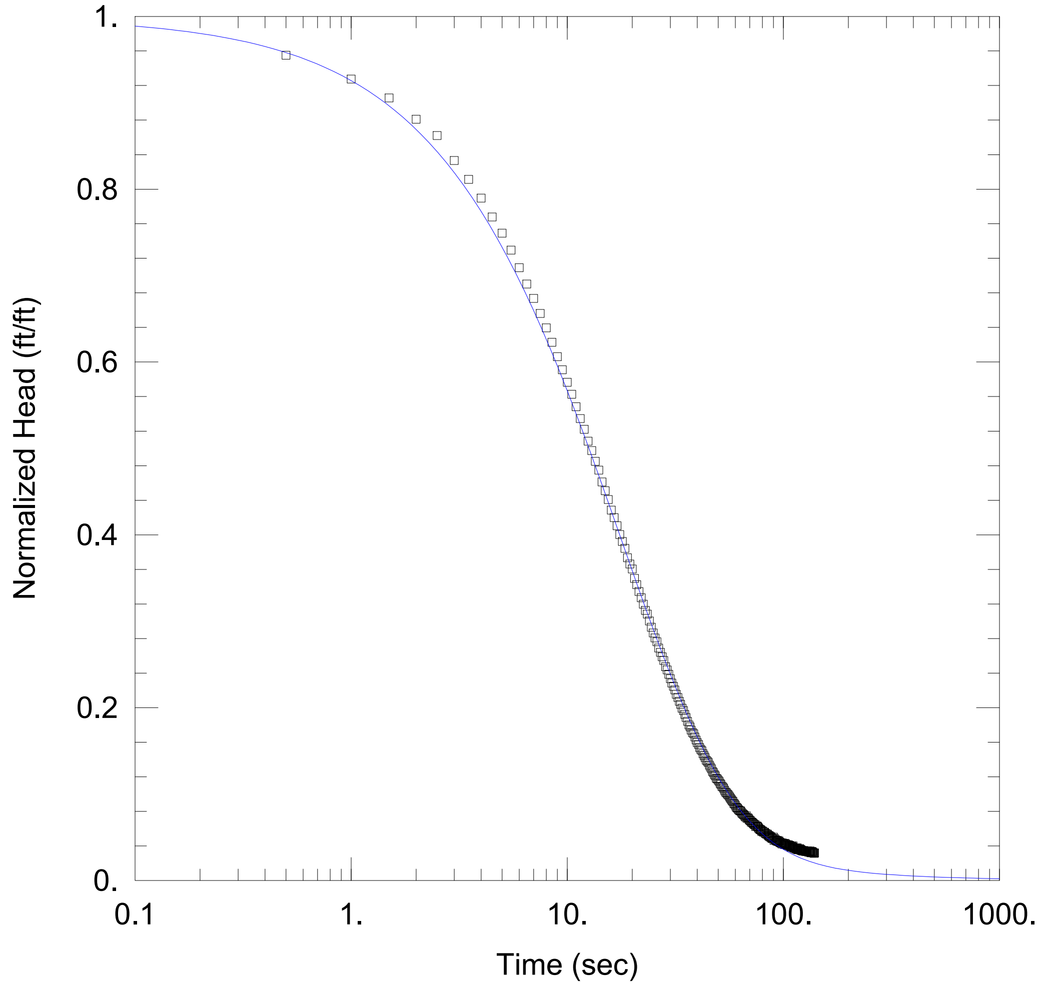
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00388 cm/sec
Kz/Kr = 1.

Ss = 4.23E-8 ft^{-1}



APW-14 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.379 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.73 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

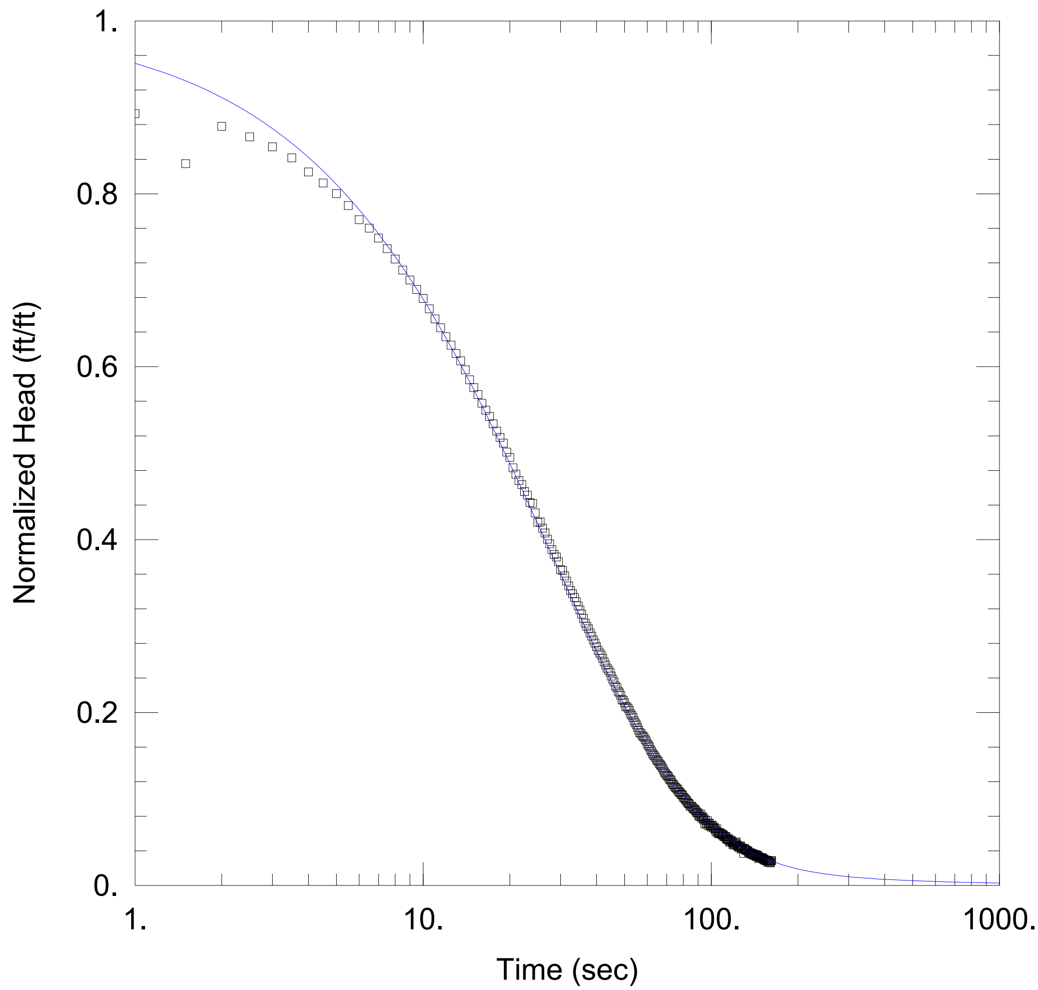
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00433 cm/sec
Kz/Kr = 1.

Ss = 4.29E-6 ft^{-1}



APW-14 FH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.648 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.72 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

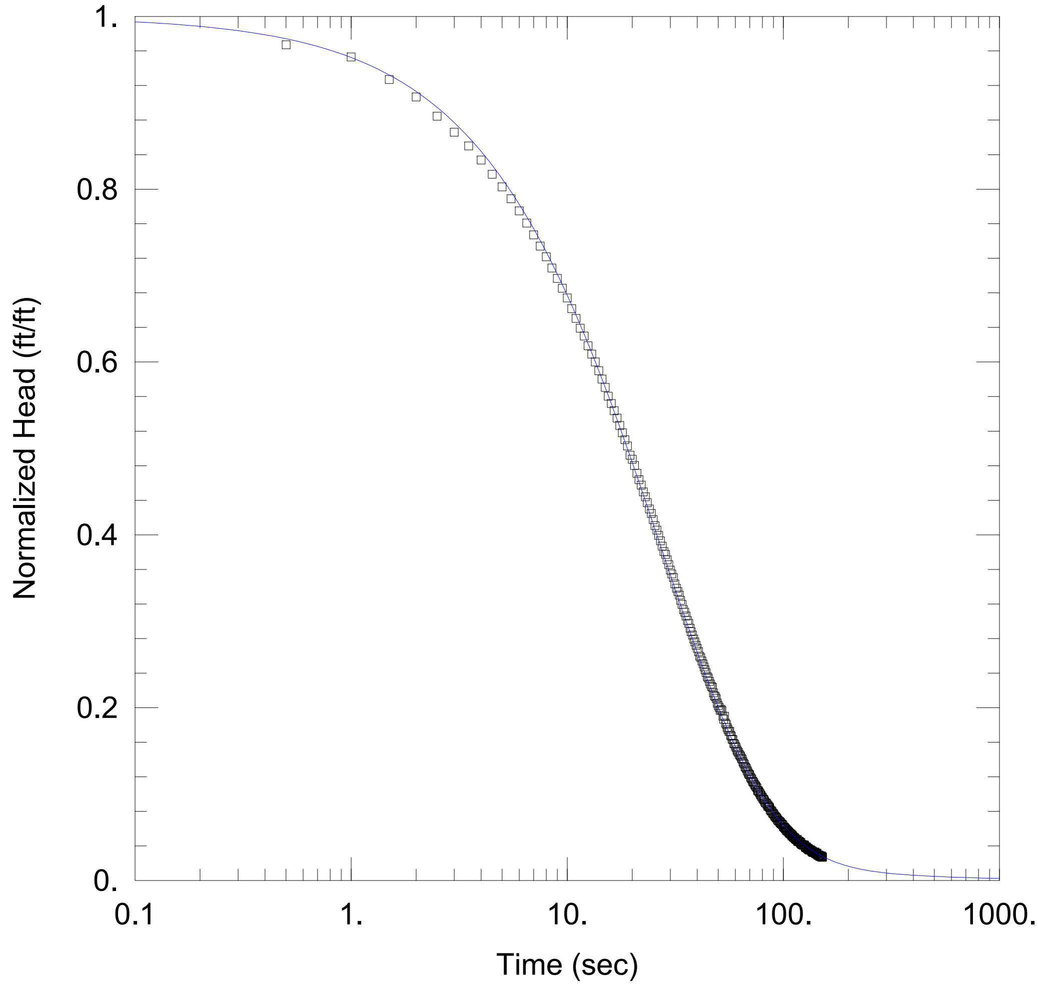
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00332 cm/sec
Kz/Kr = 1.

Ss = 8.98E-7 ft^{-1}



APW-14 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.768 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.76 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

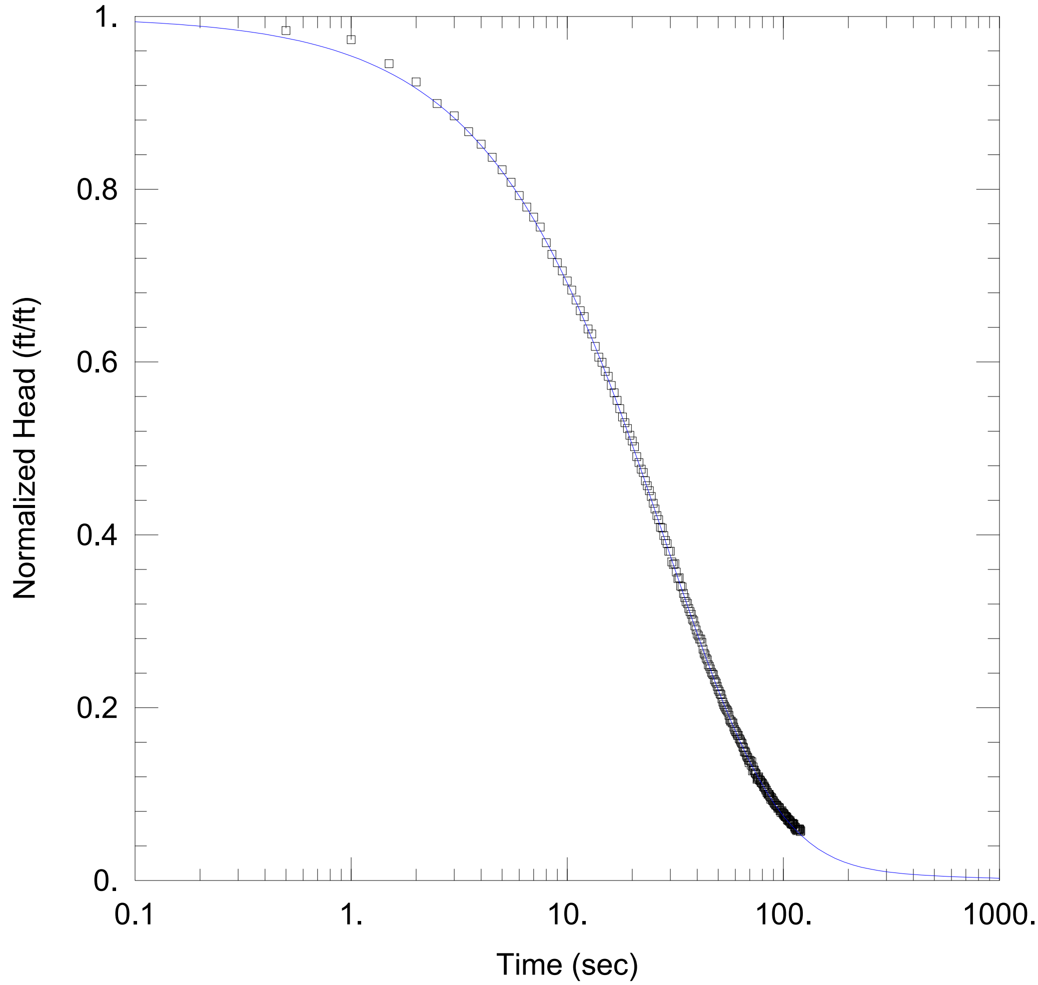
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00381 cm/sec
Kz/Kr = 1.

Ss = 2.12E-7 ft^{-1}



APW-14 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

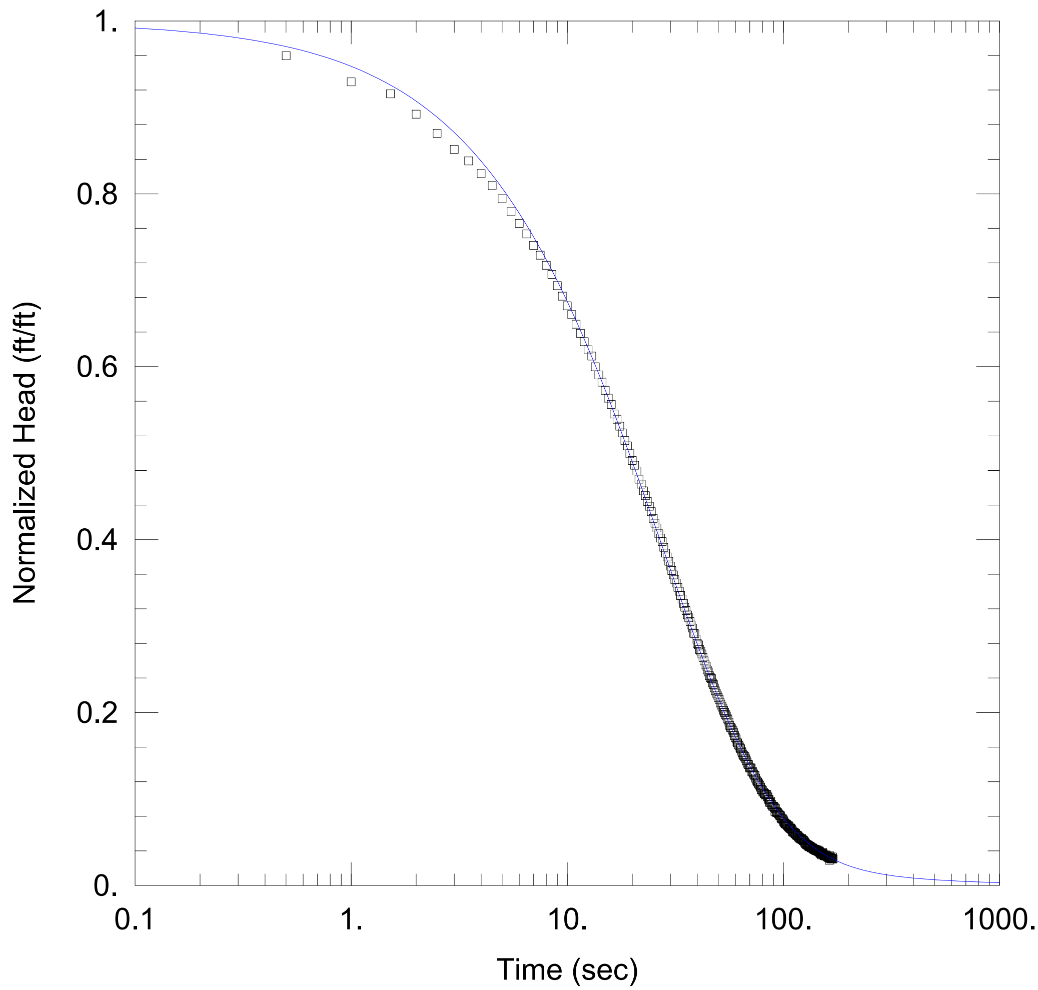
Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.042 ft	Static Water Column Height: 36.72 ft
Total Well Penetration Depth: 5. ft	Screen Length: 5. ft
Casing Radius: 0.086 ft	Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined	Solution Method: KGS Model
Kr = 0.00336 cm/sec	Ss = 4.36E-7 ft^{-1}
Kz/Kr = 1.	



APW-14 RH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.79 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.08625 ft

Static Water Column Height: 36.75 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

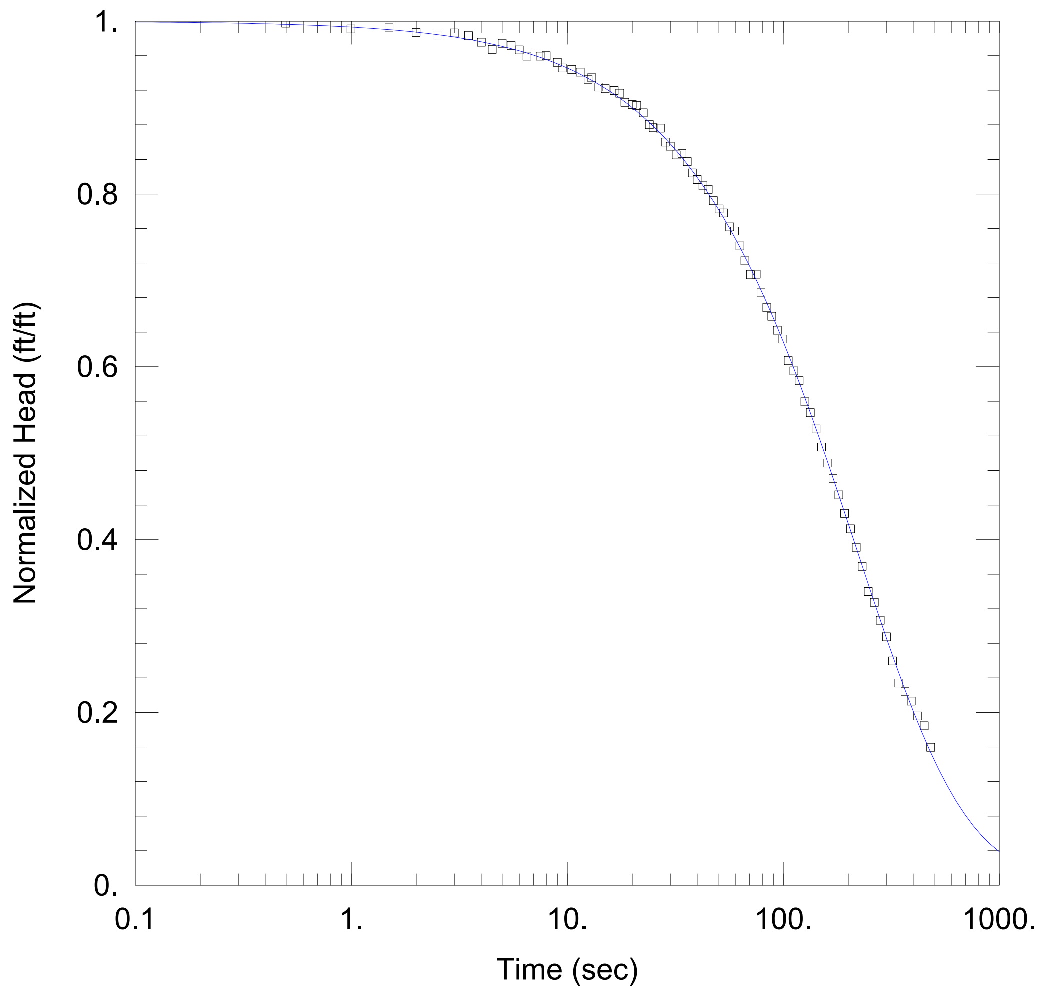
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0028 cm/sec
Kz/Kr = 1.

Ss = 4.94E-6 ft^{-1}



APW-15 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.68 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.47 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

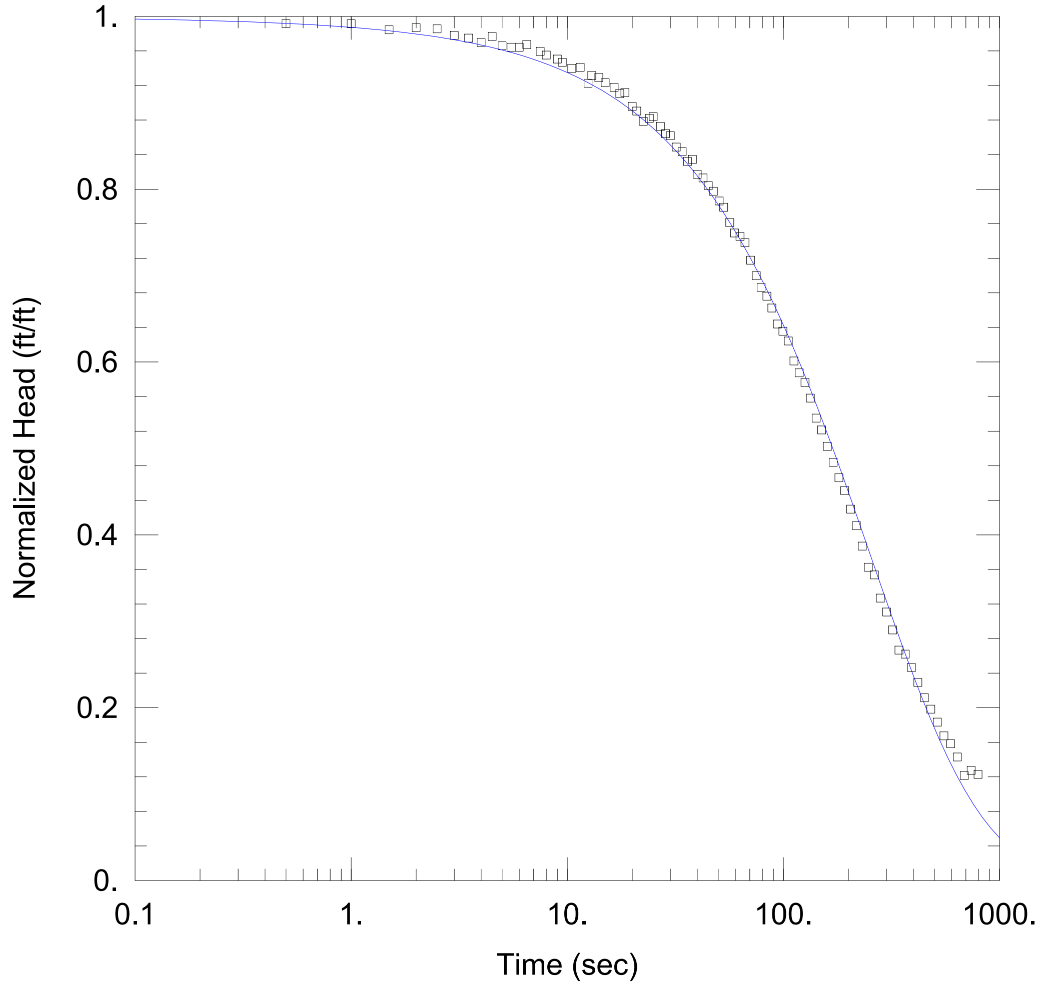
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.000485 cm/sec
Kz/Kr = 1.

Ss = 3.29E-7 ft^{-1}



APW-15 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 51.8 ft

WELL DATA (APW-15)

Initial Displacement: 1.68 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.32 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

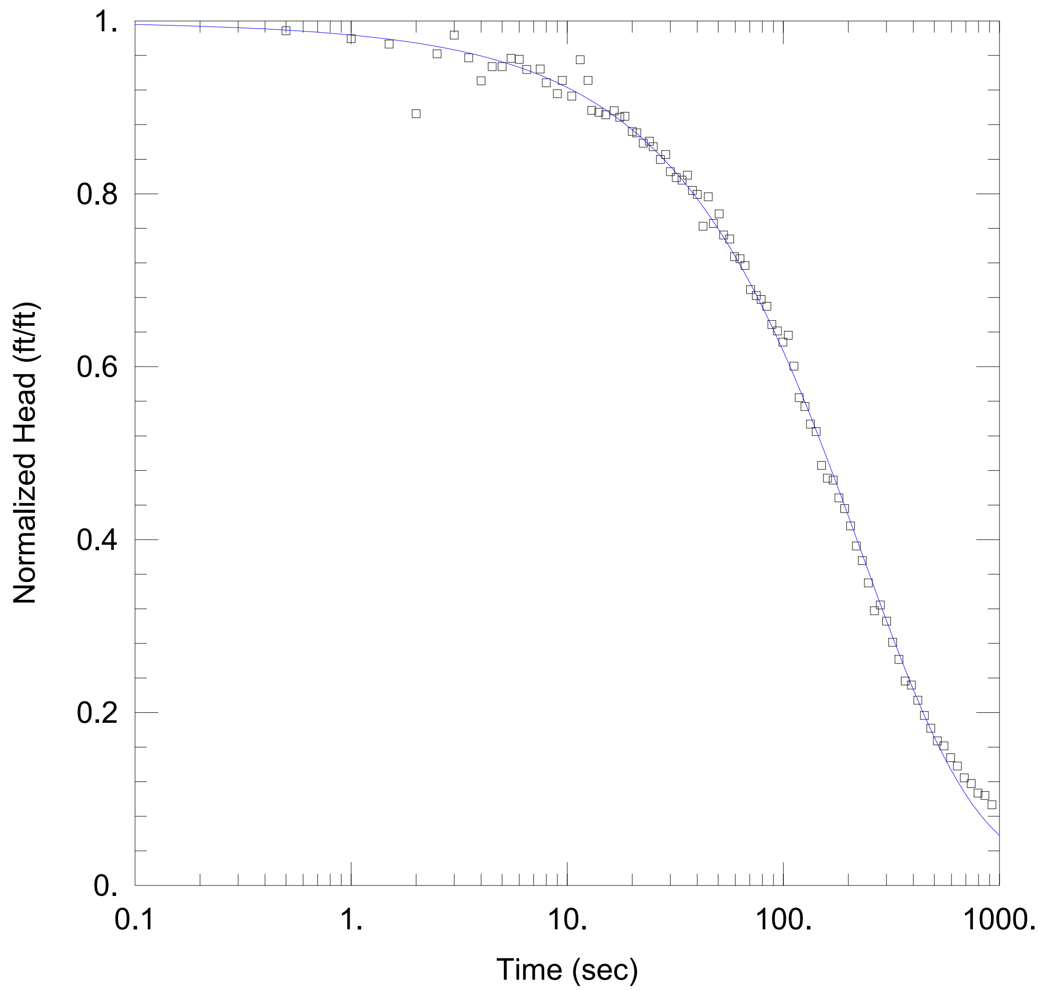
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0002 cm/sec
Kz/Kr = 1.

Ss = 5.25E-5 ft^{-1}



APW-15 RH-01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.76 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.59 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

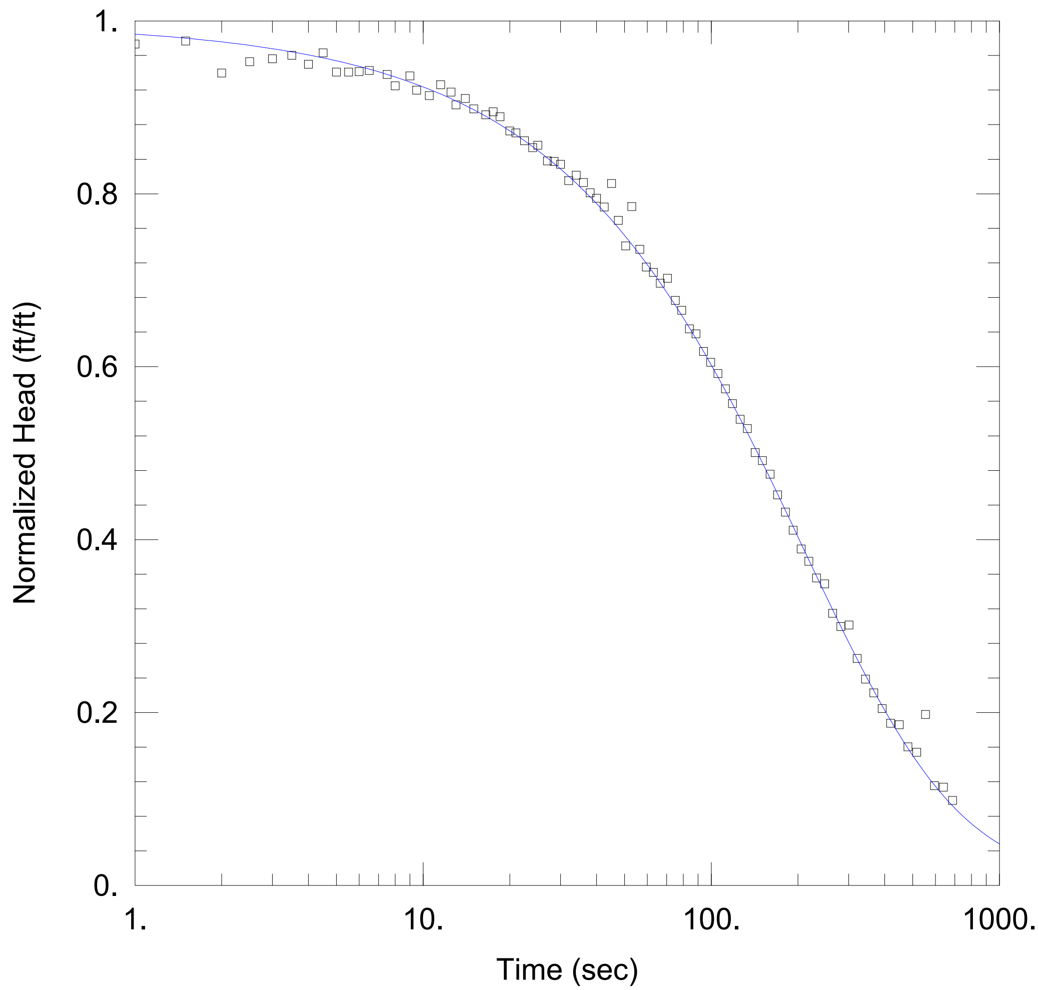
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.000281 cm/sec
Kz/Kr = 1.

Ss = 0.000132 ft^{-1}



APW-15 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.76 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.52 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

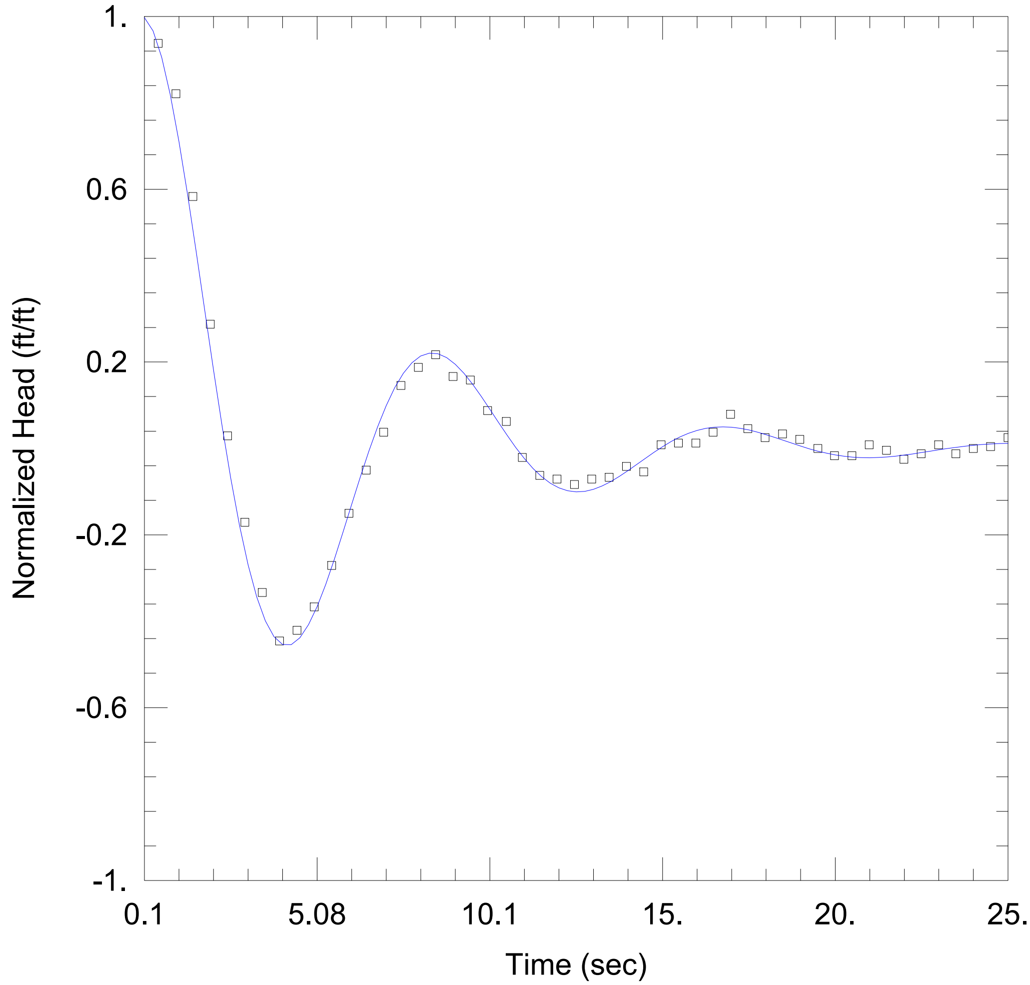
SOLUTION

Aquifer Model: Confined

Kr = 0.00032 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 8.48E-5 ft^{-1}



APW-16 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

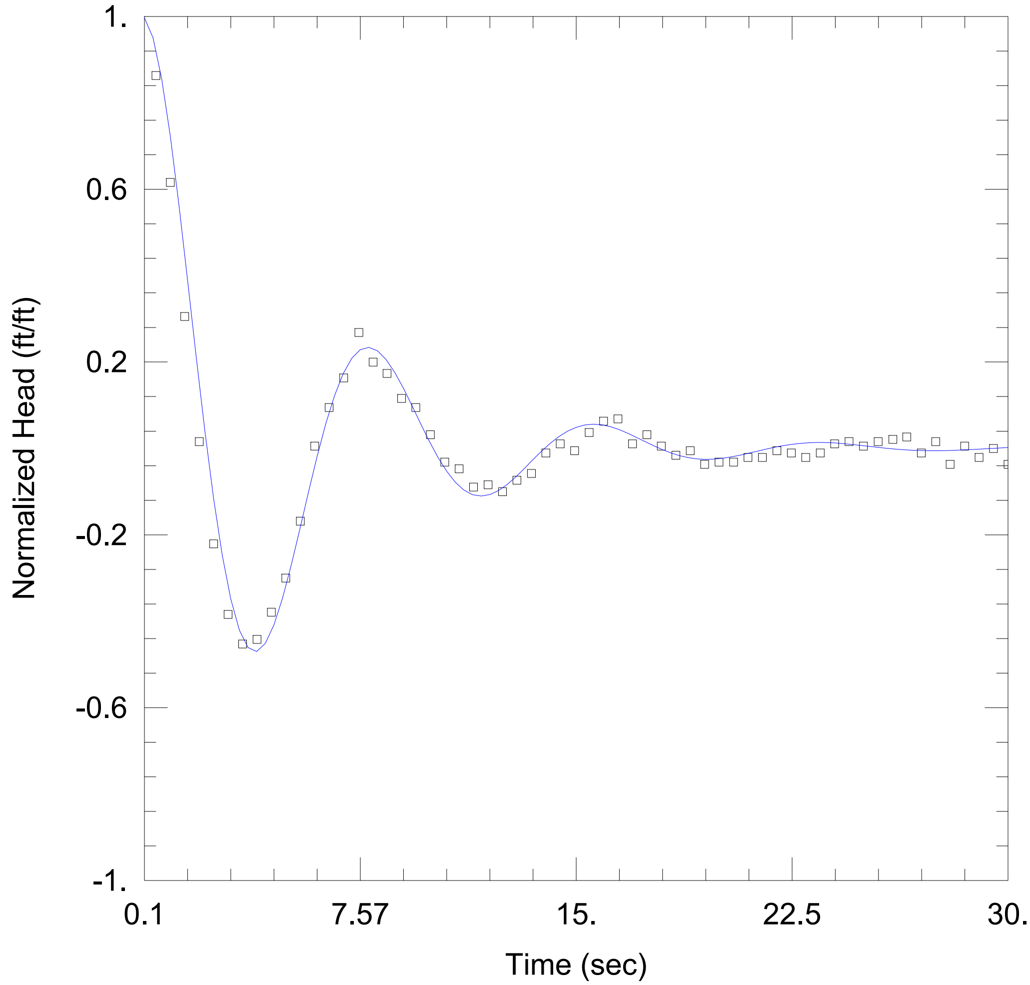
WELL DATA (APW-16)

Initial Displacement: 0.24 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.37 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.124 cm/sec
Kz/Kr = 1.
Ss = 8.12E-7 ft^{-1}
Le = 56.01 ft



APW-16 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

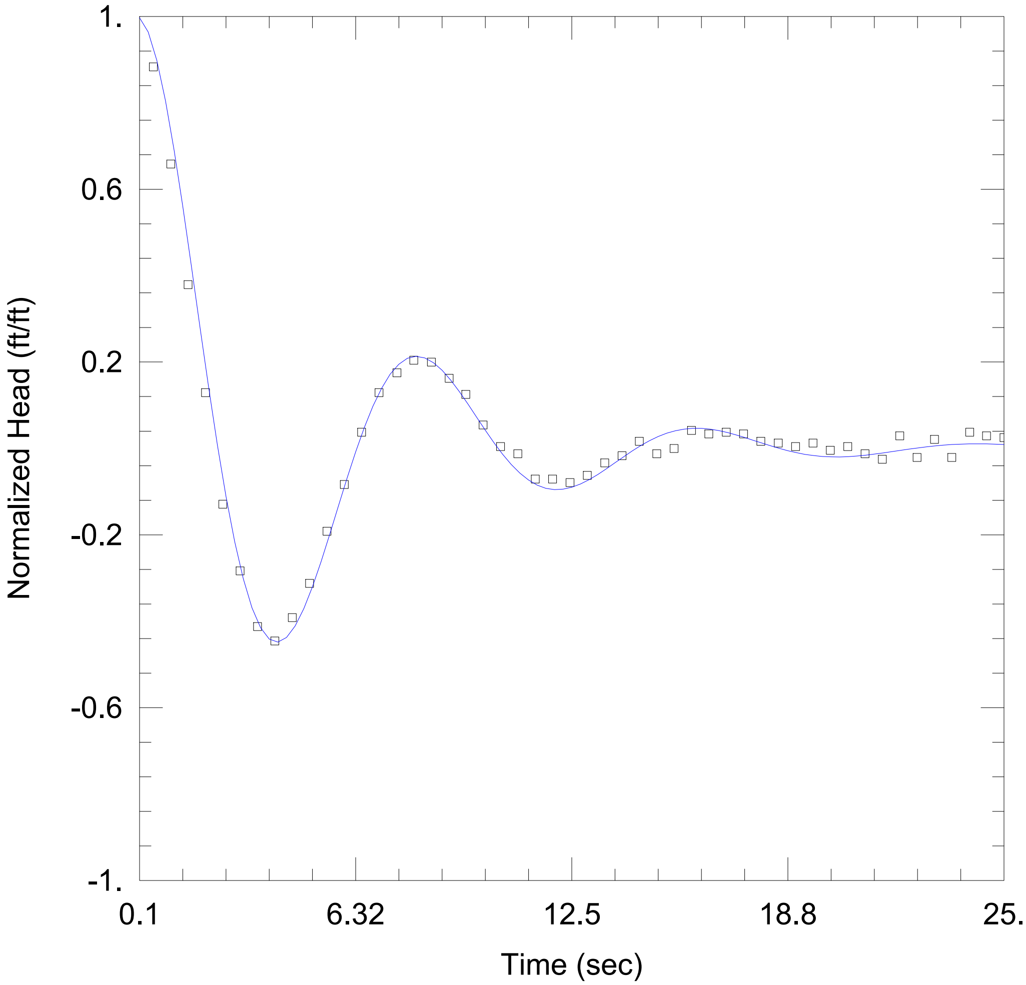
WELL DATA (APW-16)

Initial Displacement: 0.19 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 64.22 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

K_r = 0.141 cm/sec
K_z/K_r = 1.
S_s = 6.55E-7 ft^{-1}
Le = 48.91 ft



APW-16 FH03

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

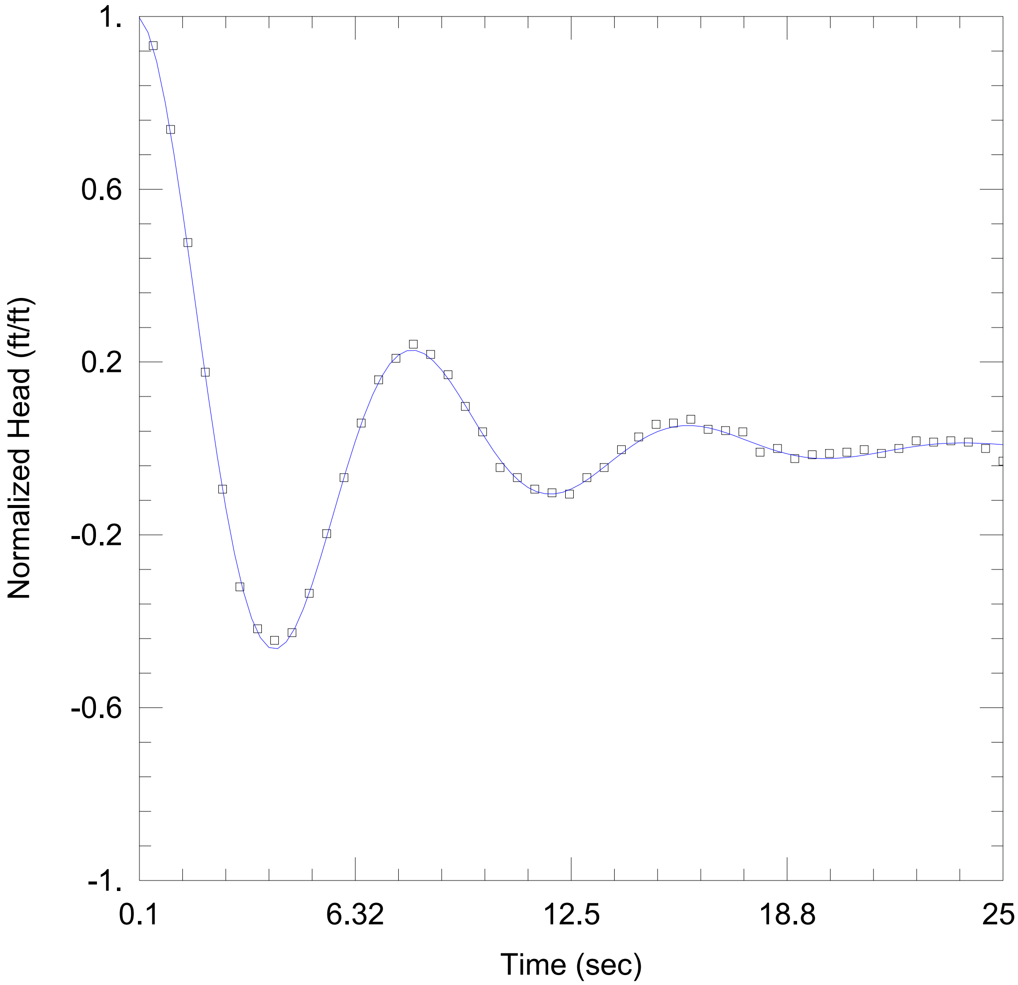
WELL DATA (APW-16)

Initial Displacement: 0.24 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.135 cm/sec
Kz/Kr = 1.
Ss = 1.65E-7 ft^{-1}
Le = 51.68 ft



APW-16 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

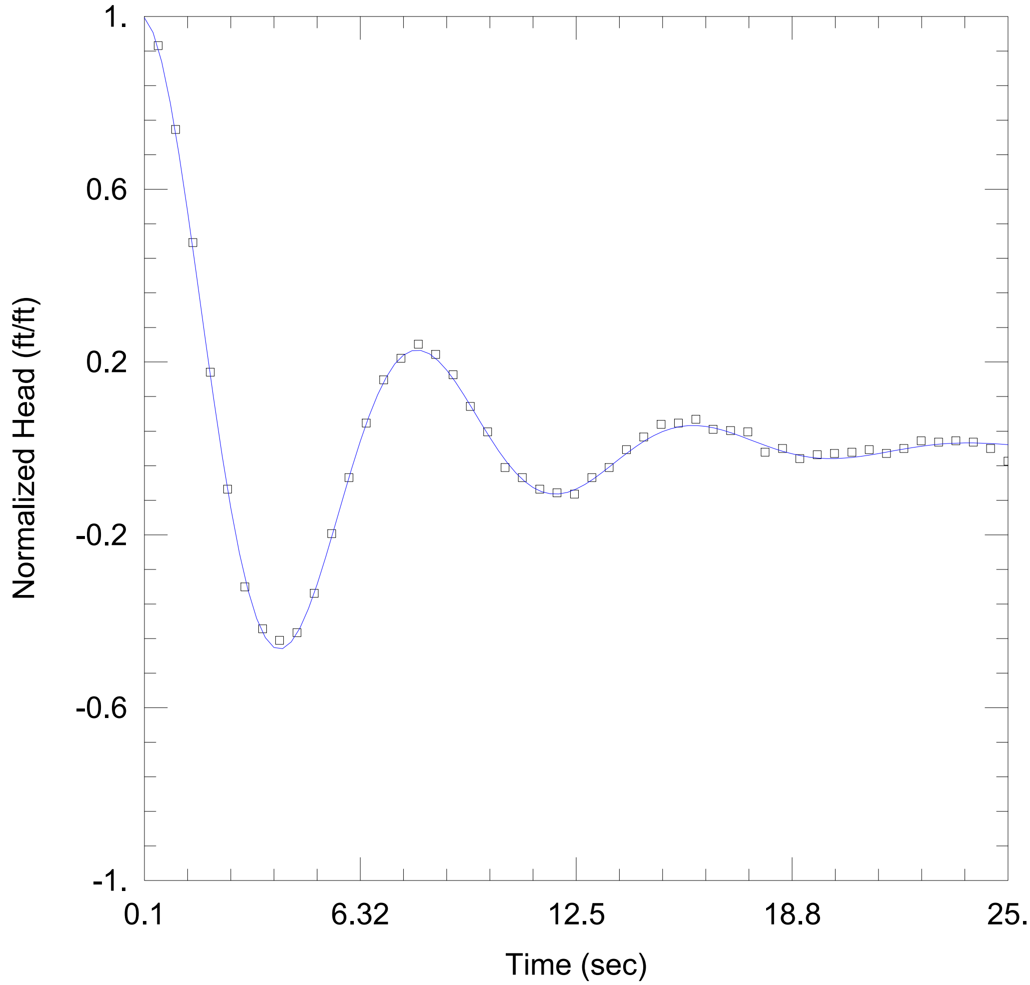
WELL DATA (APW-16)

Initial Displacement: 0.34 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.145 cm/sec
Kz/Kr = 1.
Ss = 1.21E-7 ft^{-1}
Le = 50.37 ft



APW-16 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

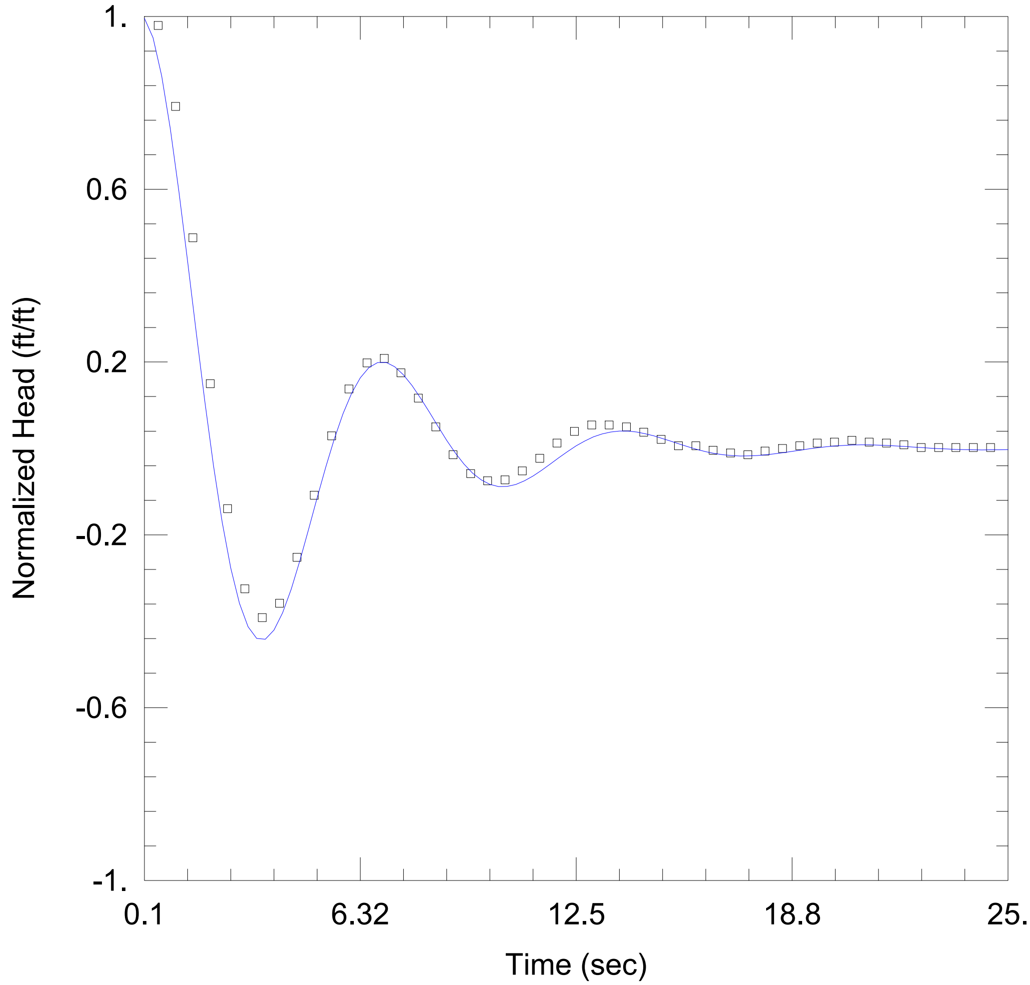
WELL DATA (APW-16)

Initial Displacement: 0.34 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.145 cm/sec
Kz/Kr = 1.
Ss = 1.21E-7 ft^{-1}
Le = 50.37 ft



APW-17 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

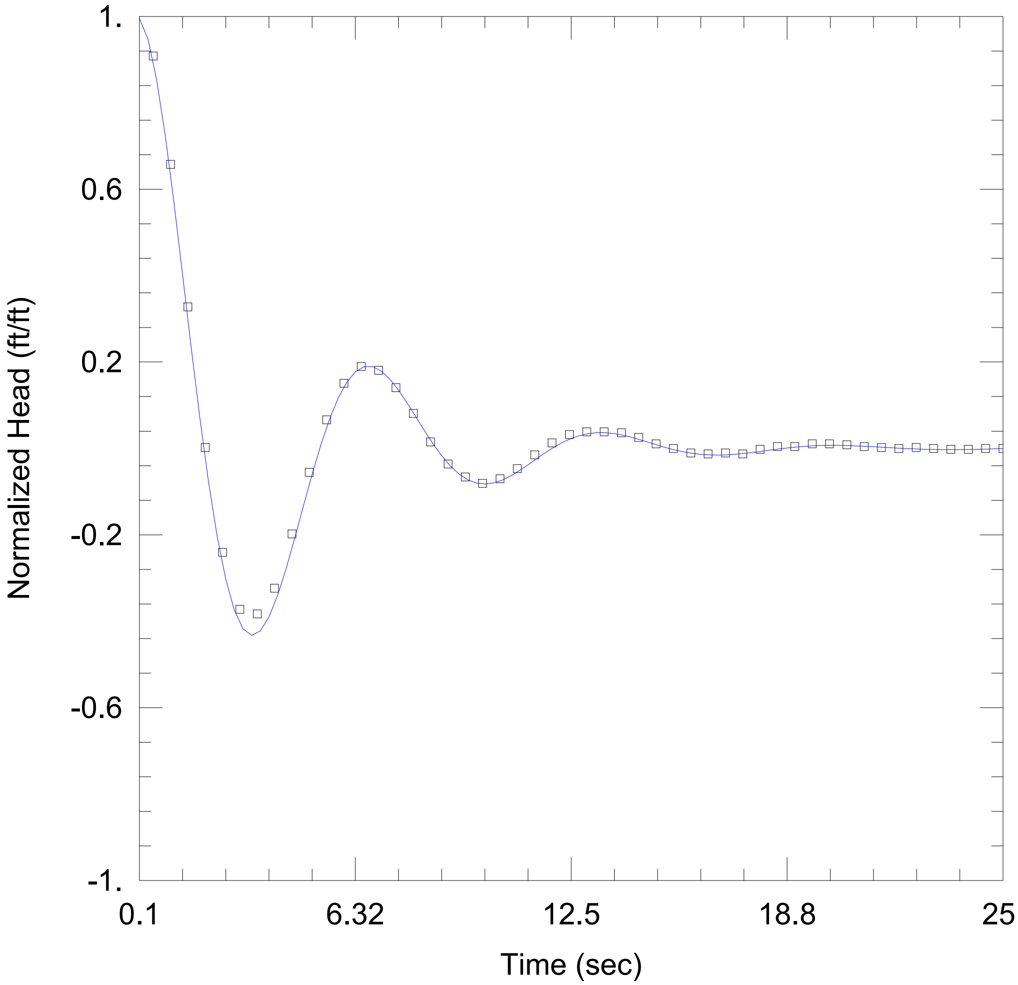
WELL DATA (APW-17)

Initial Displacement: 0.48 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.113 cm/sec
Kz/Kr = 1.
Ss = 5.88E-7 ft^{-1}
Le = 37.31 ft



APW-17 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

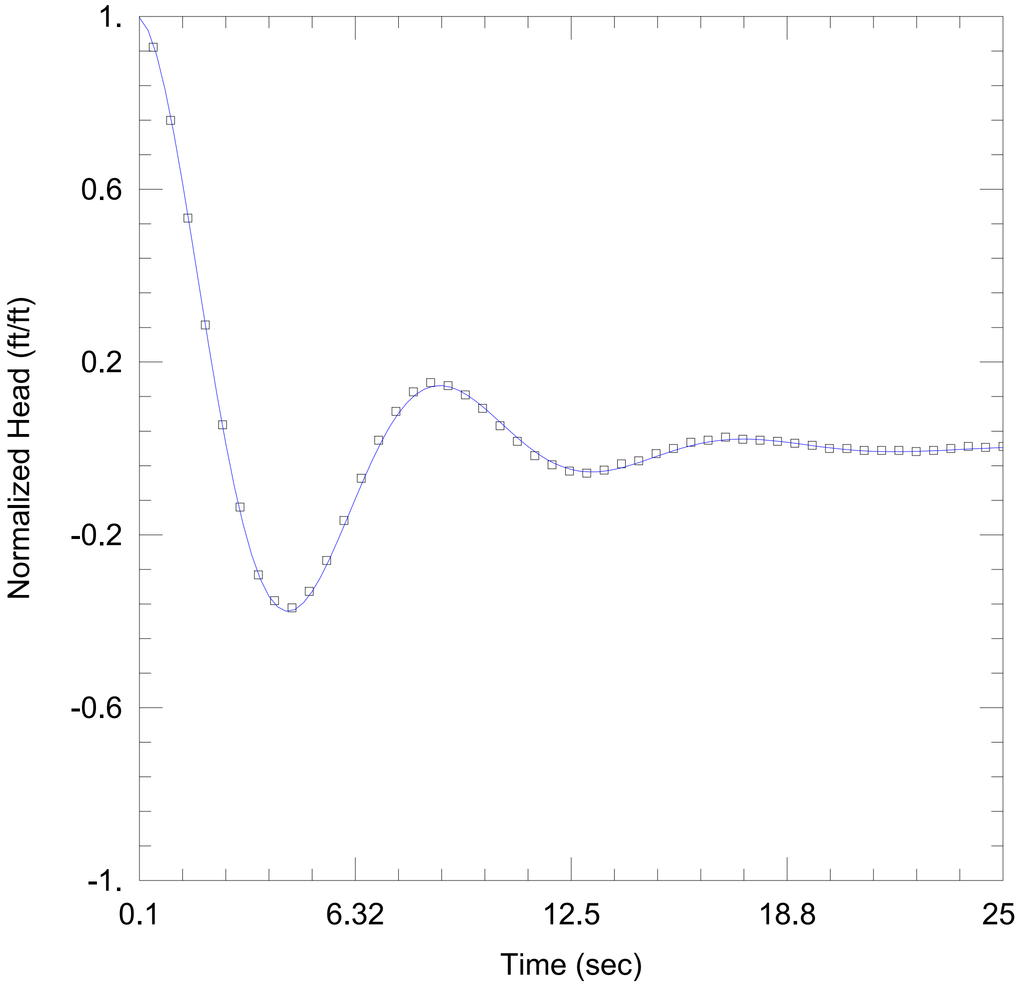
WELL DATA (APW-17)

Initial Displacement: 0.47 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.115 cm/sec
Kz/Kr = 1.
Ss = 2.88E-7 ft^{-1}
Le = 34.54 ft



APW-17 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

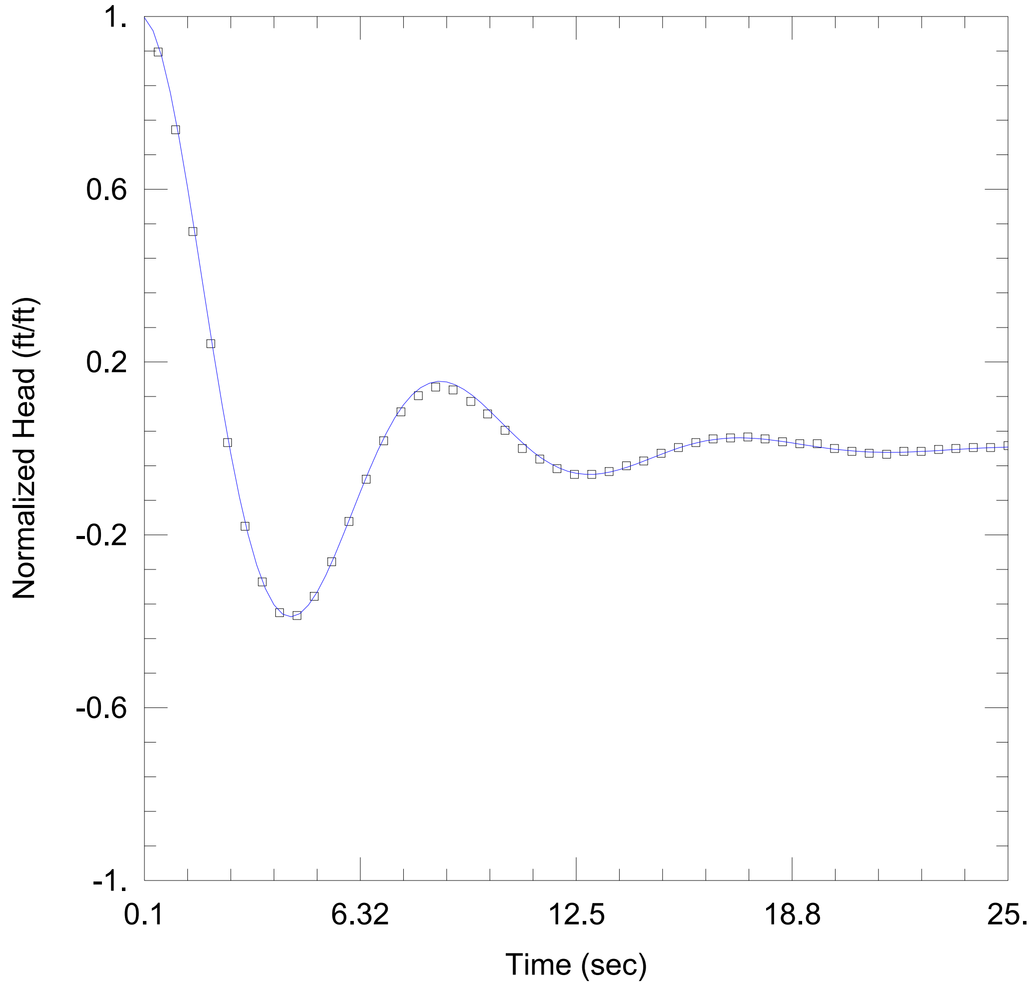
WELL DATA (APW-17)

Initial Displacement: 0.42 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.076 cm/sec
Kz/Kr = 1.
Ss = 2.88E-7 ft^{-1}
Le = 57.77 ft



APW-17 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

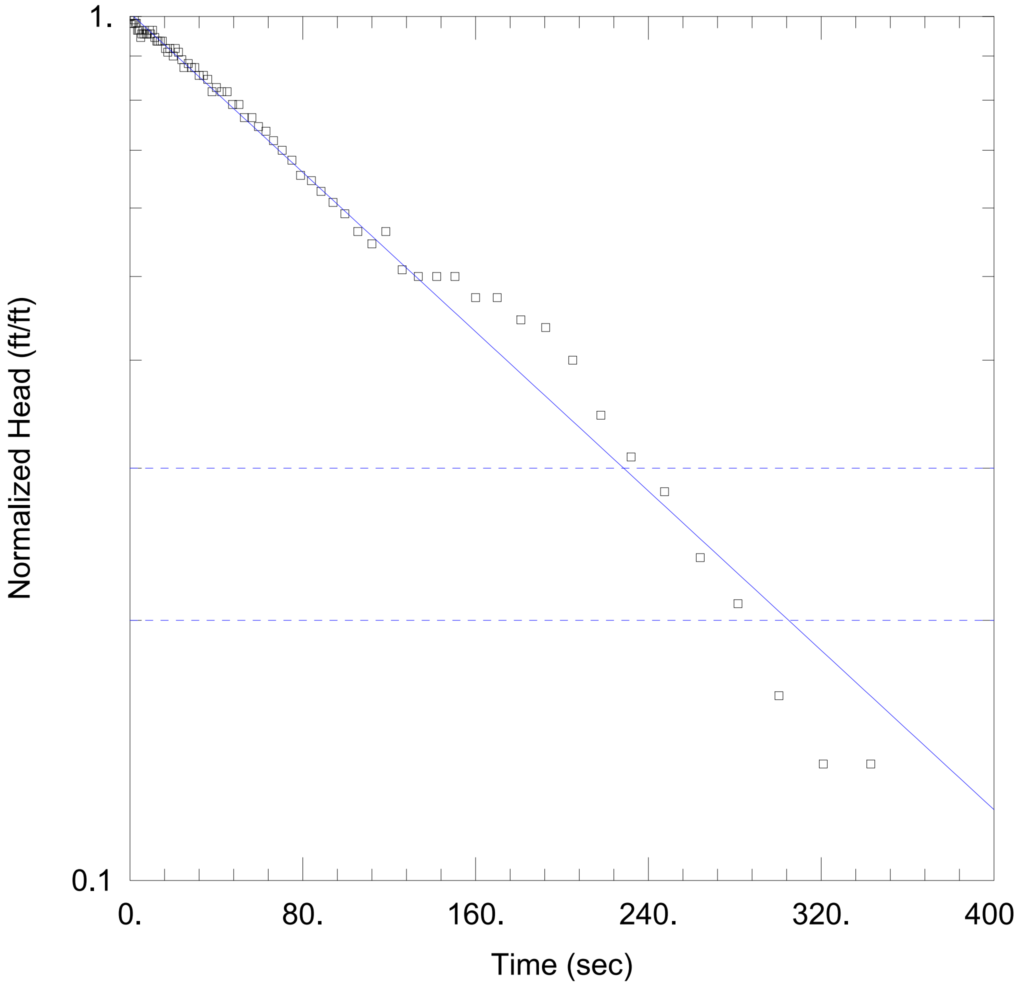
WELL DATA (APW-17)

Initial Displacement: 0.45 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.0796 cm/sec
Kz/Kr = 1.
Ss = 2.88E-7 ft^{-1}
Le = 56.31 ft



APW-18 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-18
Test Date: 2/16/21

AQUIFER DATA

Saturated Thickness: 78.8 ft
Anisotropy Ratio (Kz/Kr): 1.

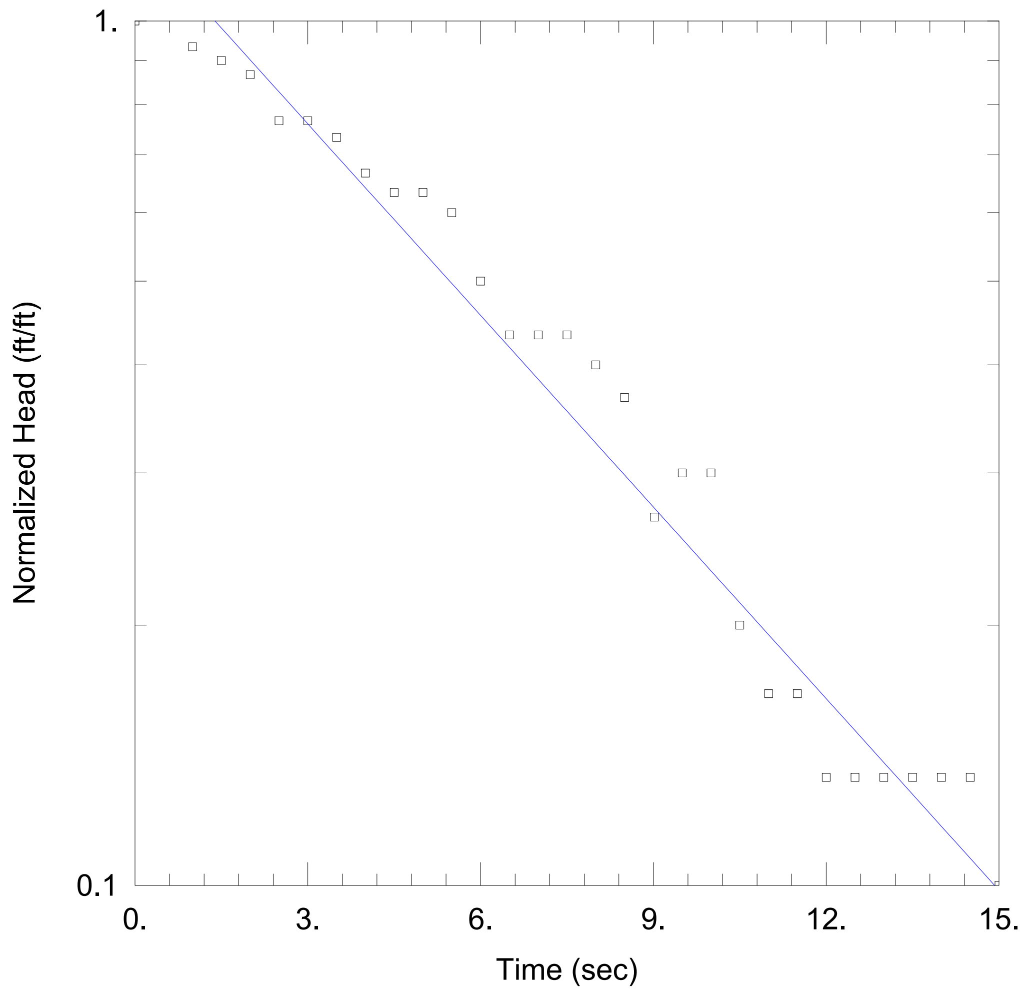
WELL DATA (APW-18)

Initial Displacement: 0.11 ft
Total Well Penetration Depth: 51.1 ft
Casing Radius: 0.086 ft
Static Water Column Height: 31.38 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.000267 cm/sec
y0 = 0.111 ft



XPW-01 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

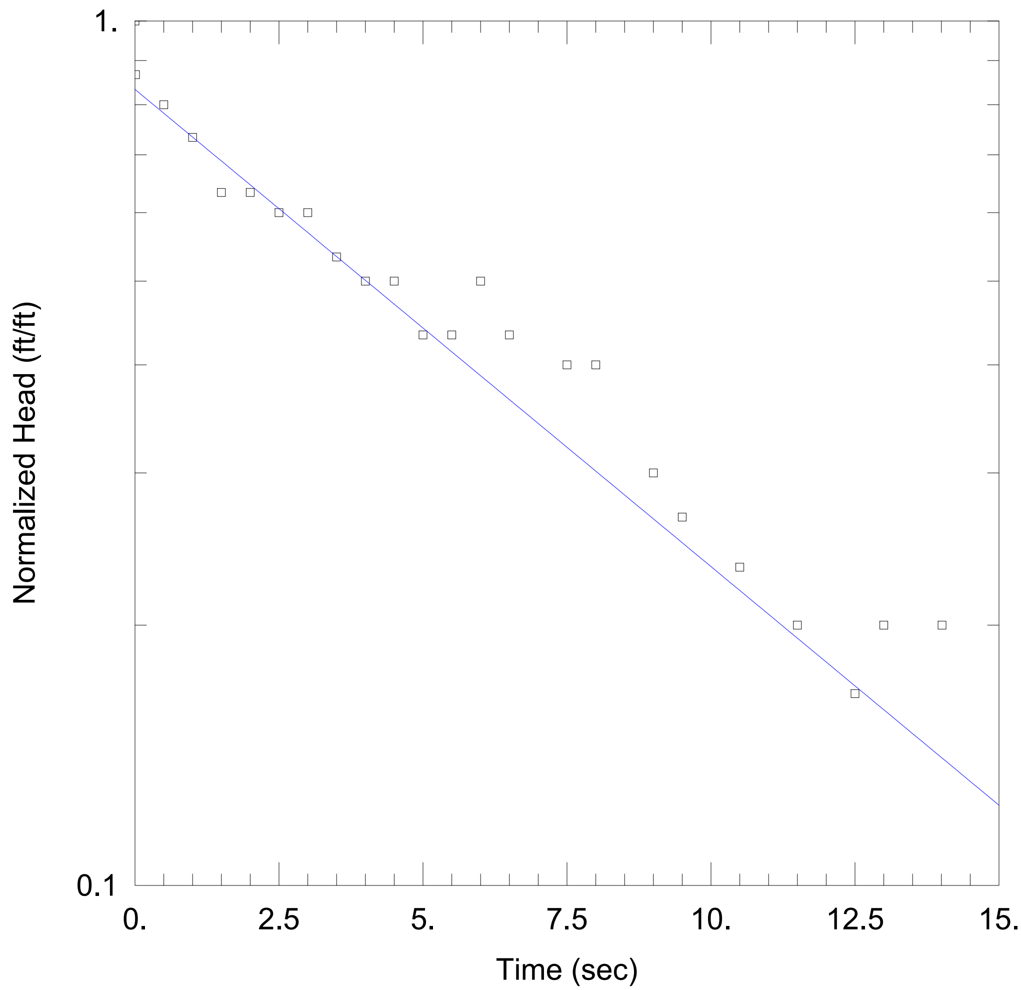
WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.183 cm/sec
y0 = 0.038 ft



XPW-01 FH-02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

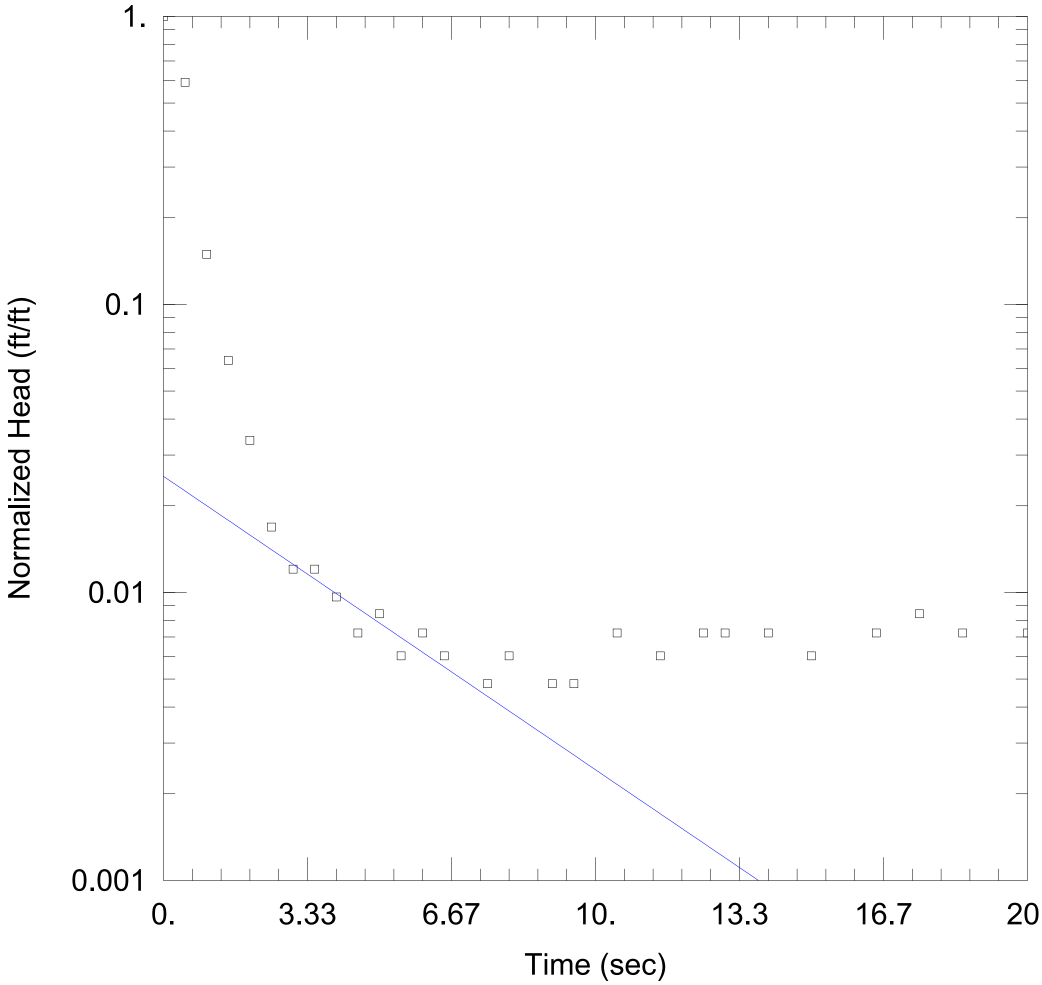
WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0129 cm/sec
y0 = 0.025 ft



XPW-01 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

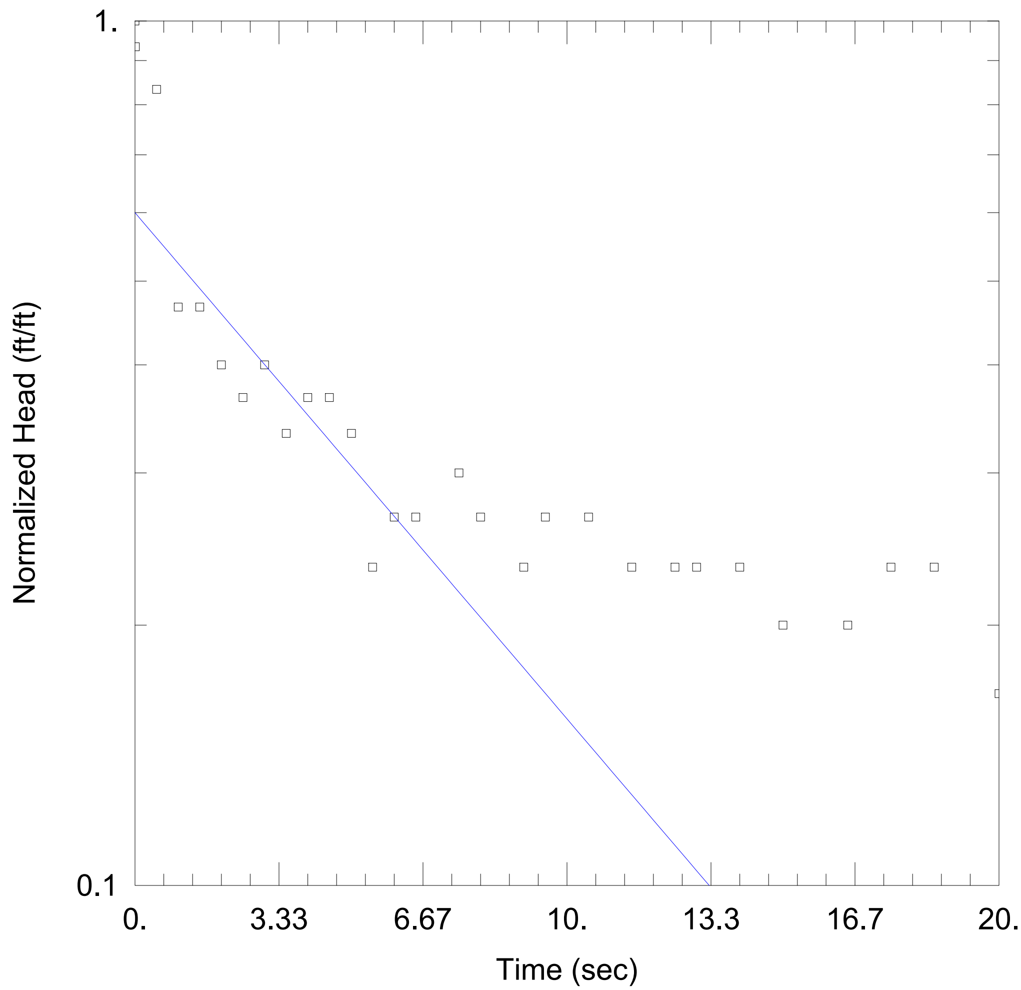
WELL DATA (XPW-01)

Initial Displacement: 0.83 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0238 cm/sec
y0 = 0.021 ft



XPW-01 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

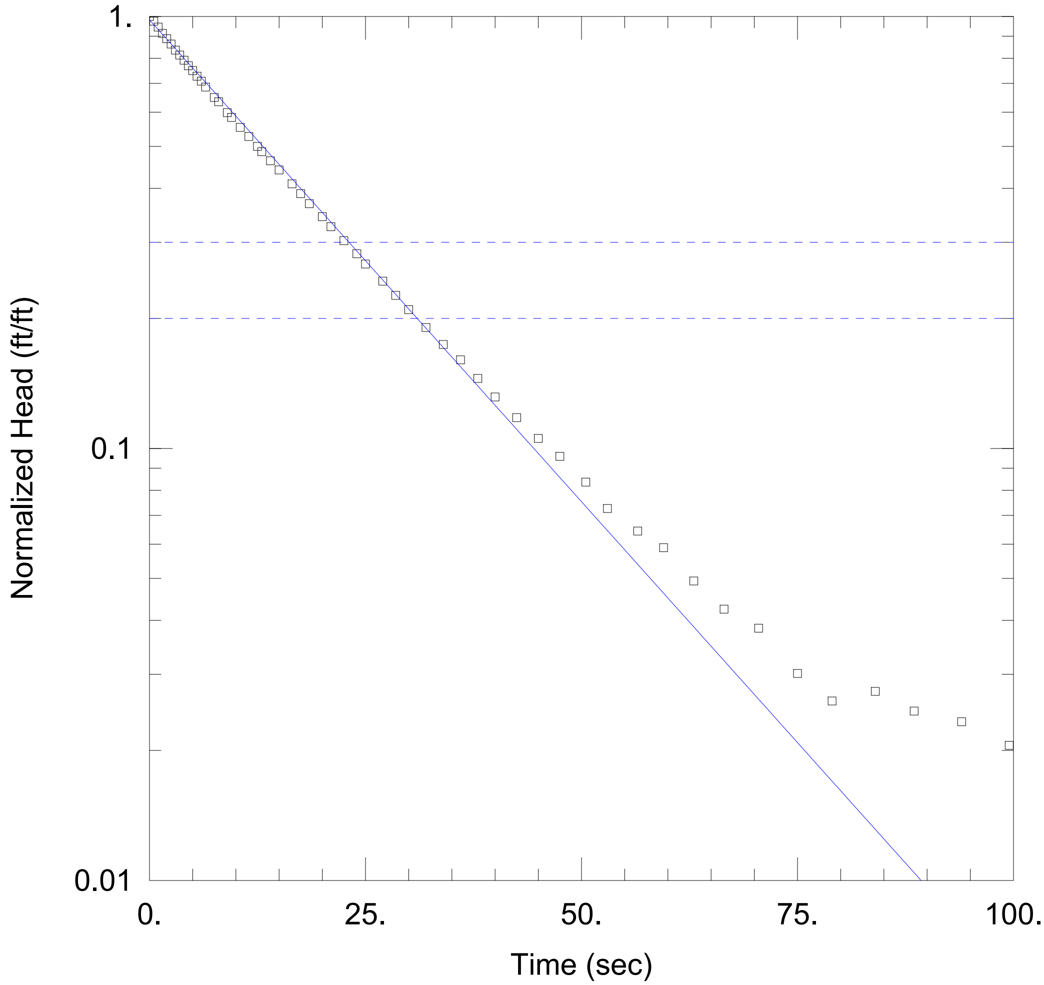
WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0137 cm/sec
y0 = 0.018 ft



XPW02 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW02
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 7.259 ft
Anisotropy Ratio (Kz/Kr): 1.

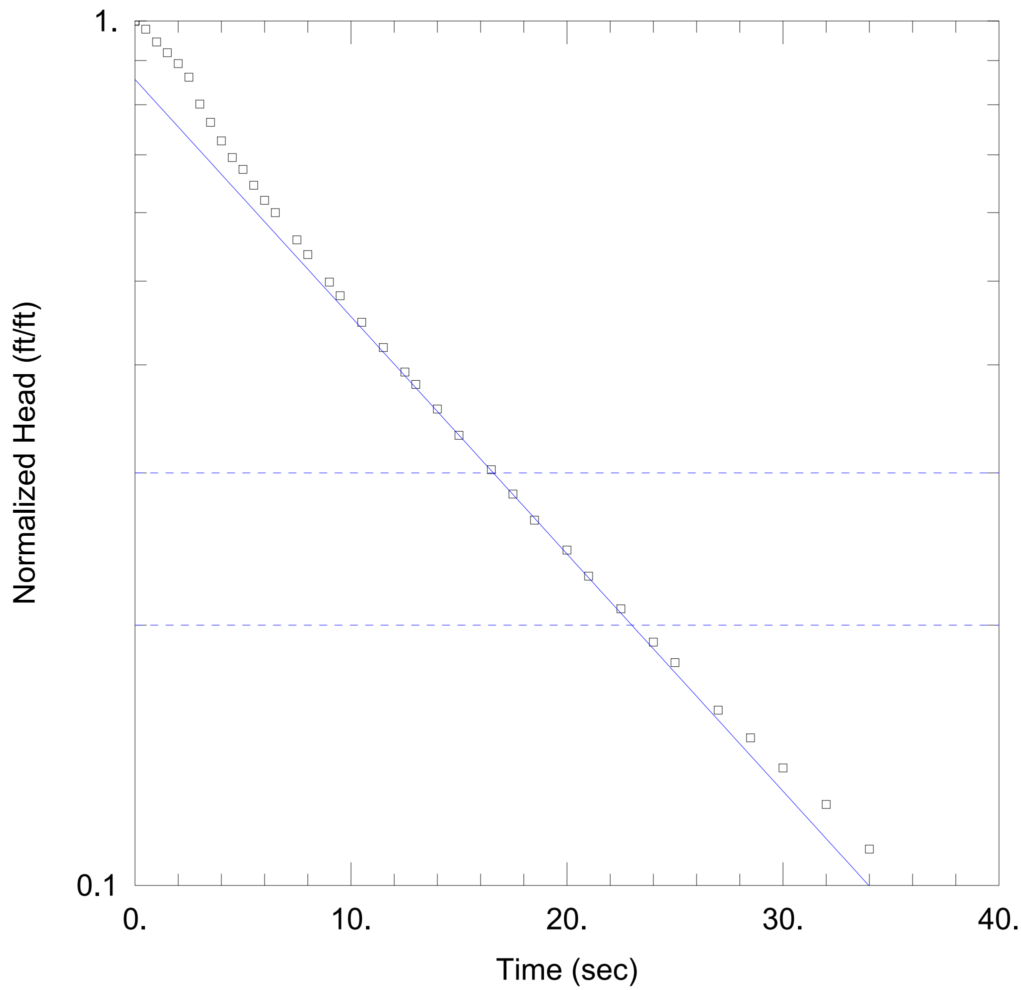
WELL DATA (XPW02)

Initial Displacement: 0.73 ft
Total Well Penetration Depth: 7.259 ft
Casing Radius: 0.086 ft
Static Water Column Height: 9.759 ft
Screen Length: 7.259 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00197 cm/sec
y0 = 0.717 ft



XPW02 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW02
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 7.259 ft
Anisotropy Ratio (Kz/Kr): 1.

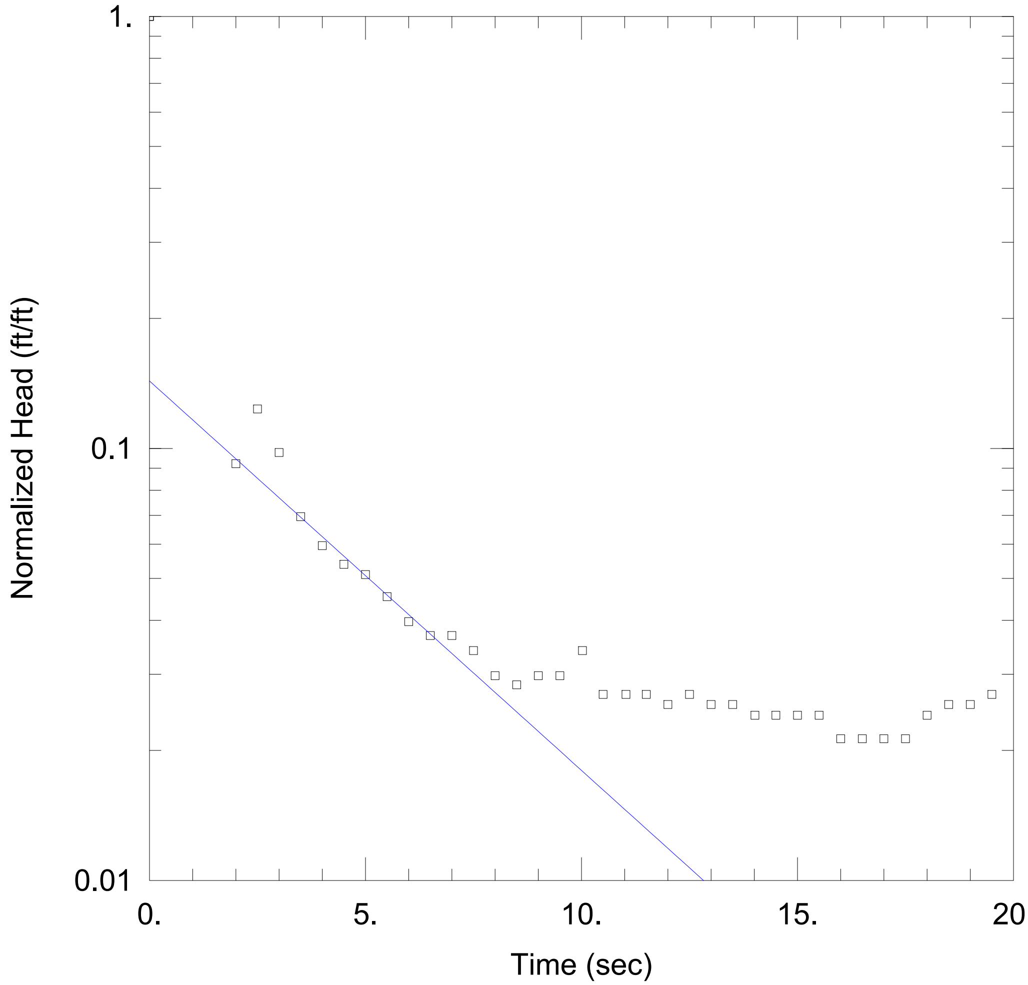
WELL DATA (XPW02)

Initial Displacement: 0.79 ft
Total Well Penetration Depth: 7.259 ft
Casing Radius: 0.086 ft
Static Water Column Height: 9.759 ft
Screen Length: 7.259 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00257 cm/sec
y0 = 0.676 ft



XPW03 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

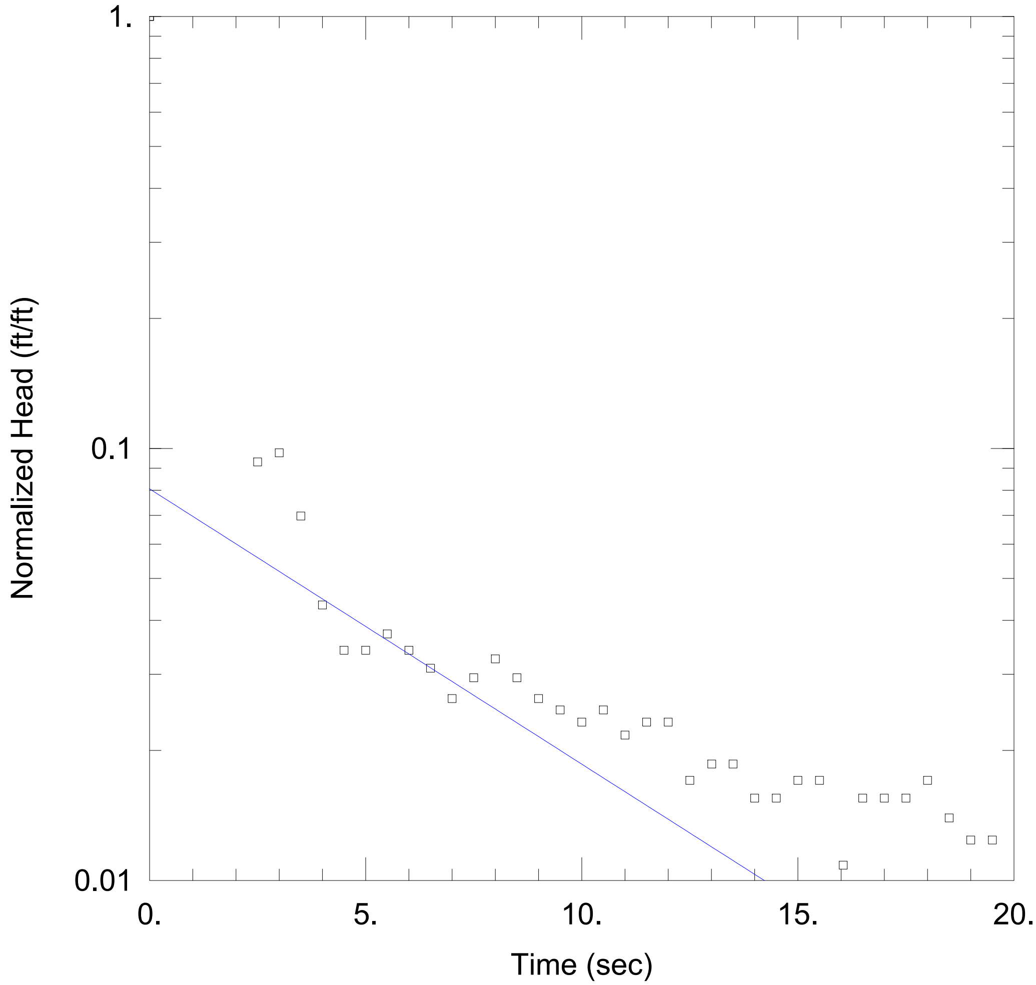
Saturated Thickness: 7.958 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW03)

Initial Displacement: 0.705 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.26 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0573 cm/sec
y0 = 0.101 ft



XPW03 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.938 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW03)

Initial Displacement: 0.645 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft

Static Water Column Height: 13.24 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

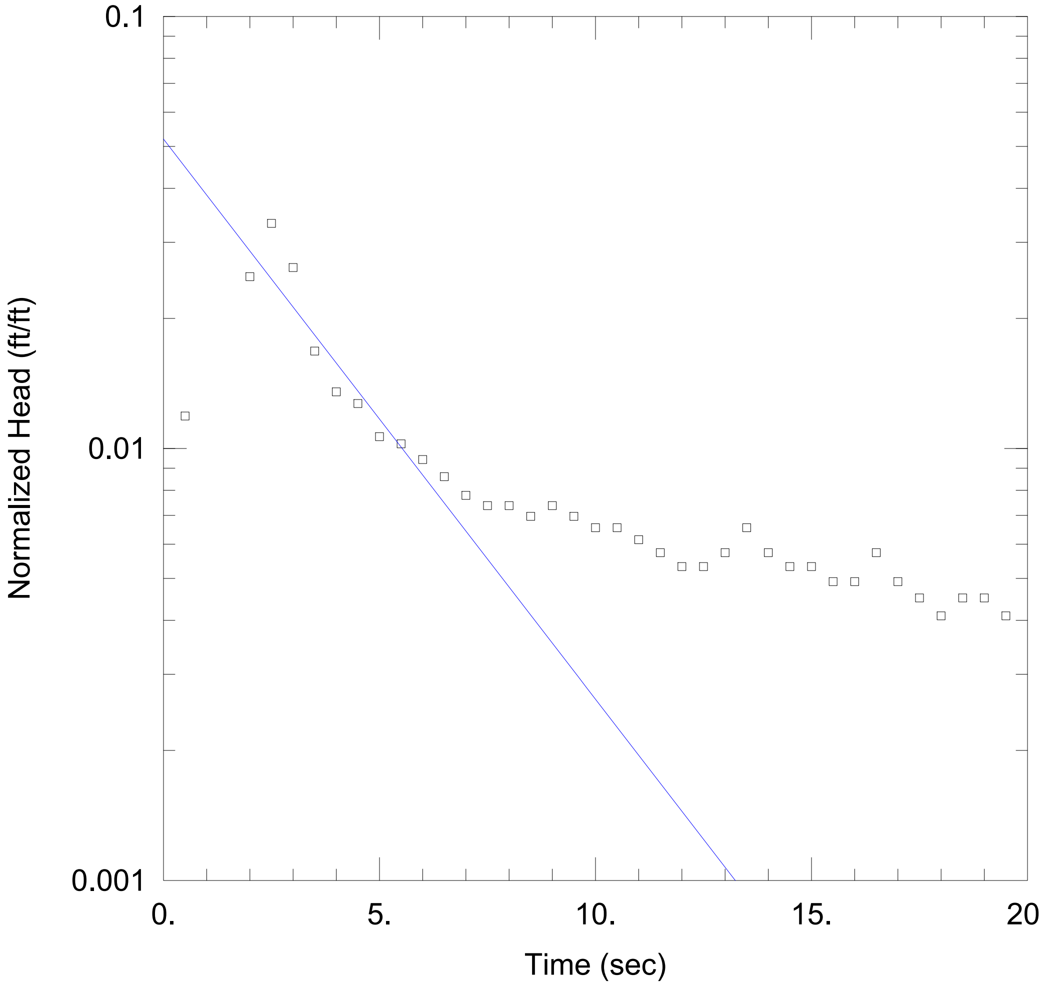
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.072 cm/sec

y0 = 0.052 ft



XPW03 FH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW03)

Initial Displacement: 2.441 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft

Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

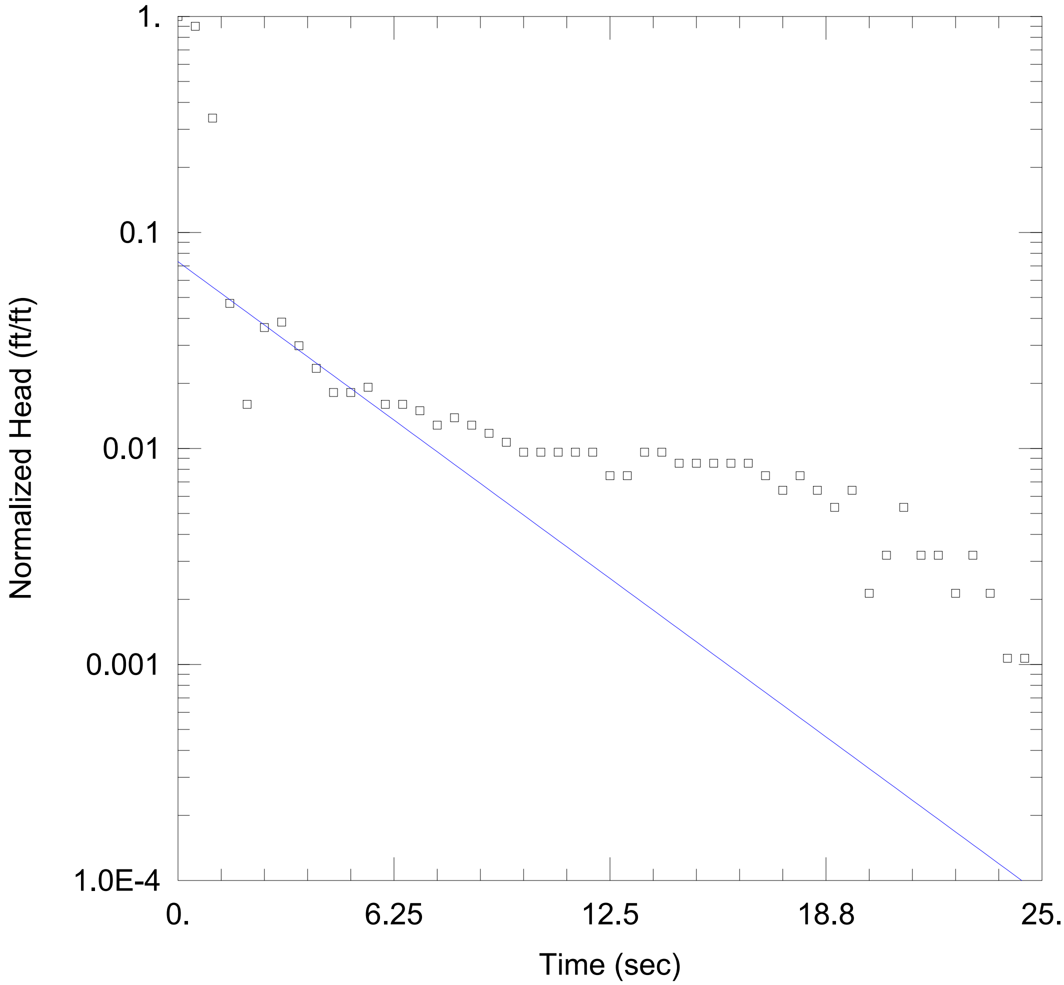
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.227 cm/sec

y0 = 0.127 ft



XPW03 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

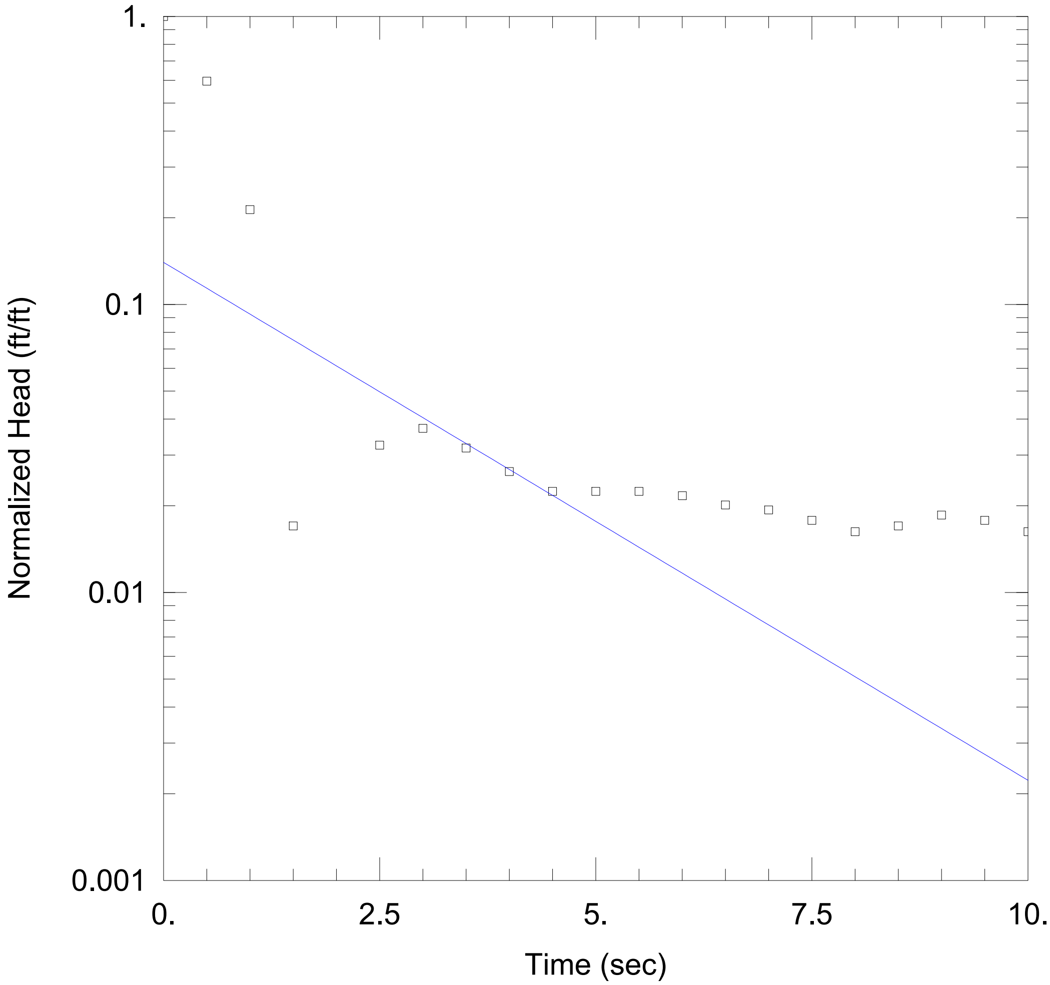
WELL DATA (XPW03)

Initial Displacement: -0.937 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.146 cm/sec
y0 = -0.0686 ft



XPW03 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

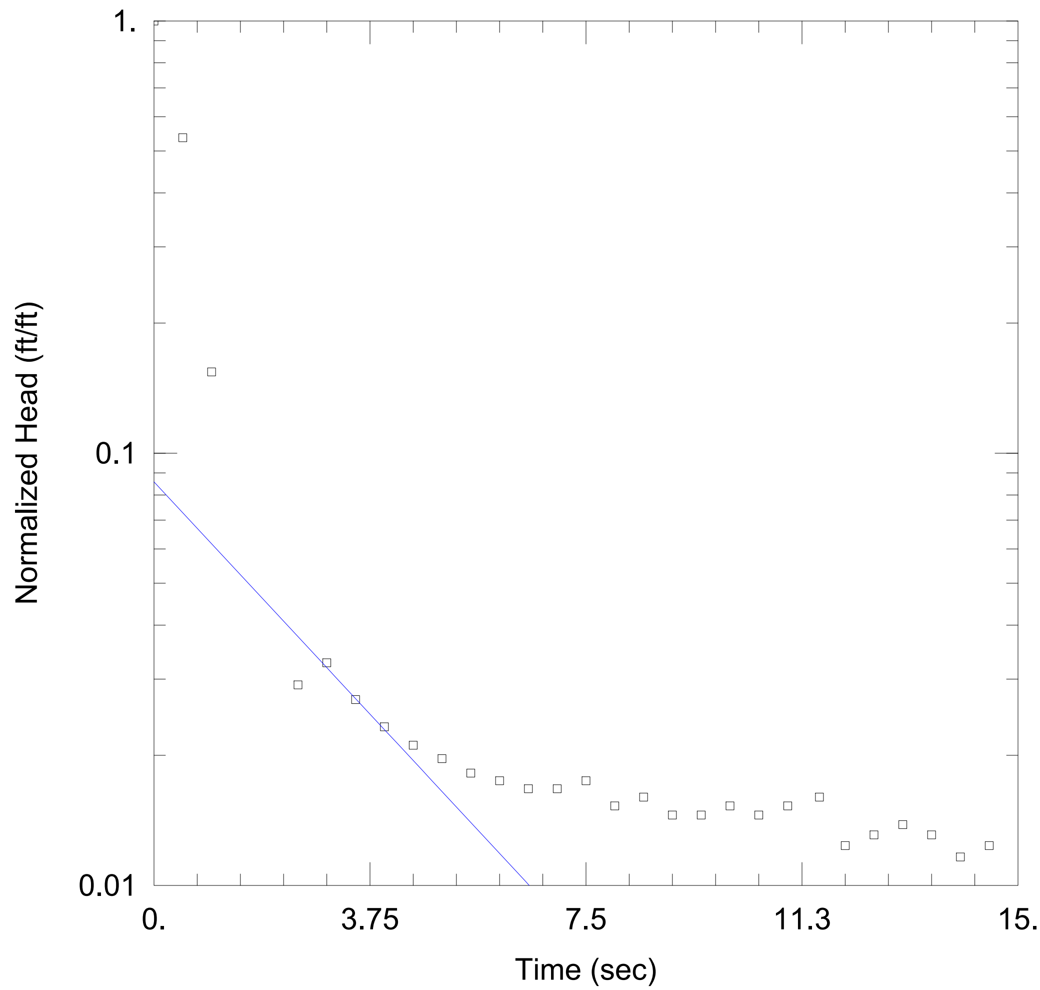
WELL DATA (XPW03)

Initial Displacement: -1.293 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.117 cm/sec
y0 = -0.181 ft



XPW03 RH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

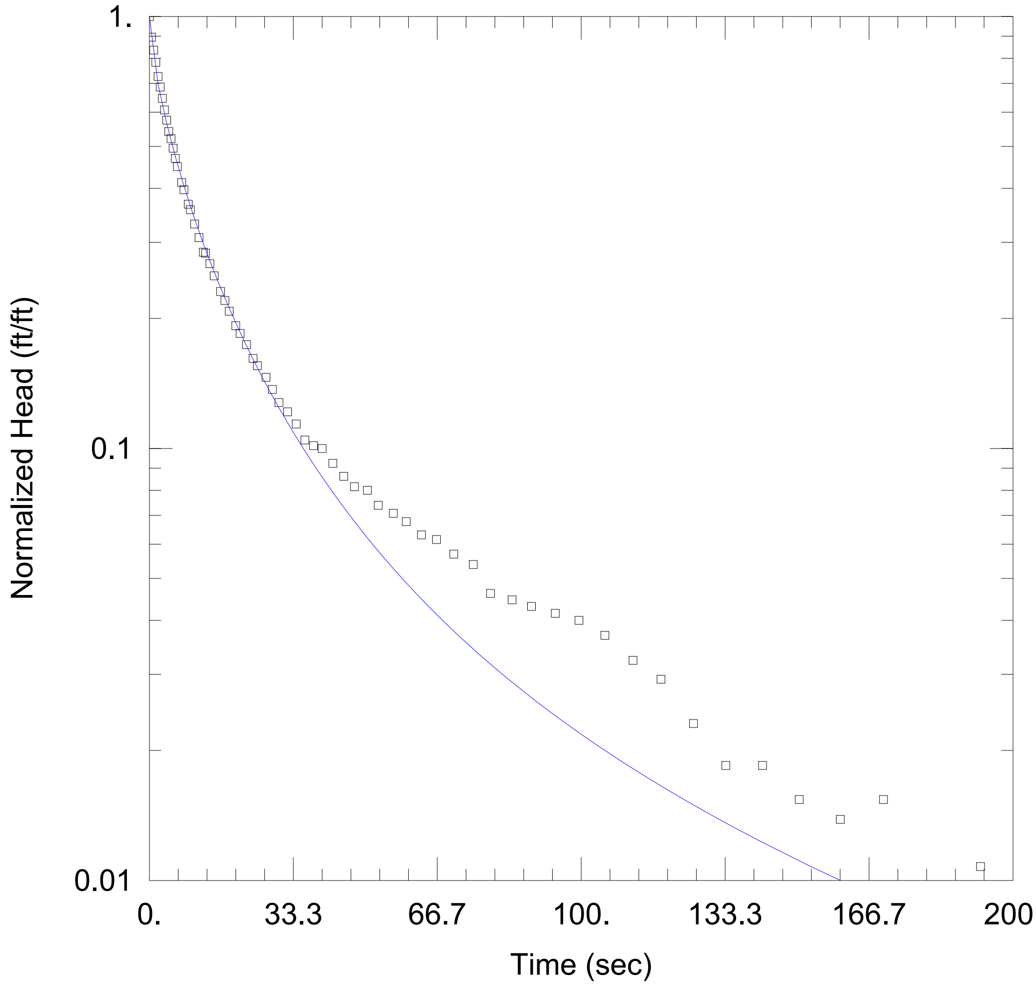
WELL DATA (XPW03)

Initial Displacement: -1.375 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.143 cm/sec
y0 = -0.118 ft



XPW04 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

WELL DATA (XPW04)

Initial Displacement: 0.65 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft

Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

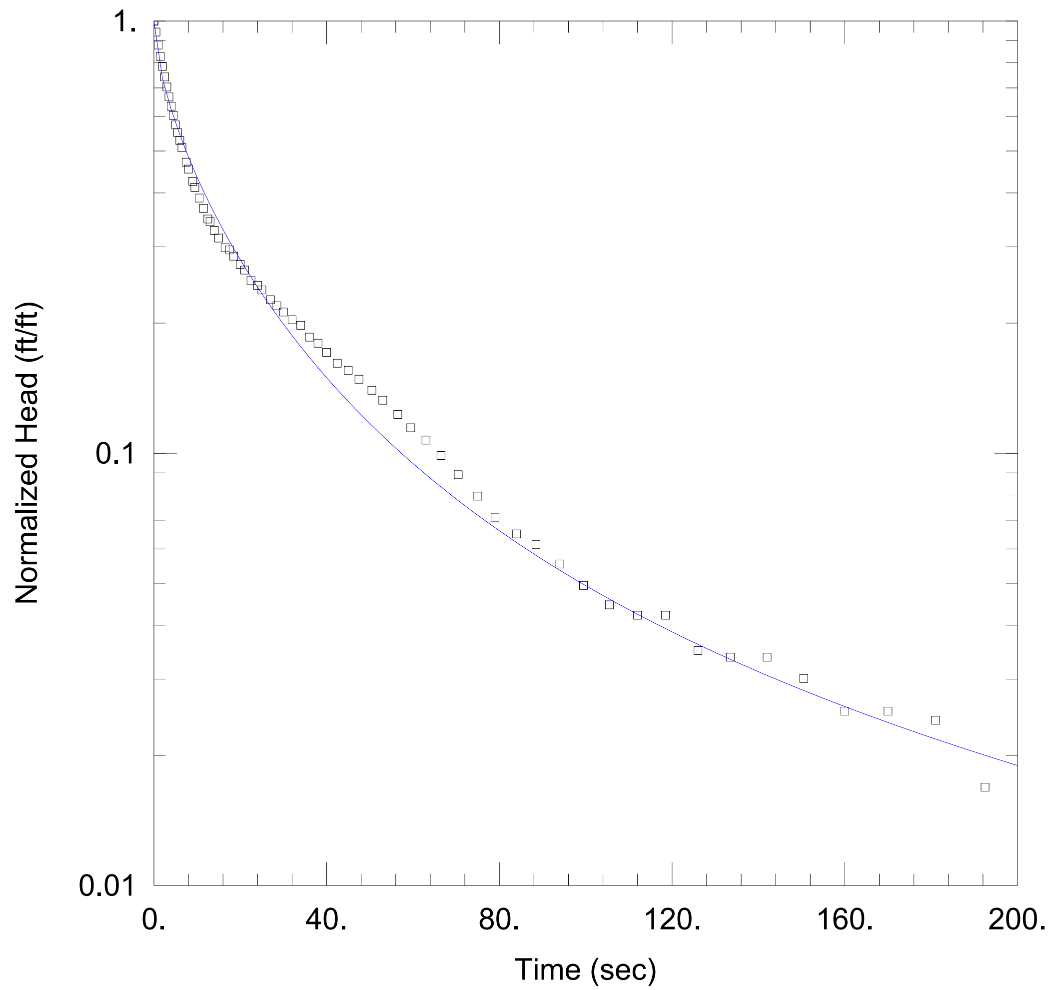
SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.0021 cm/sec
Kz/Kr = 1.

Ss = 0.00051 ft^{-1}



XPW04 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

WELL DATA (XPW04)

Initial Displacement: 0.83 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft

Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

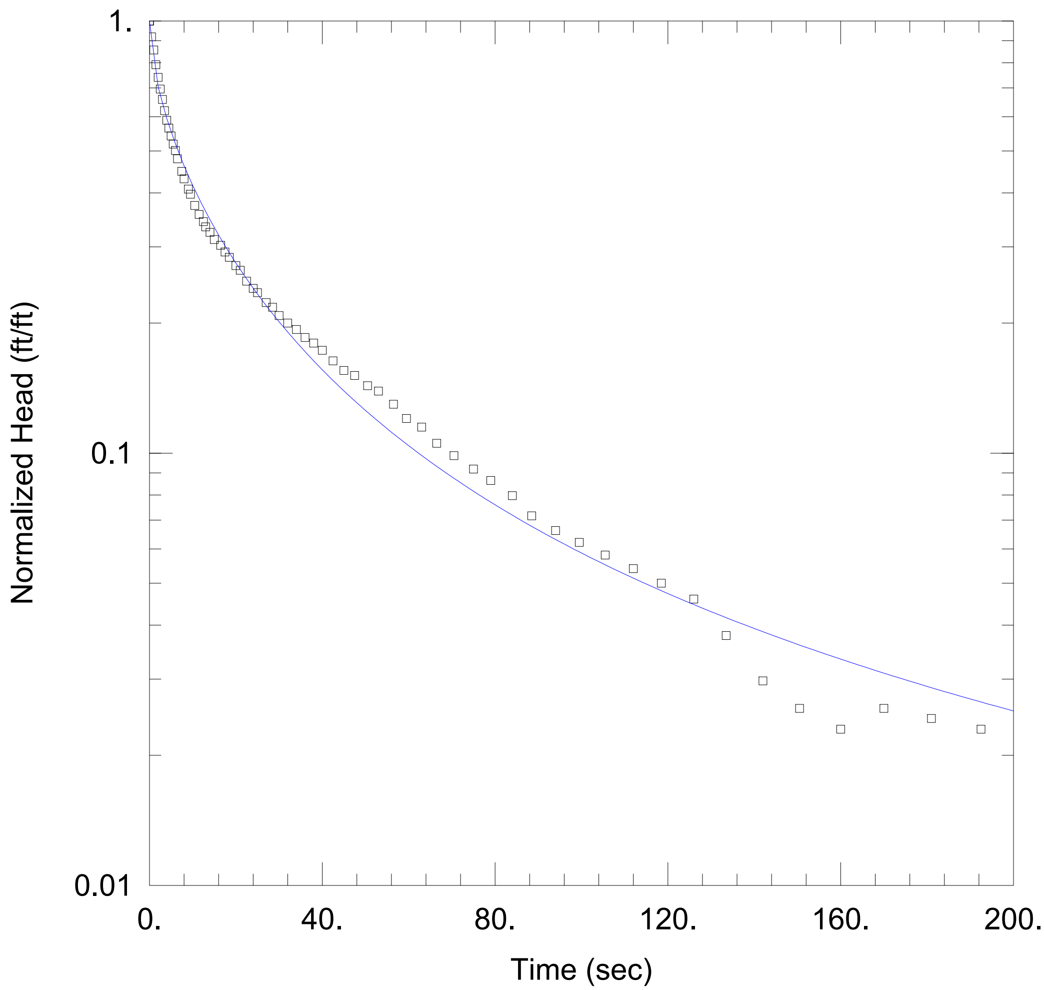
SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.00122 cm/sec
Kz/Kr = 1.

Ss = 0.00094 ft^{-1}



XPW04 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

WELL DATA (XPW04)

Initial Displacement: 0.74 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft

Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.00101 cm/sec
Kz/Kr = 1.

Ss = 0.0019 ft^{-1}

2017 HYDRAULIC CONDUCTIVITY TEST DATA

Appendix C - Table 1
Newton Power Station
Slug Test Results - Primary Ash Pond Wells (ID 501)
Hydrogeologic Monitoring Plan

Well ID	Slug In 1	Slug In 2	Slug In 3	Slug Out 1	Slug Out 2	Slug Out 3	Slug Out 4	MIN	MAX	GEOMEAN	Solution
APW2		4.41E-05		4.52E-05		3.45E-05		3.45E-05	4.52E-05	4.1E-05	Bouwer-Rice
APW3	8.44E-06			8.61E-06				8.44E-06	8.61E-06	8.5E-06	Bouwer-Rice
APW4	6.66E-06			5.14E-06				5.14E-06	6.66E-06	5.8E-06	Bouwer-Rice
APW5	5.66E-04	1.42E-03		1.54E-04	2.74E-04	2.56E-04		1.54E-04	1.42E-03	3.9E-04	Bouwer-Rice
APW6	1.64E-03	2.18E-03			2.09E-03	1.98E-03		1.64E-03	2.18E-03	2.0E-03	Bouwer-Rice
APW7	2.25E-03				3.24E-03	2.99E-03	2.75E-03	2.25E-03	3.24E-03	2.8E-03	Bouwer-Rice
APW8	6.60E-04	1.31E-03			1.06E-03	7.89E-04		6.60E-04	1.31E-03	9.2E-04	Bouwer-Rice
APW9	3.21E-03	3.28E-03		3.40E-03	3.00E-03			3.00E-03	3.40E-03	3.2E-03	Bouwer-Rice
APW10	5.27E-04	5.49E-04			5.73E-04	5.60E-04		5.27E-04	5.73E-04	5.5E-04	Bouwer-Rice

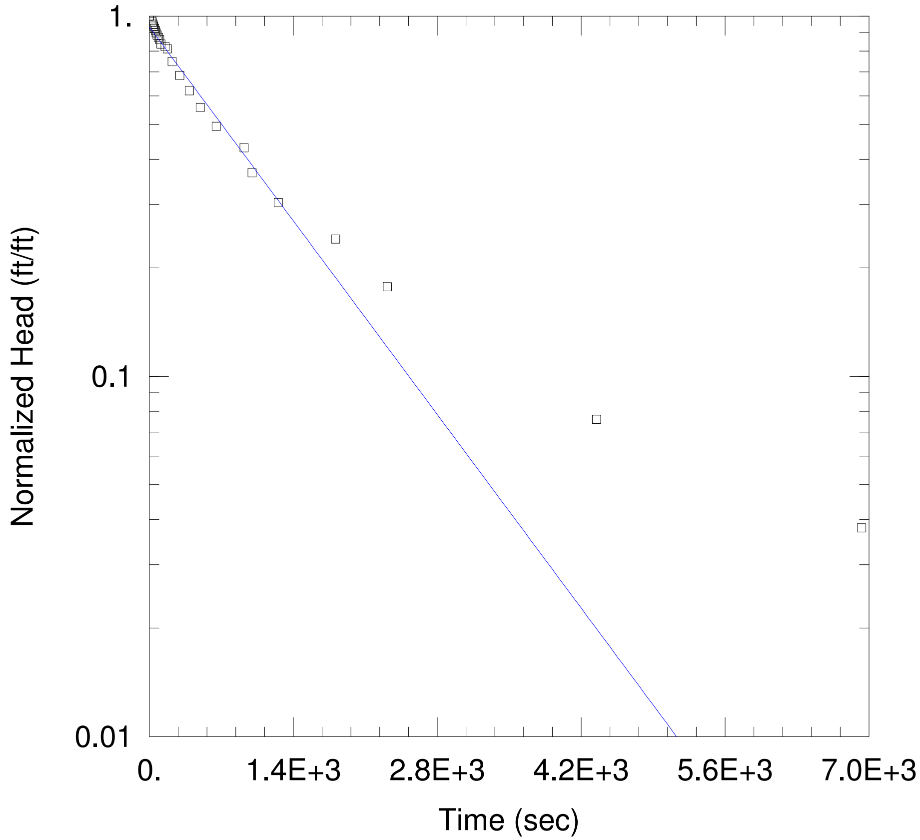
All slug test (i.e. hydraulic conductivity) results are in centimeters per second
Not Applicable

Appendix C - Table 2
Newton Power Station
Slug Test Results - Landfill 2 CCR Wells (ID 502)
Hydrogeologic Monitoring Plan

Well ID	Slug In 1	Slug In 2	Slug In 3	Slug Out 1	Slug Out 2	Slug Out 3	MIN	MAX	GEOMEAN	Solution
G06D				3.92E-08			3.92E-08	3.92E-08	3.9E-08	Bouwer-Rice
G202	1.70E-02	1.43E-02			2.87E-02	2.33E-02	1.43E-02	2.87E-02	2.0E-02	Bouwer-Rice
G203	2.53E-02			2.42E-02	3.47E-02		2.42E-02	3.47E-02	2.8E-02	Bouwer-Rice
G208				1.32E-08			1.32E-08	1.32E-08	1.3E-08	Bouwer-Rice
G217D	2.27E-04	2.92E-04				3.03E-04	2.27E-04	3.03E-04	2.7E-04	Bouwer-Rice
G220				3.51E-07			3.51E-07	3.51E-07	3.5E-07	Bouwer-Rice
G222				1.54E-06			1.54E-06	1.54E-06	1.5E-06	Bouwer-Rice
G223	5.19E-05	2.50E-05		1.37E-05	1.79E-05		1.37E-05	5.19E-05	2.4E-05	Bouwer-Rice
G224	5.15E-02	1.90E-02	4.64E-02	4.31E-02		2.97E-02	1.90E-02	5.15E-02	3.6E-02	Bouwer-Rice

All slug test (i.e. hydraulic conductivity) results are in centimeters per second

(grey cell) Not Applicable



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SI2.aqt
Date: 10/09/17 Time: 15:04:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

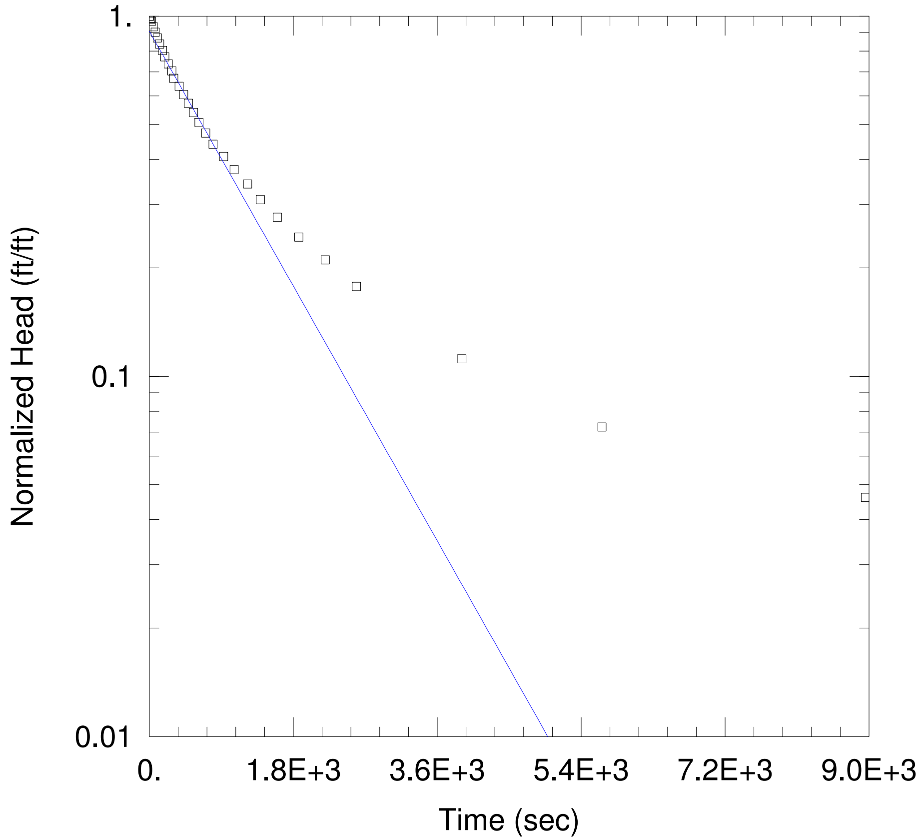
K = 4.414E-5 cm/sec
y0 = 0.7361 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SI2)

Initial Displacement: 0.79 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SO1.aqt
Date: 10/09/17 Time: 15:05:33

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

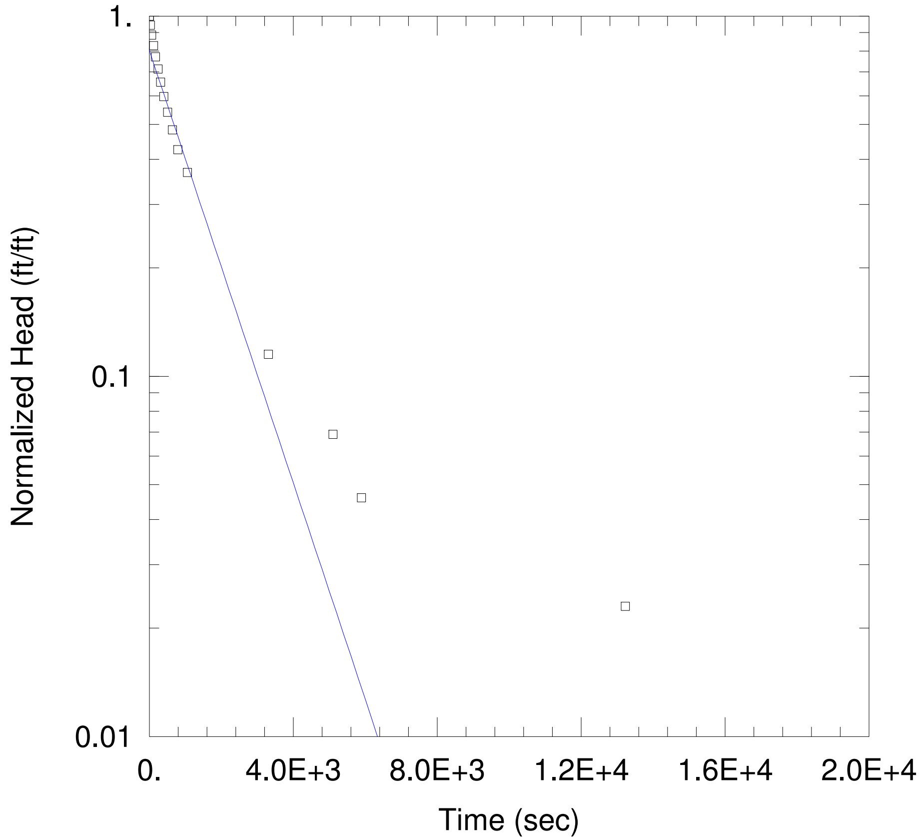
K = 4.517E-5 cm/sec
y0 = 1.38 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SO1)

Initial Displacement: 1.52 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SO3.aqt
Date: 10/09/17 Time: 15:06:23

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

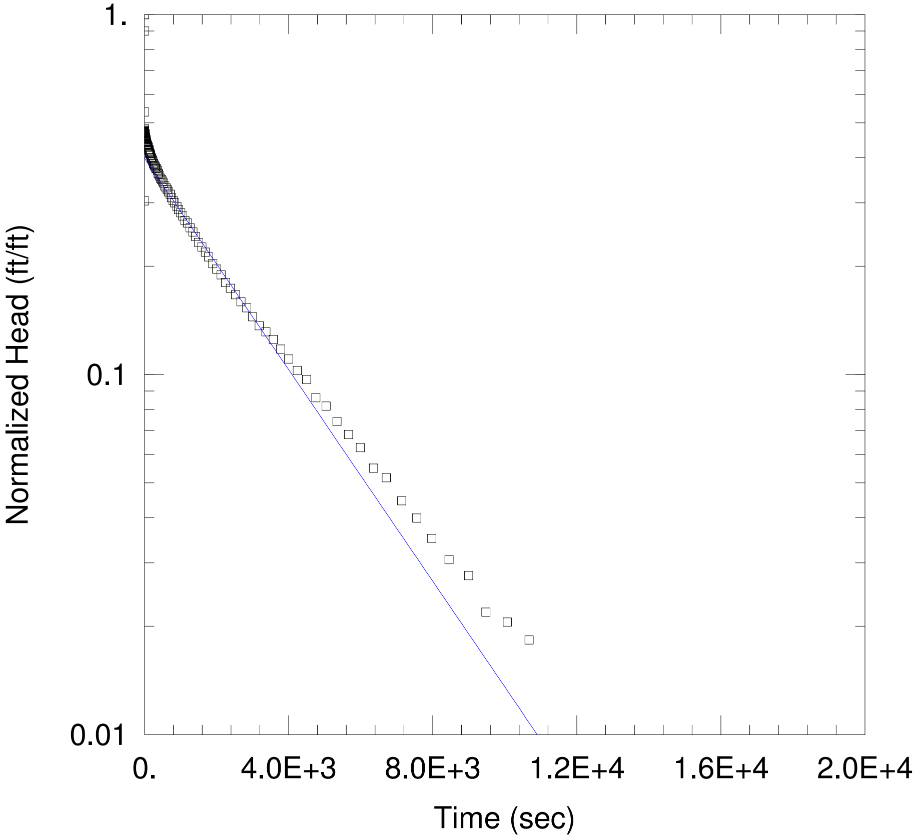
K = 3.449E-5 cm/sec
y0 = 0.698 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SO3)

Initial Displacement: 0.87 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 3 SI1.aqt
Date: 10/09/17 Time: 15:13:21

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW3
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

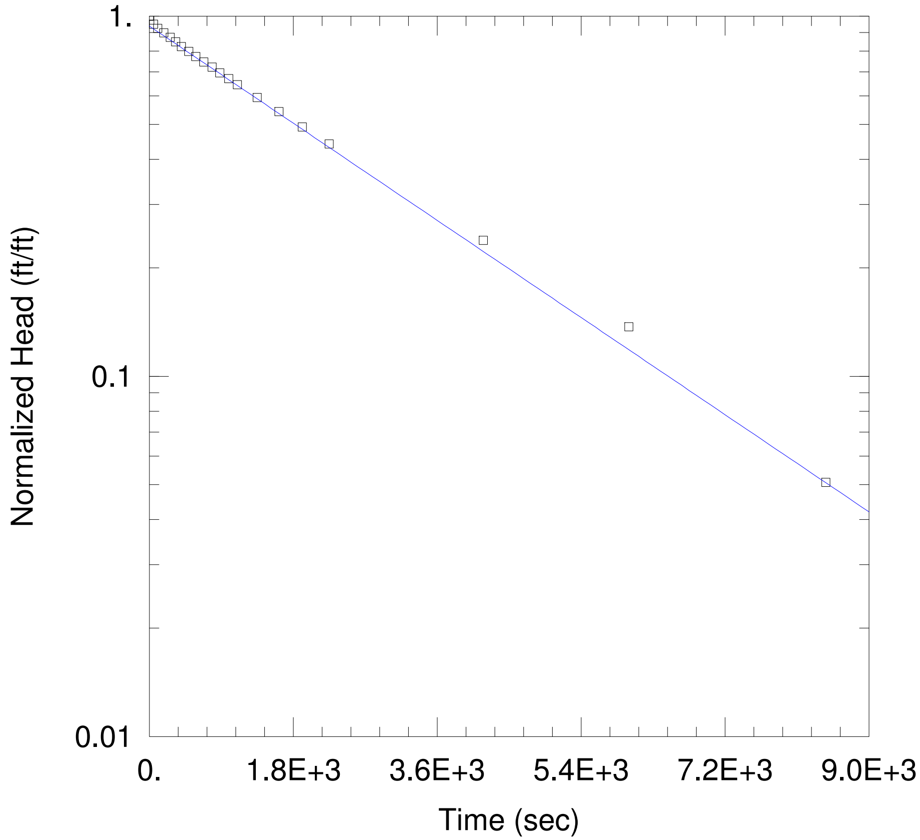
K = 8.437E-6 cm/sec
y0 = 1.458 ft

AQUIFER DATA

Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW3 SI1)

Initial Displacement: 3.656 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 14. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 3 SO1.aqt
Date: 10/09/17 Time: 15:08:16

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW3
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 8.611E-6 cm/sec
y0 = 1.848 ft

AQUIFER DATA

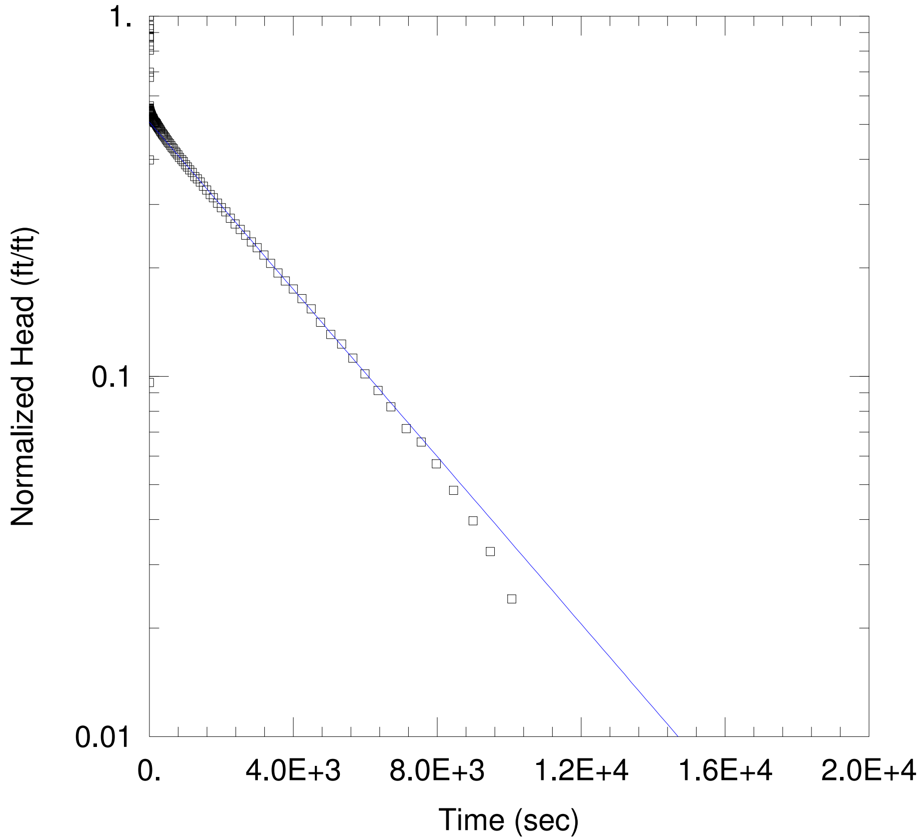
Saturated Thickness: 14. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW3 SO1)

Initial Displacement: 1.97 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 14. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 4 SI1.aqt
Date: 10/09/17 Time: 15:15:09

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW4
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 6.66E-6 cm/sec
y0 = 1.37 ft

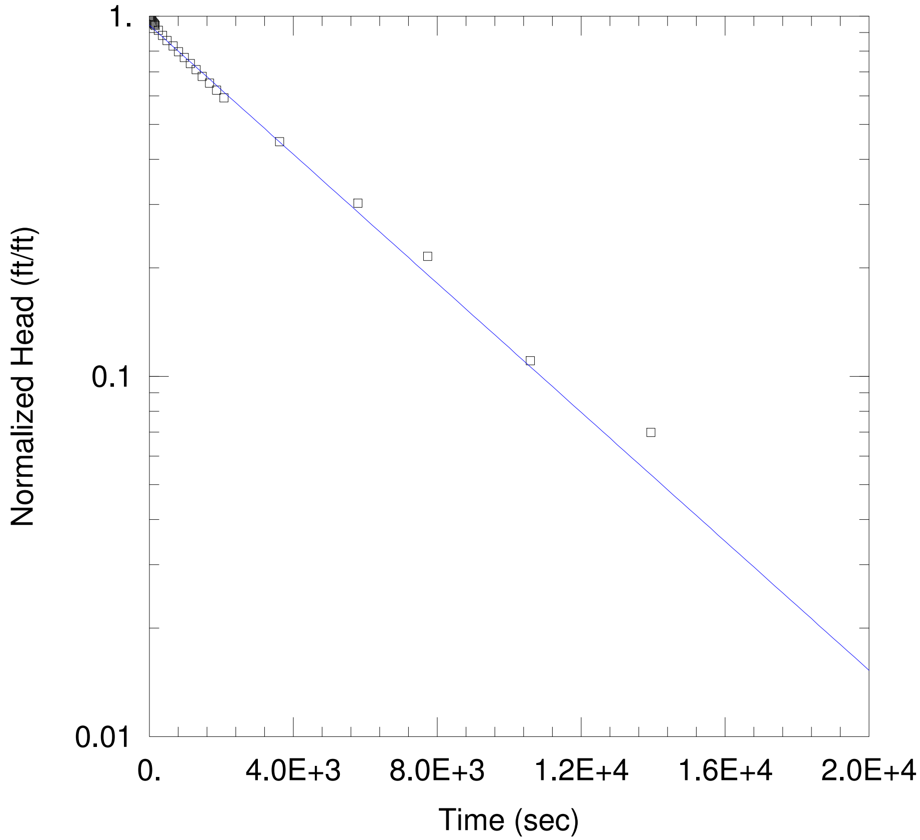
AQUIFER DATA

Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW4 S11)

Initial Displacement: 2.697 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 11. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 4 SO1.aqt
Date: 10/09/17 Time: 15:15:46

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW4
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

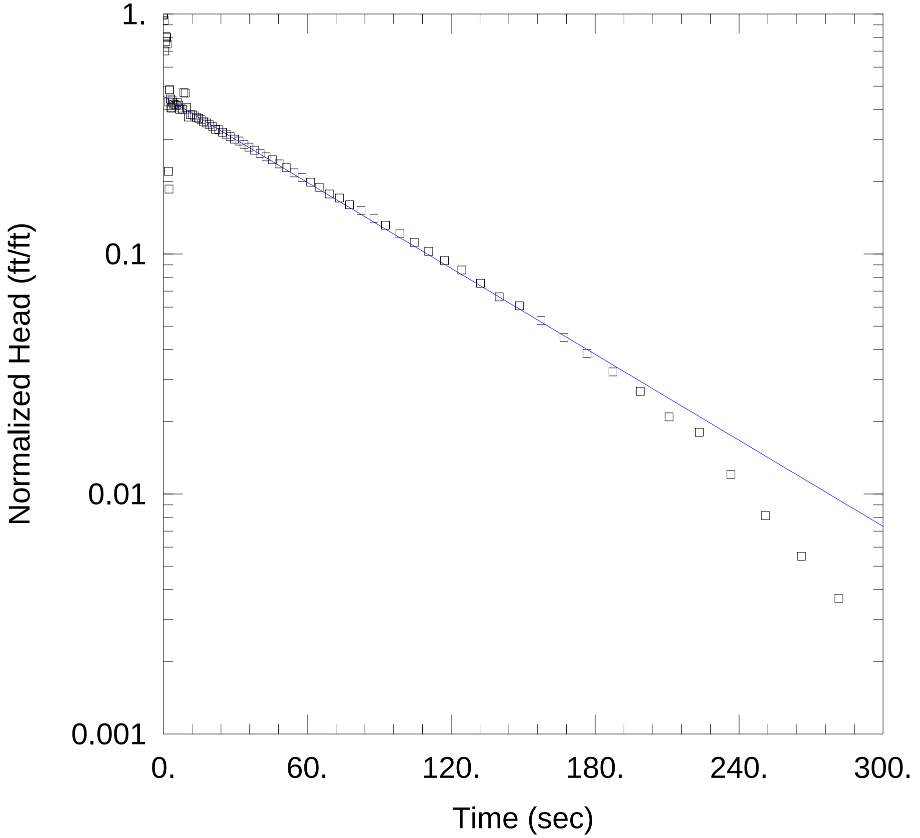
K = 5.137E-6 cm/sec
y0 = 1.622 ft

AQUIFER DATA

Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW4 SO1)

Initial Displacement: 1.72 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 11. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SI1.aqt
Date: 06/15/17 Time: 11:53:01

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

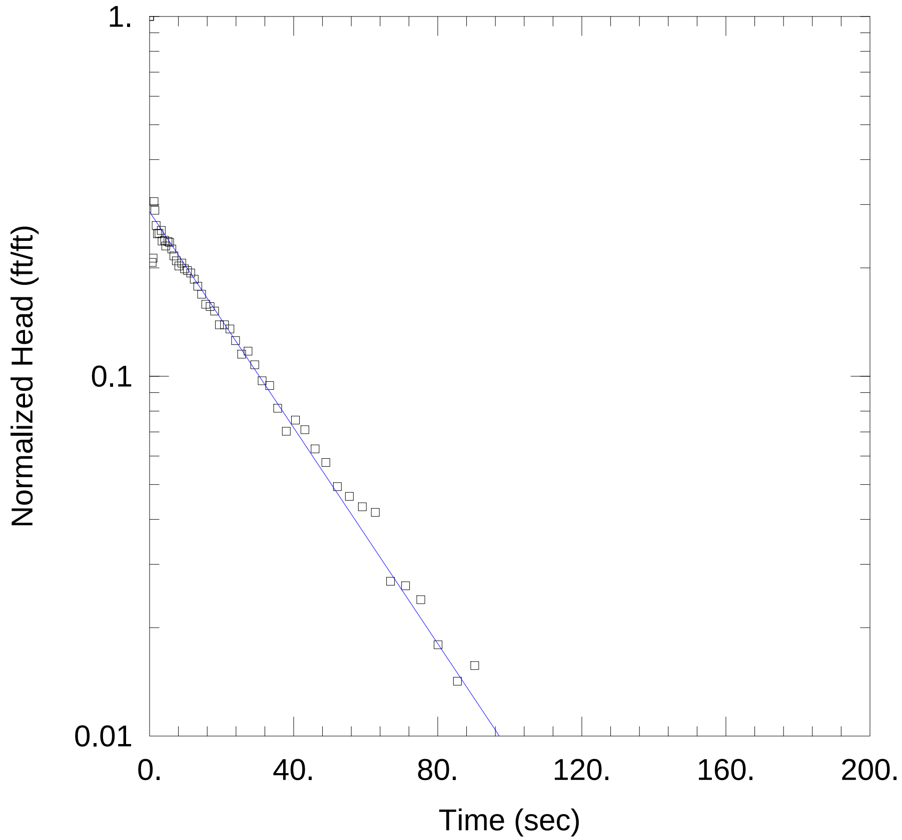
K = 0.0005655 cm/sec
y0 = 1.731 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SI1)

Initial Displacement: 3.818 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SI2.aqt
Date: 05/12/17 Time: 17:23:52

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

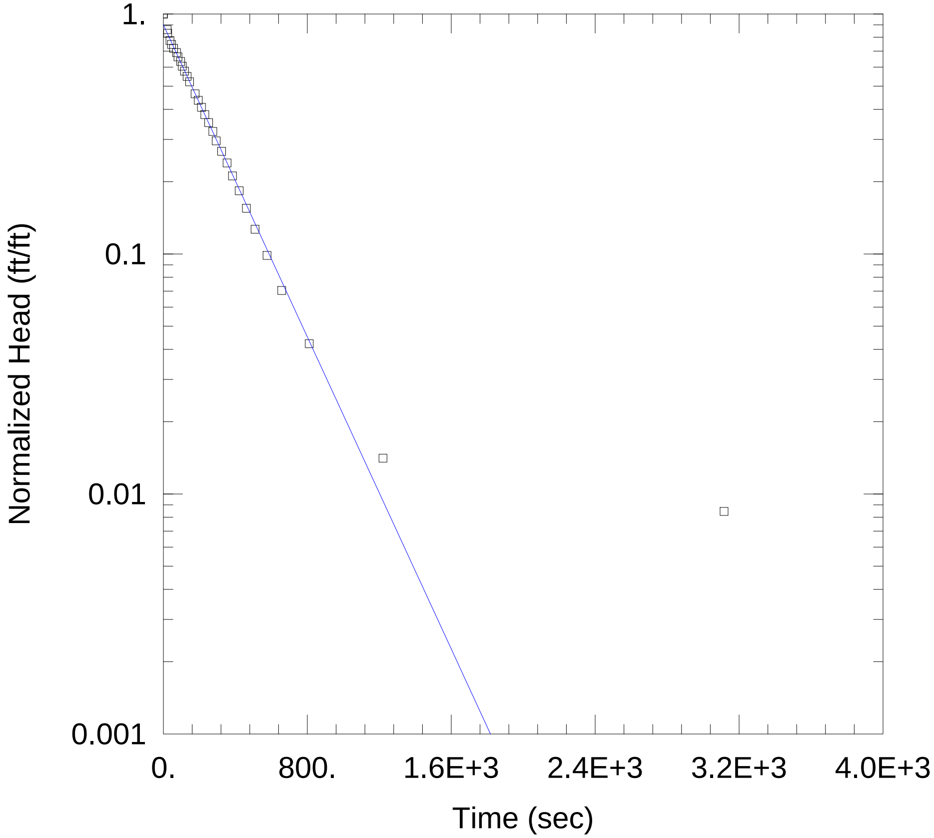
K = 0.001421 cm/sec
y0 = 0.383 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SI2)

Initial Displacement: 1.338 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO1.aqt
Date: 05/12/17 Time: 17:30:12

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

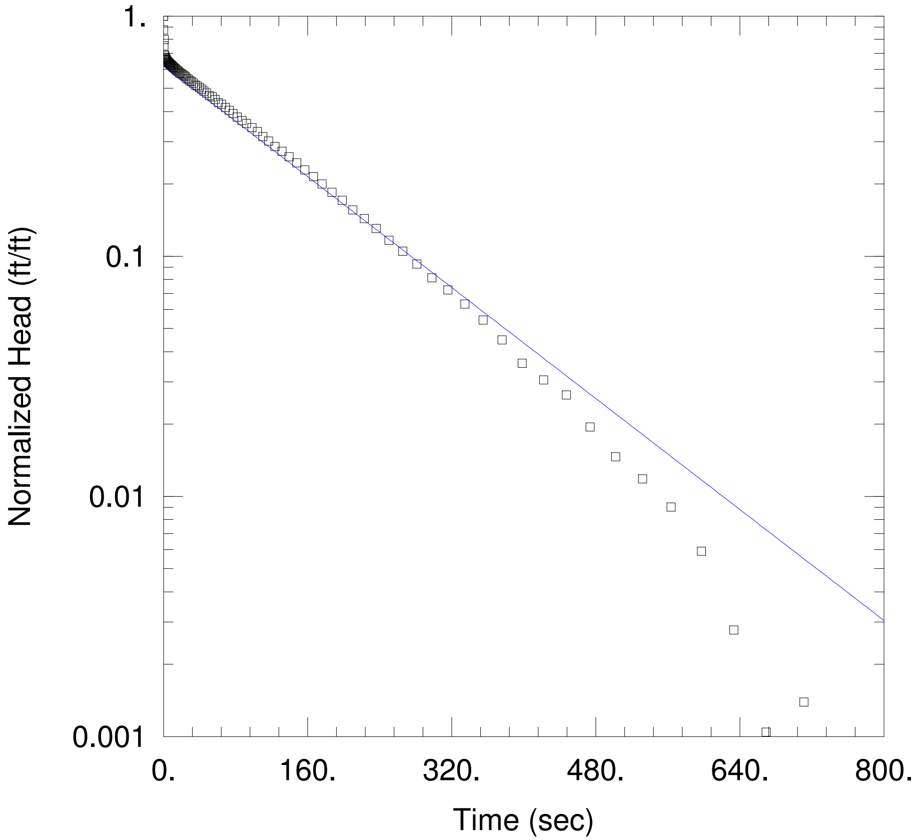
K = 0.0001539 cm/sec
y0 = 3.197 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO1)

Initial Displacement: 3.55 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO2.aqt
Date: 10/09/17 Time: 14:59:07

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0002735 cm/sec
y0 = 1.789 ft

AQUIFER DATA

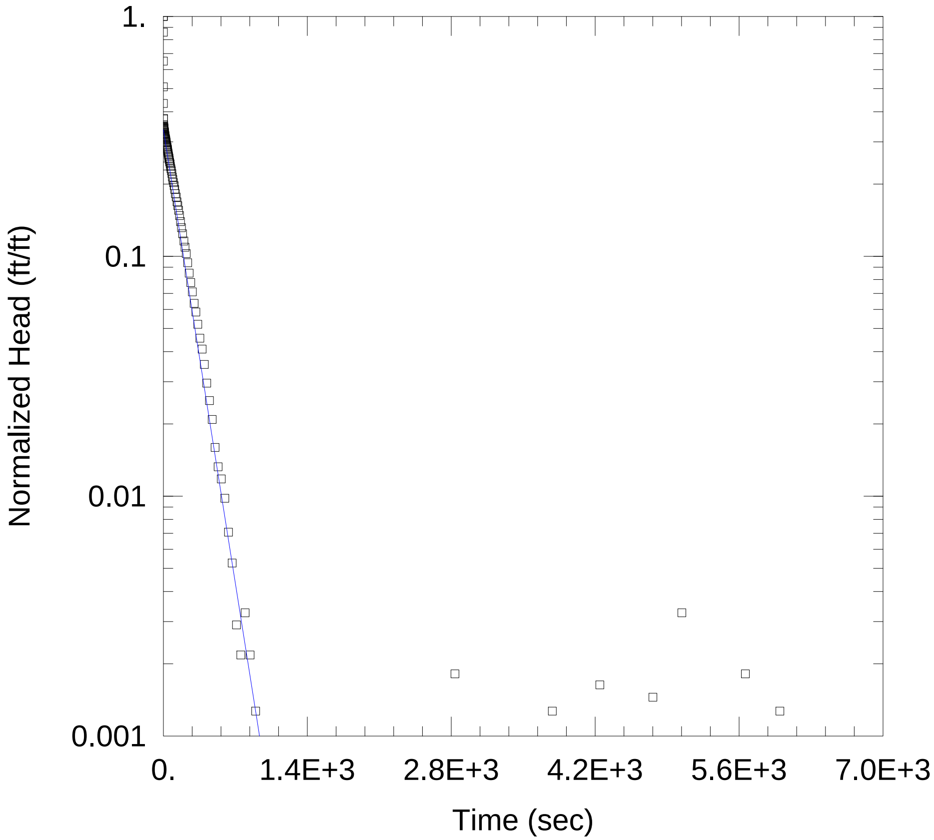
Saturated Thickness: 8.5 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO2)

Initial Displacement: 2.879 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO3.aqt
Date: 06/15/17 Time: 11:57:15

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

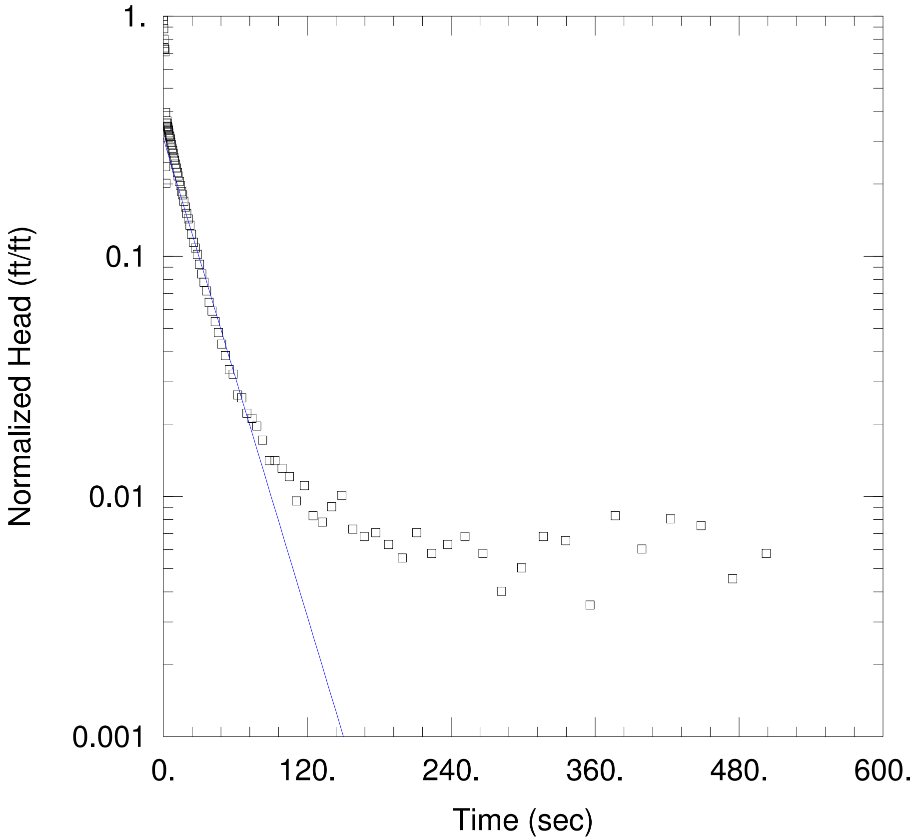
K = 0.0002559 cm/sec
y0 = 1.858 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO3)

Initial Displacement: 5.512 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SI1.aqt
Date: 10/10/17 Time: 08:43:51

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

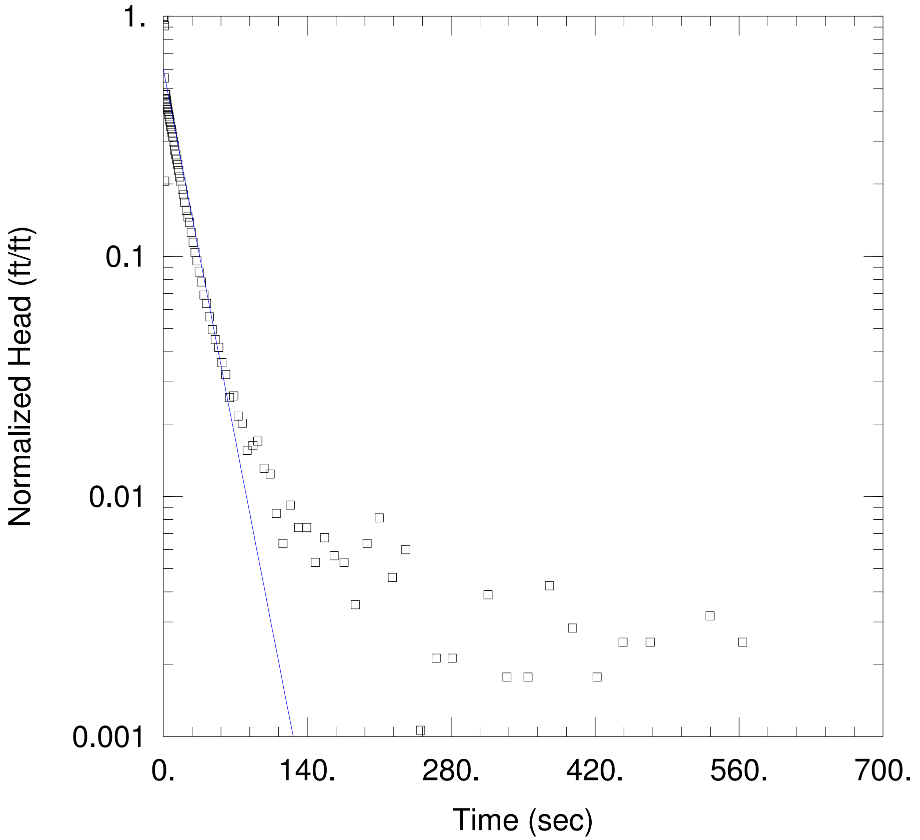
K = 0.001642 cm/sec
y0 = 1.231 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SI1)

Initial Displacement: 3.973 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SI2.aqt
Date: 10/10/17 Time: 08:45:57

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

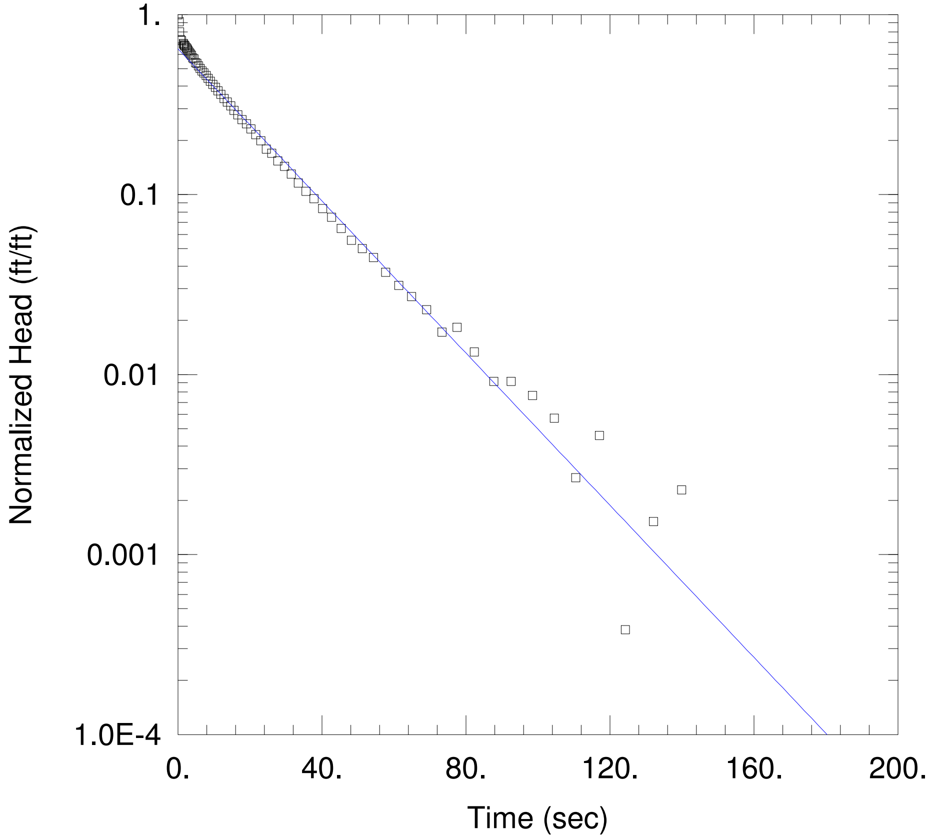
K = 0.002177 cm/sec
y0 = 1.702 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SI2)

Initial Displacement: 2.83 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SO2.aqt
Date: 10/10/17 Time: 08:48:43

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

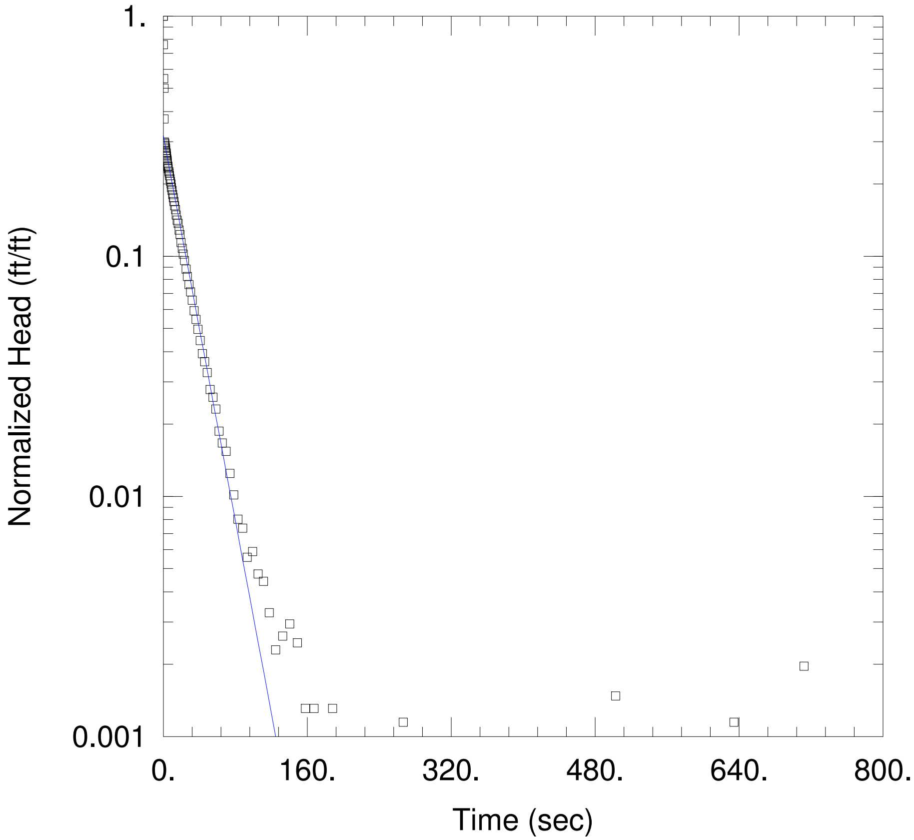
K = 0.002091 cm/sec
y0 = 1.689 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SO2)

Initial Displacement: 2.62 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SO3.aqt
Date: 10/10/17 Time: 08:51:05

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

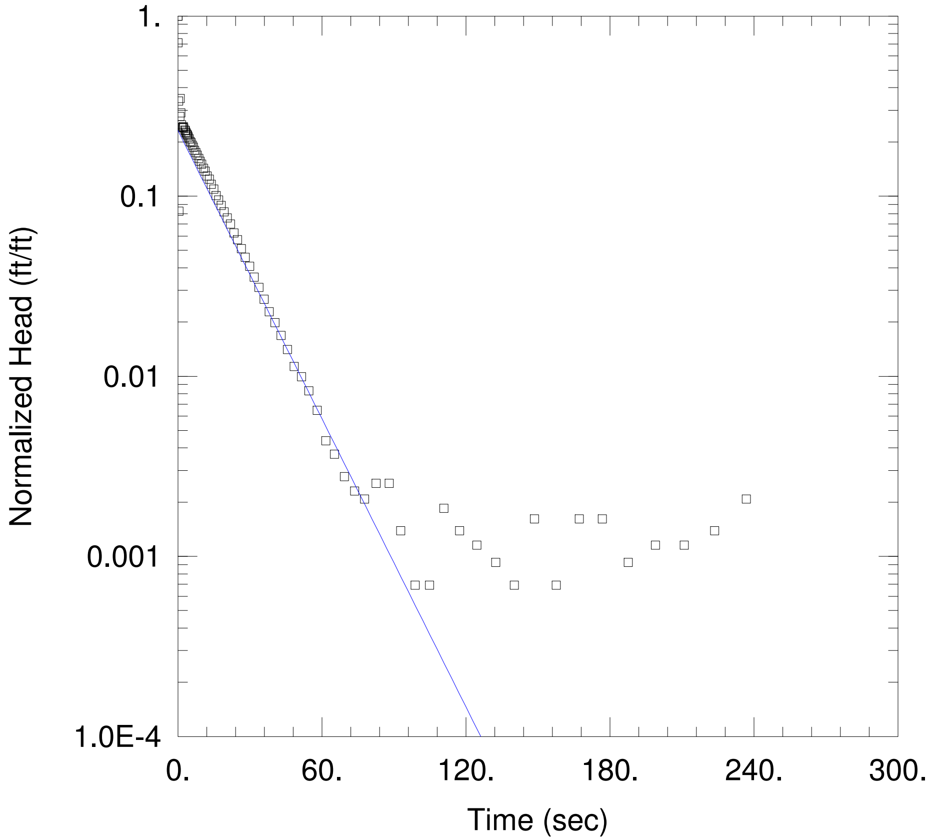
K = 0.001979 cm/sec
y0 = 1.936 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SO3)

Initial Displacement: 6.109 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SI1.aqt
Date: 10/10/17 Time: 09:03:20

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

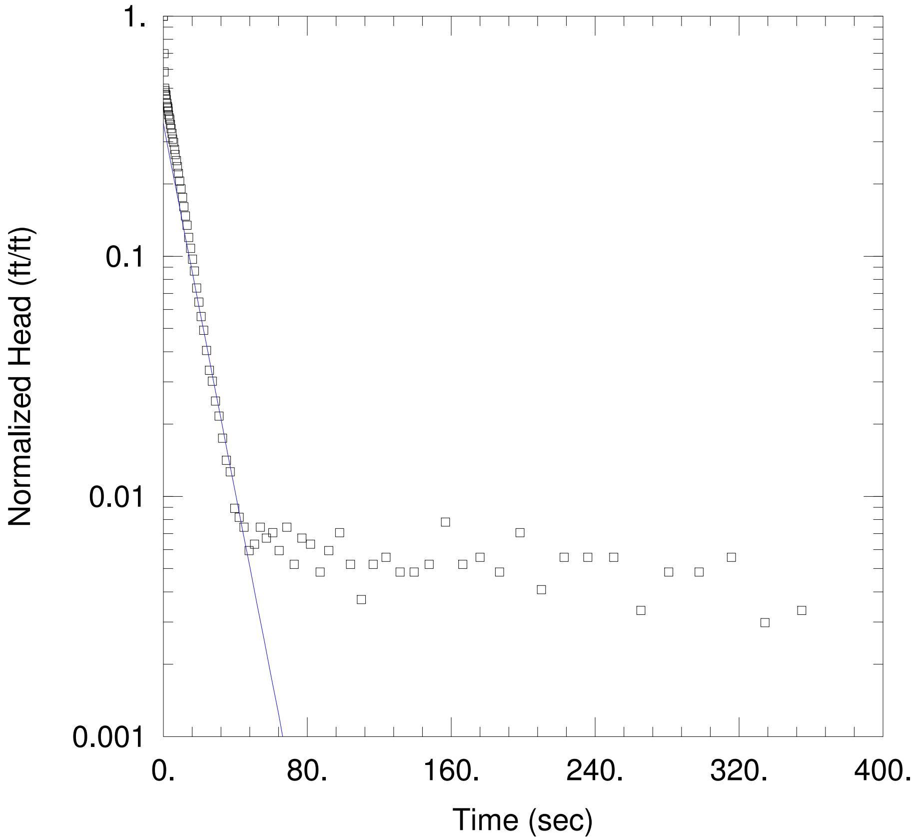
K = 0.00225 cm/sec
y0 = 1.004 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 SI1)

Initial Displacement: 4.331 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO2.aqt
Date: 10/10/17 Time: 09:05:47

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

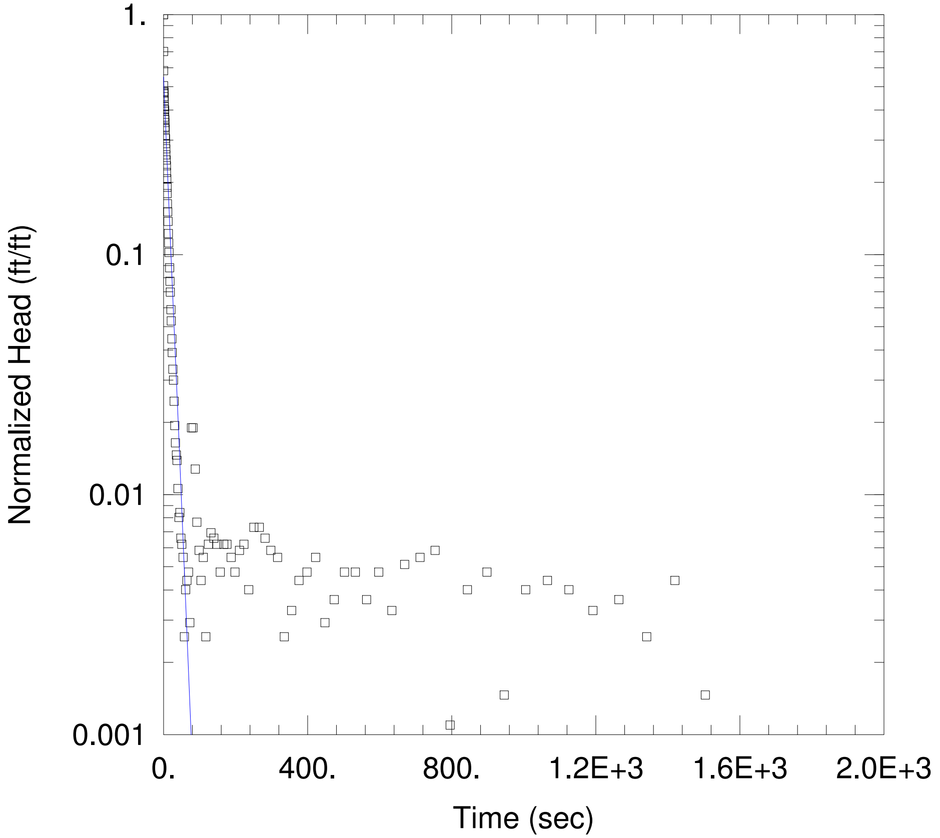
K = 0.003237 cm/sec
y0 = 0.9561 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 S02)

Initial Displacement: 2.69 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO3.aqt
Date: 10/10/17 Time: 09:07:38

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.002989 cm/sec
y0 = 1.503 ft

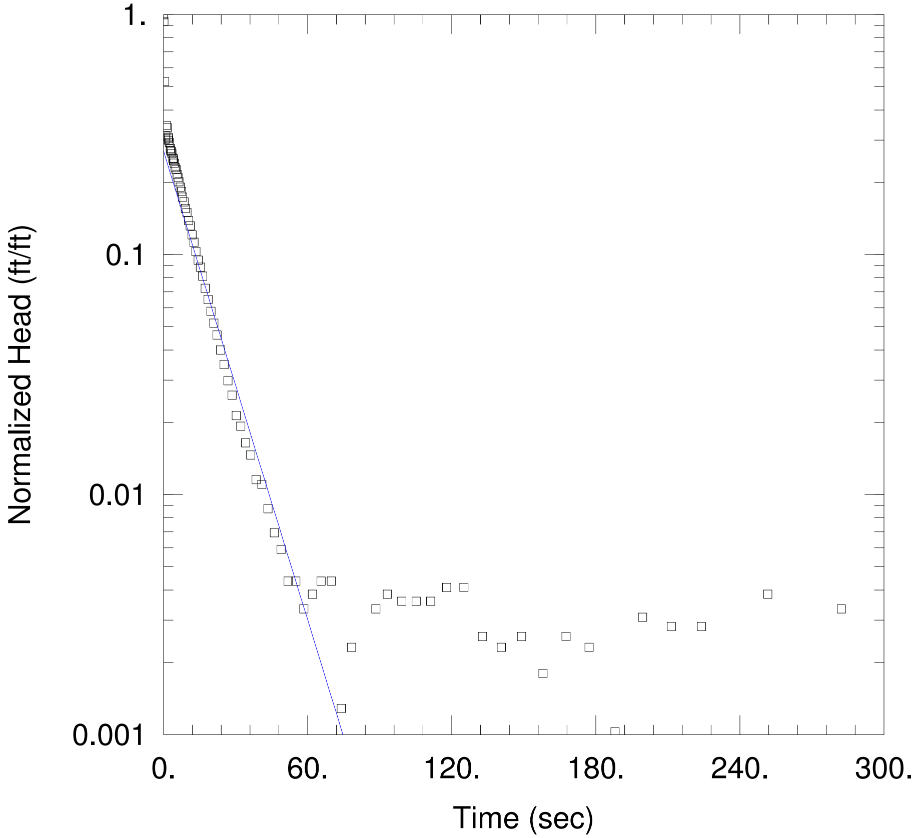
AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 S03)

Initial Displacement: 2.738 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO4.aqt
Date: 10/10/17 Time: 09:09:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

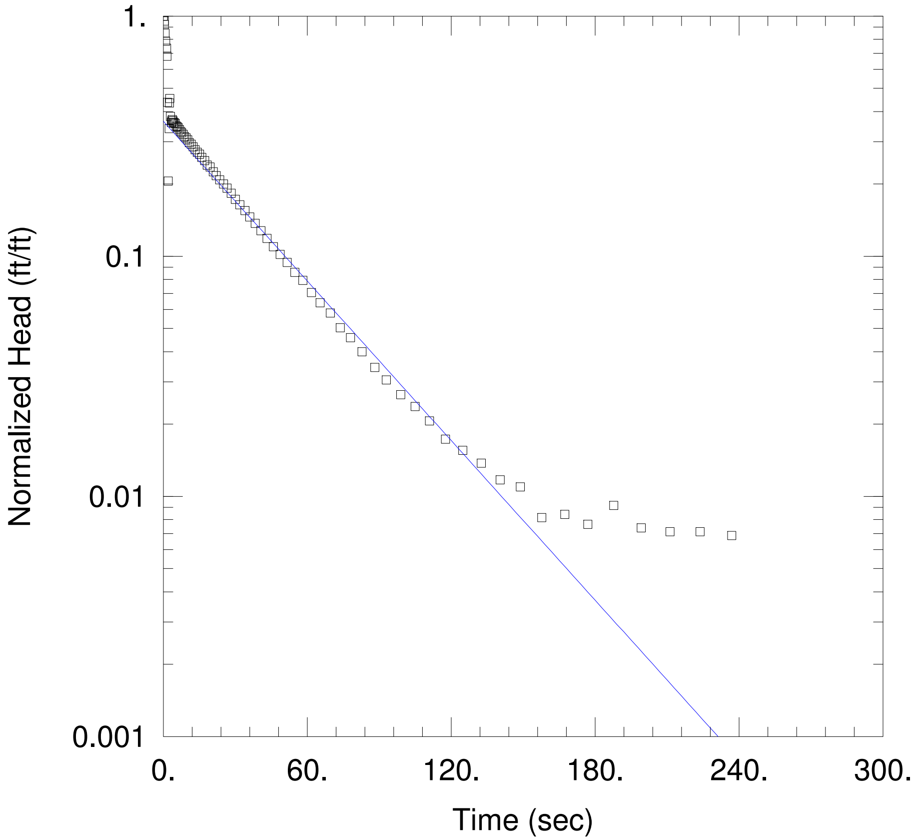
K = 0.002745 cm/sec
y0 = 1.052 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 SO4)

Initial Displacement: 3.899 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SI1.aqt
Date: 10/10/17 Time: 09:12:16

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

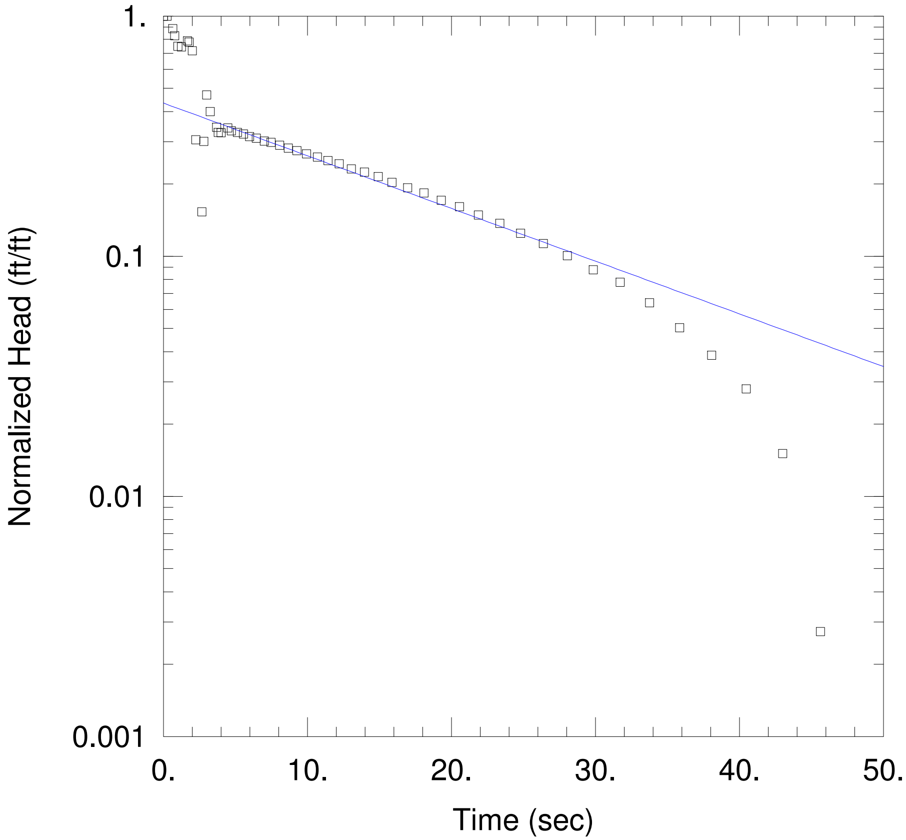
K = 0.0006602 cm/sec
y0 = 1.431 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SI1)

Initial Displacement: 3.929 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SI2.aqt
Date: 10/10/17 Time: 09:39:50

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

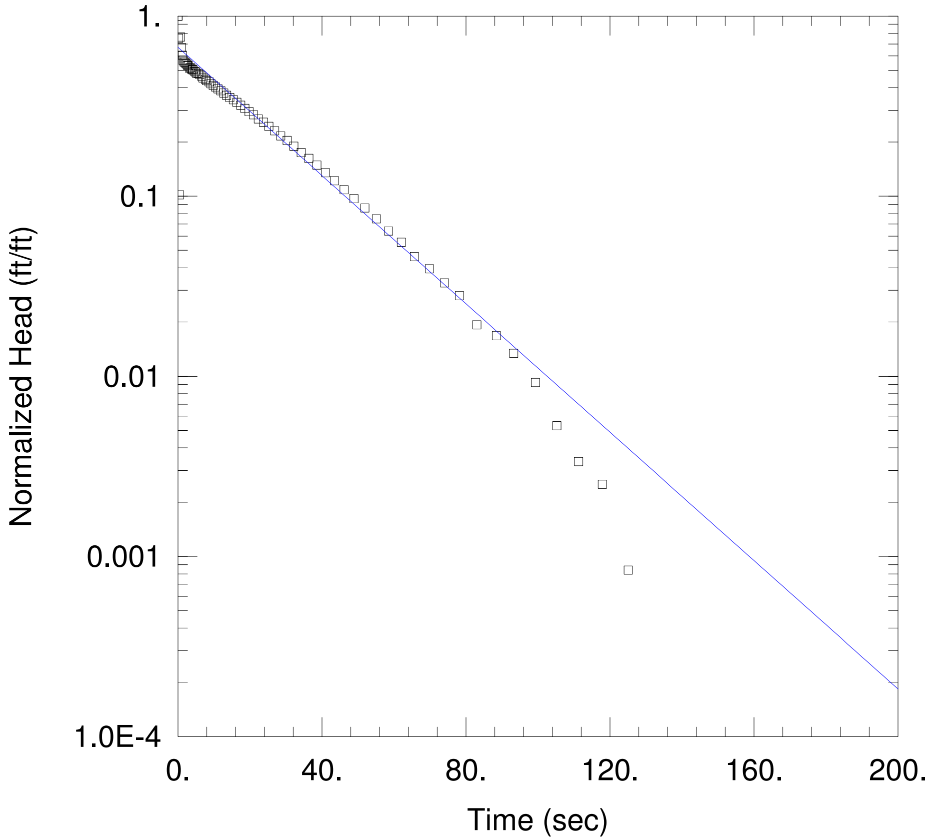
K = 0.001308 cm/sec
y0 = 1.269 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SI2)

Initial Displacement: 2.924 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SO2.aqt
Date: 10/10/17 Time: 09:41:42

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.001062 cm/sec
y0 = 2.403 ft

AQUIFER DATA

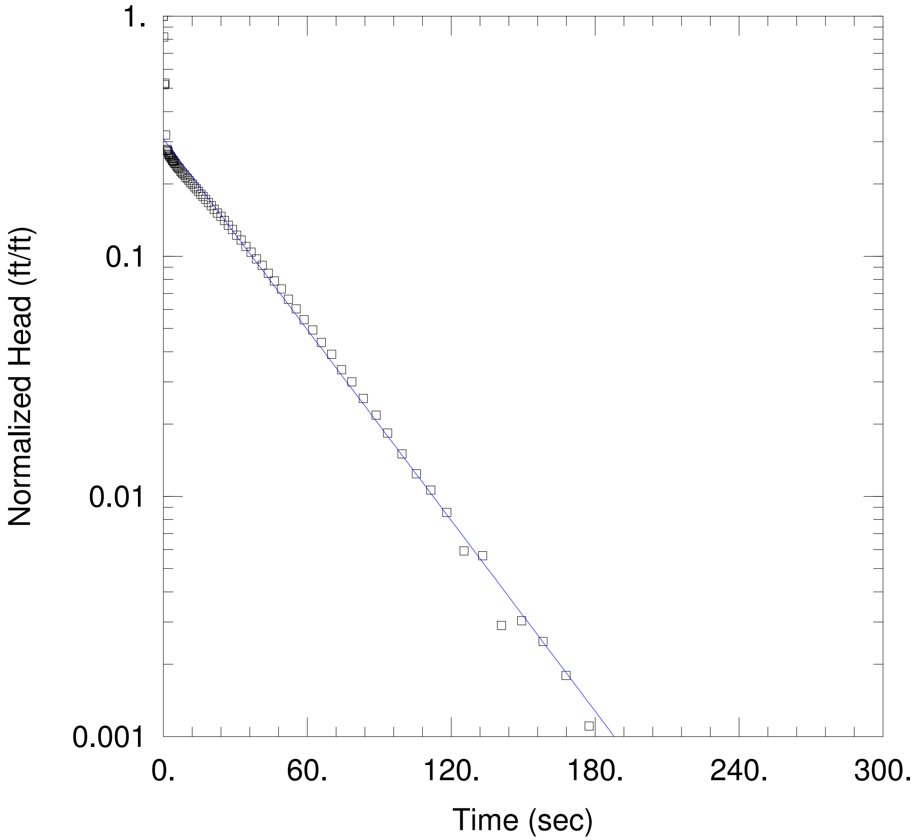
Saturated Thickness: 16.3 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SO2)

Initial Displacement: 3.577 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SO3.aqt
Date: 10/10/17 Time: 09:43:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

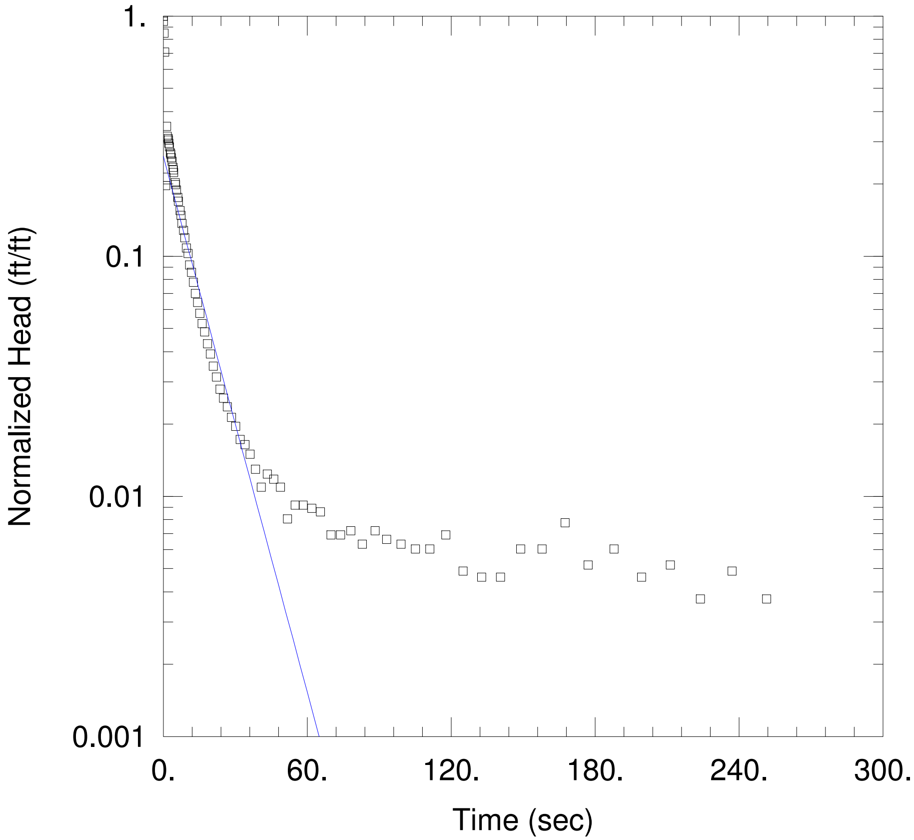
K = 0.0007891 cm/sec
y0 = 2.233 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SO3)

Initial Displacement: 7.249 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SI1.aqt
Date: 10/10/17 Time: 09:48:54

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

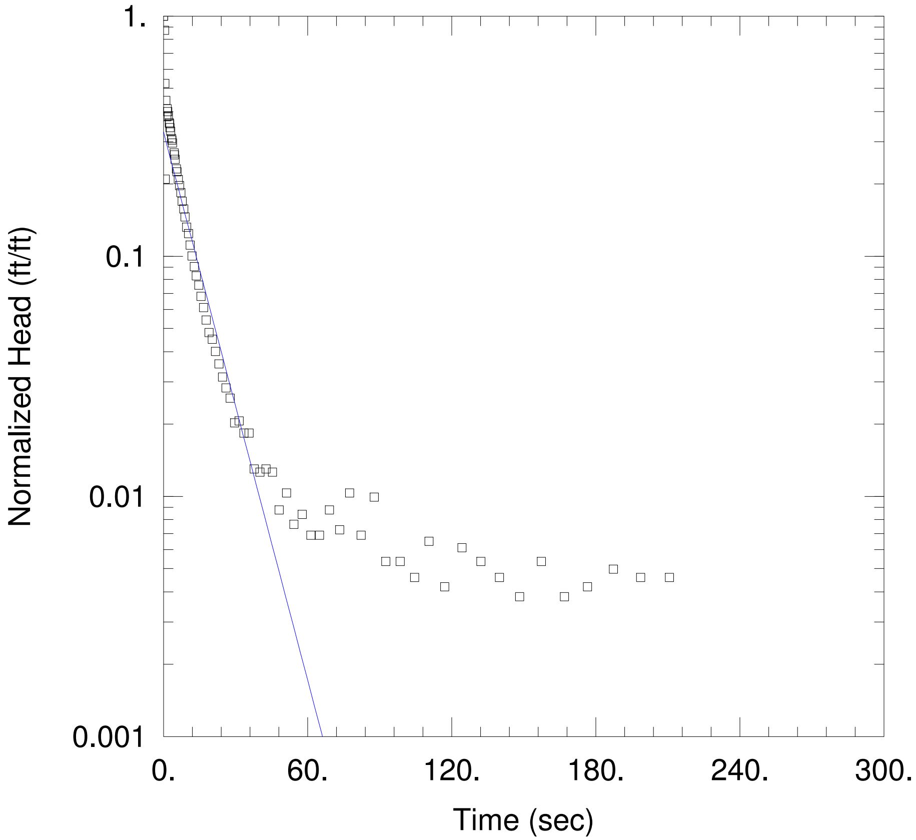
K = 0.00321 cm/sec
y0 = 0.9059 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SI1)

Initial Displacement: 3.477 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SI2.aqt
Date: 10/10/17 Time: 09:50:42

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.003282 cm/sec
y0 = 0.8588 ft

AQUIFER DATA

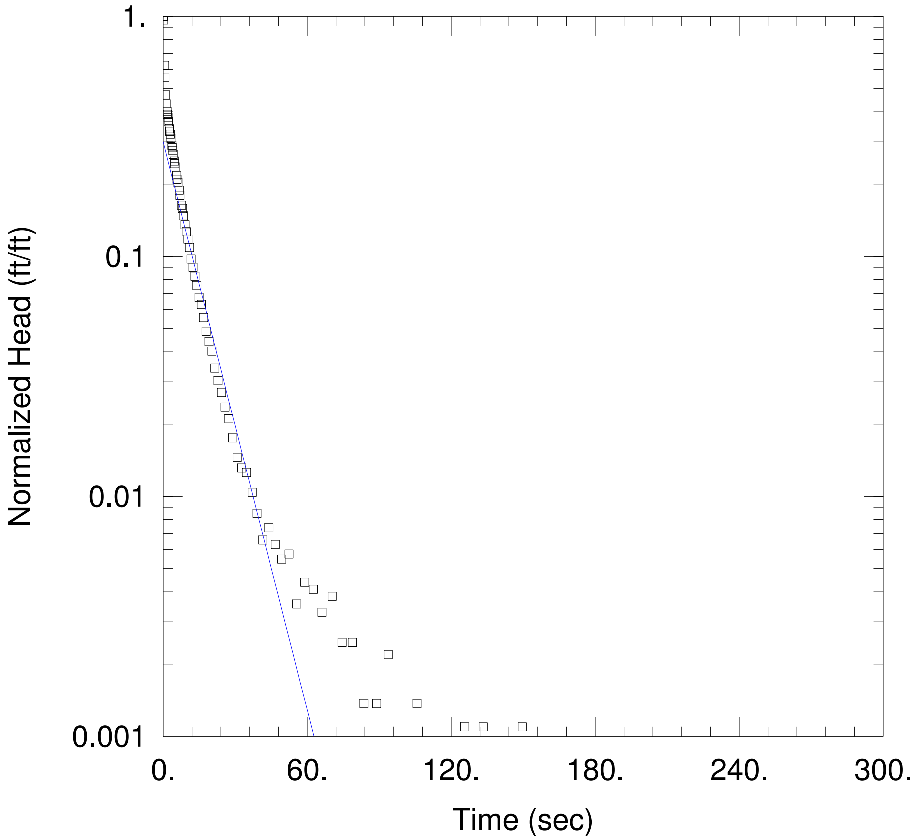
Saturated Thickness: 6.3 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SI2)

Initial Displacement: 2.617 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SO1.aqt
Date: 10/10/17 Time: 09:52:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

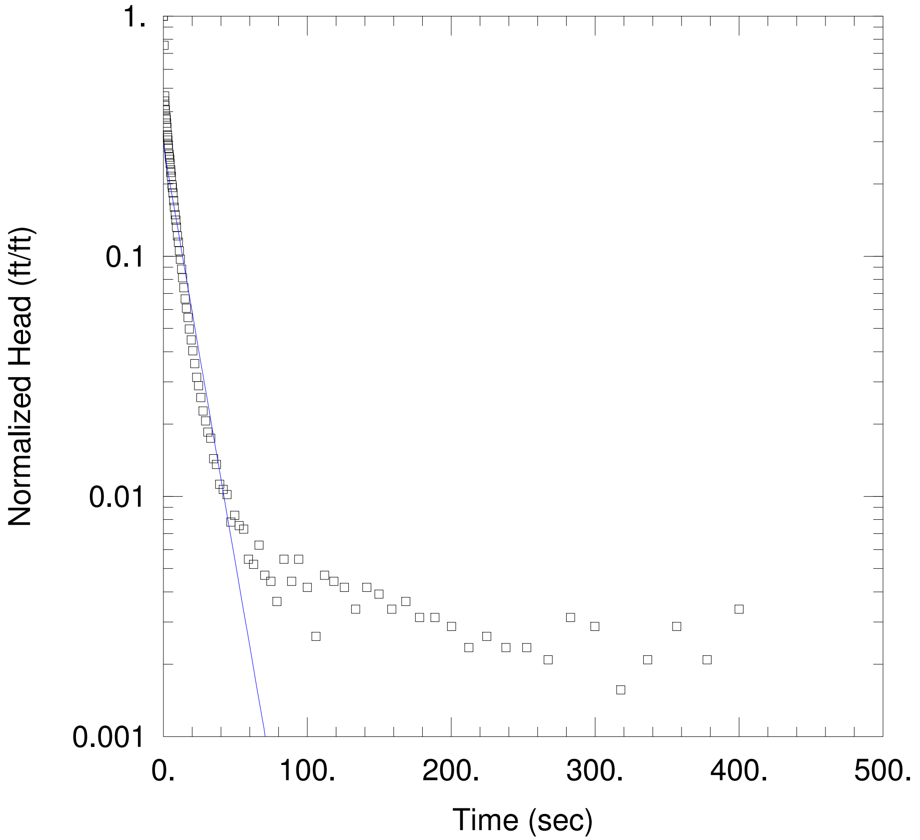
K = 0.003404 cm/sec
y0 = 1.094 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SO1)

Initial Displacement: 3.654 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SO2.aqt
Date: 10/10/17 Time: 09:53:49

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

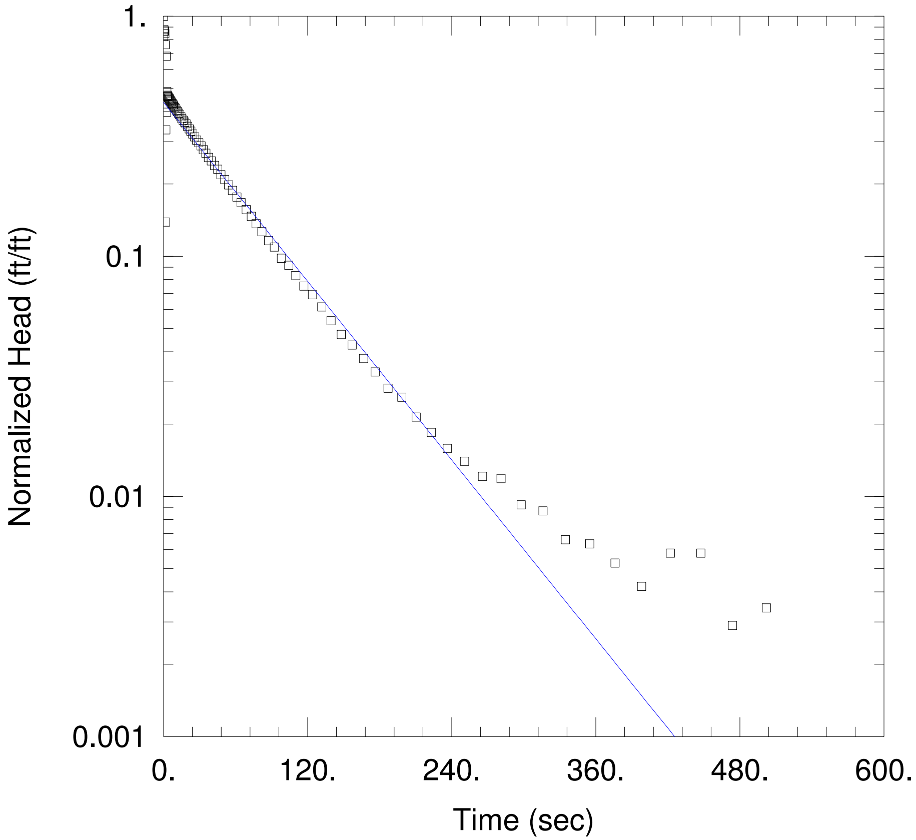
K = 0.003003 cm/sec
y0 = 1.117 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SO2)

Initial Displacement: 3.837 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SI1.aqt
Date: 10/10/17 Time: 09:56:32

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

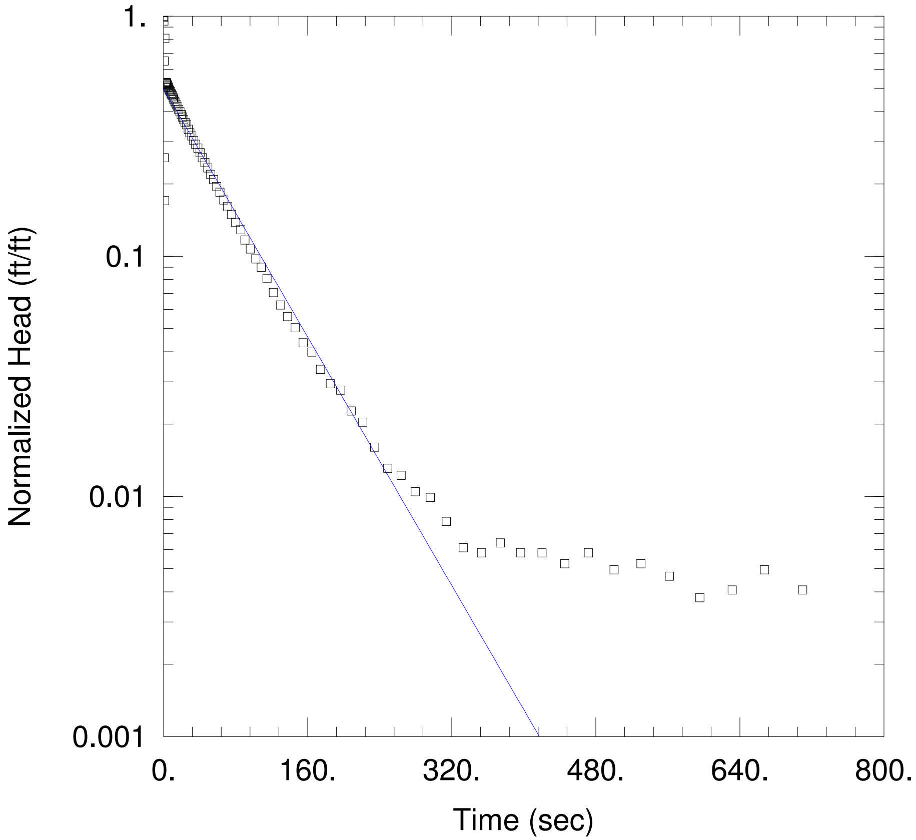
K = 0.0005269 cm/sec
y0 = 1.656 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SI1)

Initial Displacement: 3.792 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SI2.aqt
Date: 10/10/17 Time: 09:59:35

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

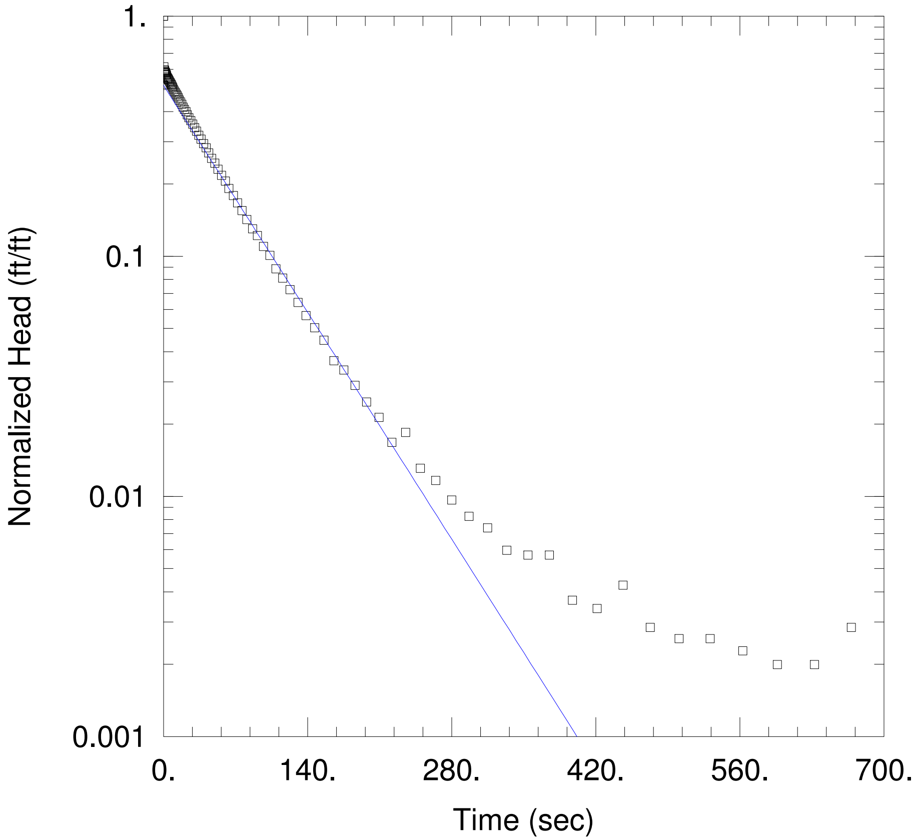
K = 0.0005491 cm/sec
y0 = 1.716 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SI2)

Initial Displacement: 3.438 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SO2.aqt
Date: 10/10/17 Time: 10:01:28

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

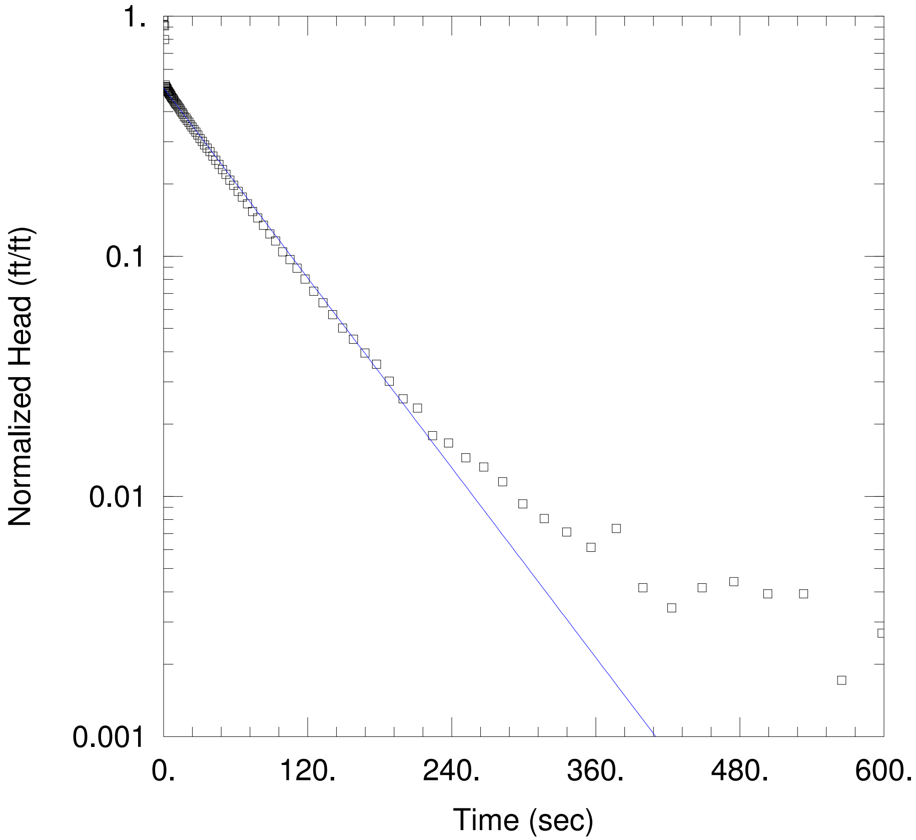
K = 0.0005731 cm/sec
y0 = 1.809 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SO2)

Initial Displacement: 3.518 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SO3.aqt
Date: 10/10/17 Time: 10:09:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

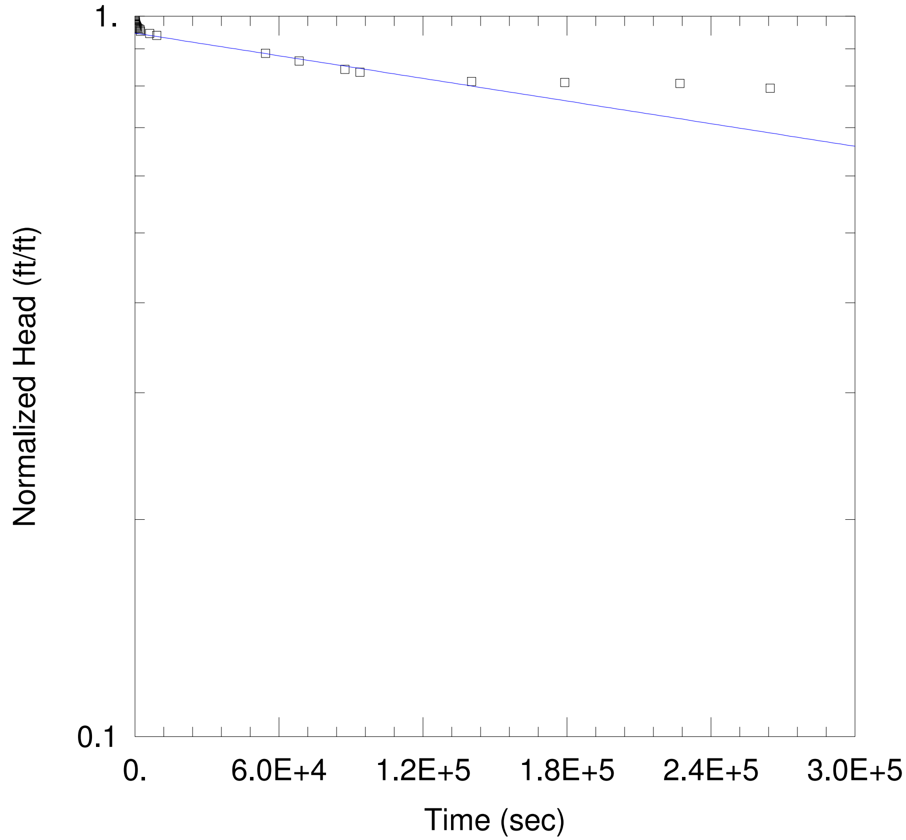
K = 0.0005595 cm/sec
y0 = 2.048 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SO2)

Initial Displacement: 4.081 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G06D SO1.aqt
Date: 10/10/17 Time: 10:15:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G06D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.917E-8 cm/sec
y0 = 3.807 ft

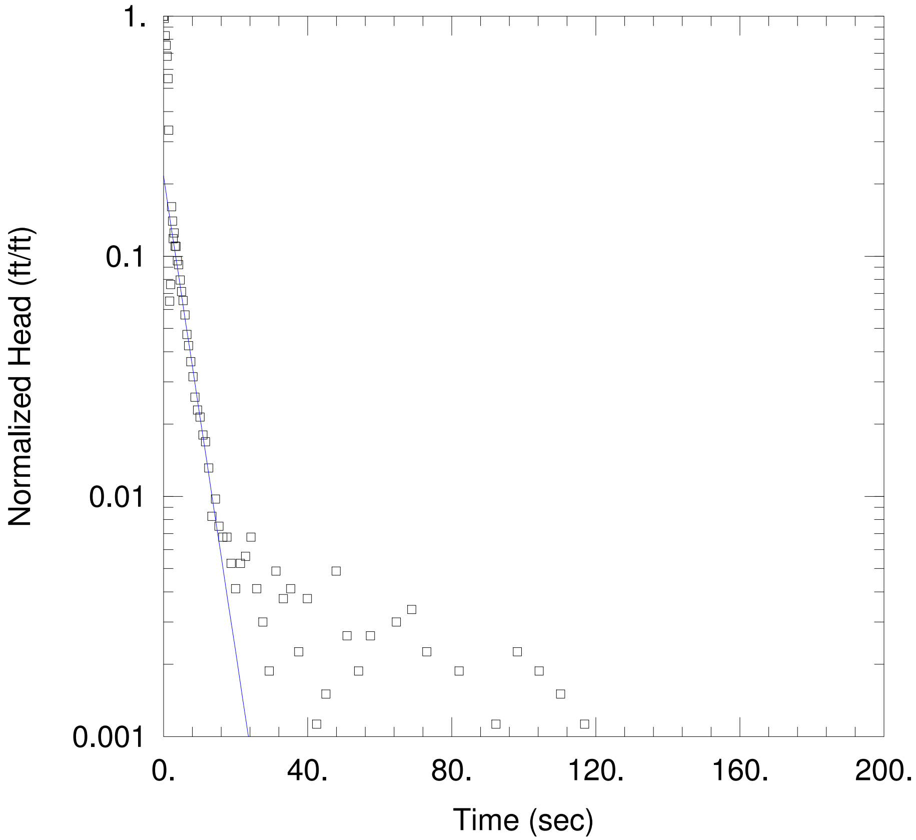
AQUIFER DATA

Saturated Thickness: 0.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G06D)

Initial Displacement: 4.02 ft
Total Well Penetration Depth: 0.4 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 0.4 ft
Screen Length: 0.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SI1.aqt
Date: 10/10/17   Time: 10:19:06

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.01698 cm/sec
y0 = 0.5744 ft

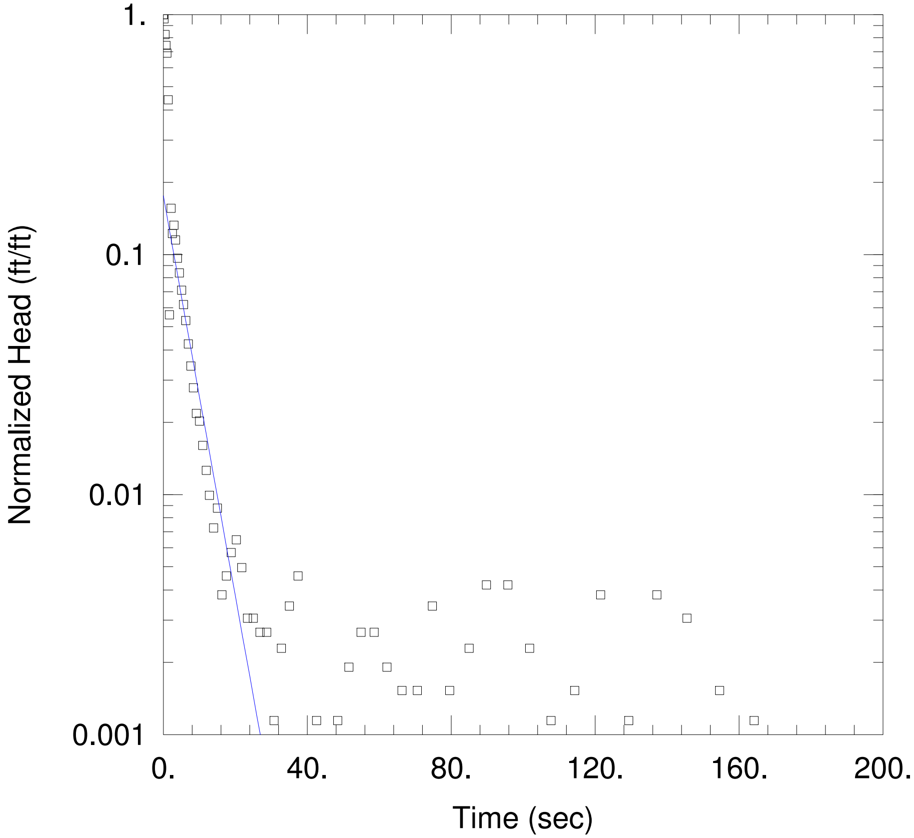
AQUIFER DATA

Saturated Thickness: 0.6 ft   Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SI1)

Initial Displacement: 2.666 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SI2.aqt
Date: 10/10/17 Time: 10:20:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

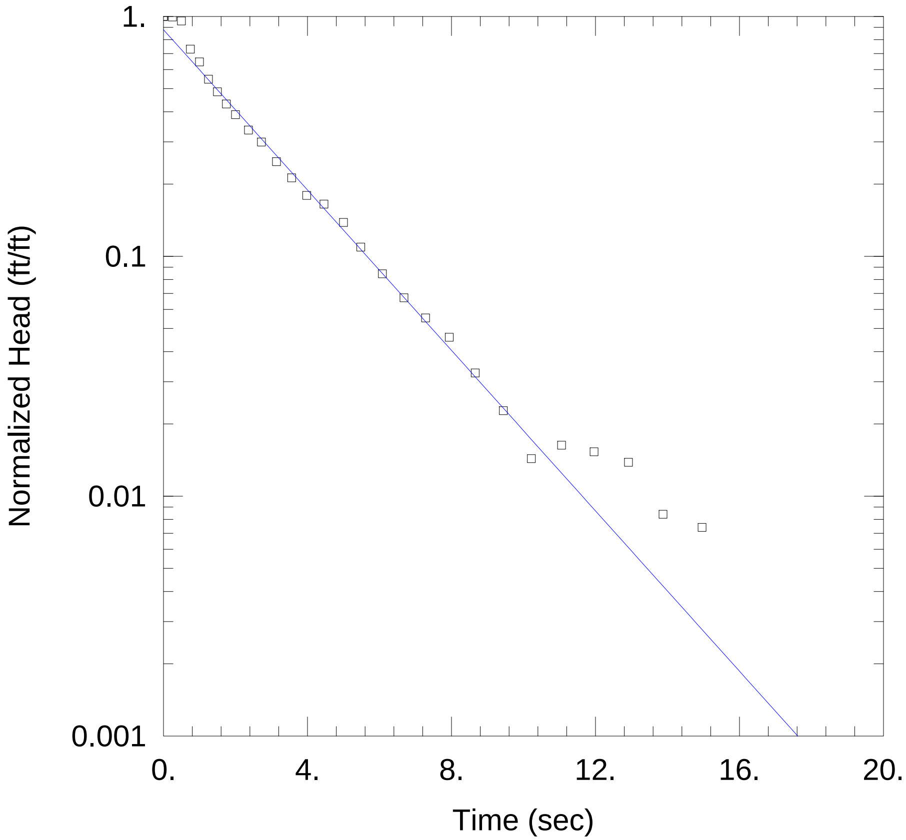
K = 0.0143 cm/sec
y0 = 0.4599 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SI2)

Initial Displacement: 2.621 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SO2.aqt
Date: 06/15/17 Time: 10:21:12

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

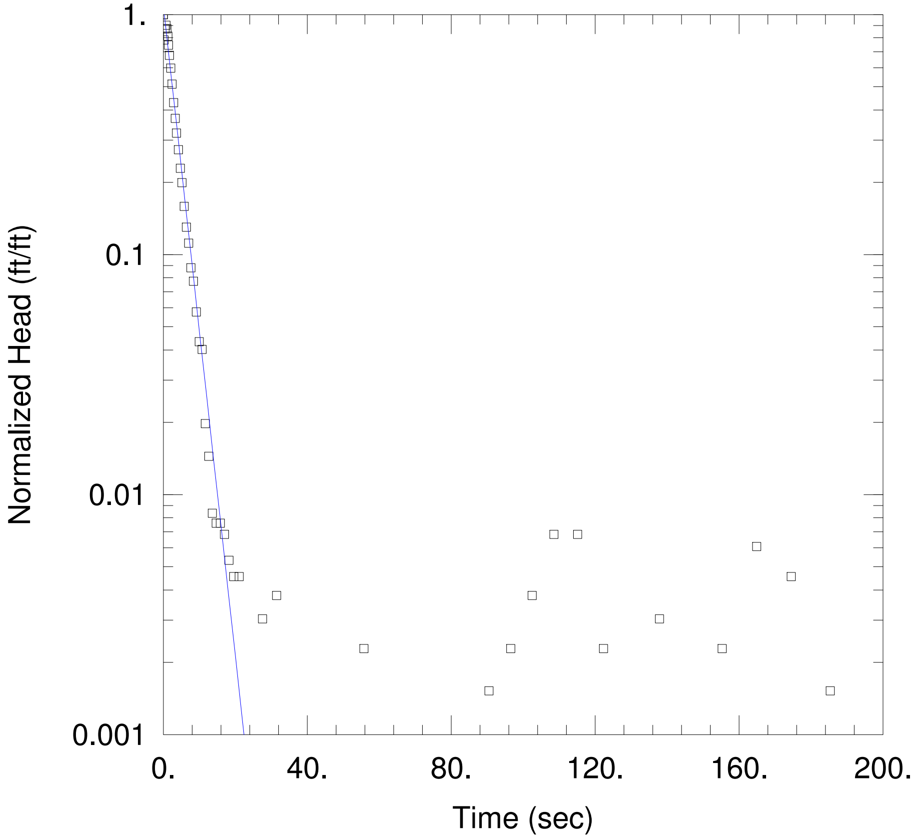
K = 0.02868 cm/sec
y0 = 1.781 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SO2)

Initial Displacement: 2.024 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SO3.aqt
Date: 10/10/17 Time: 10:21:38

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

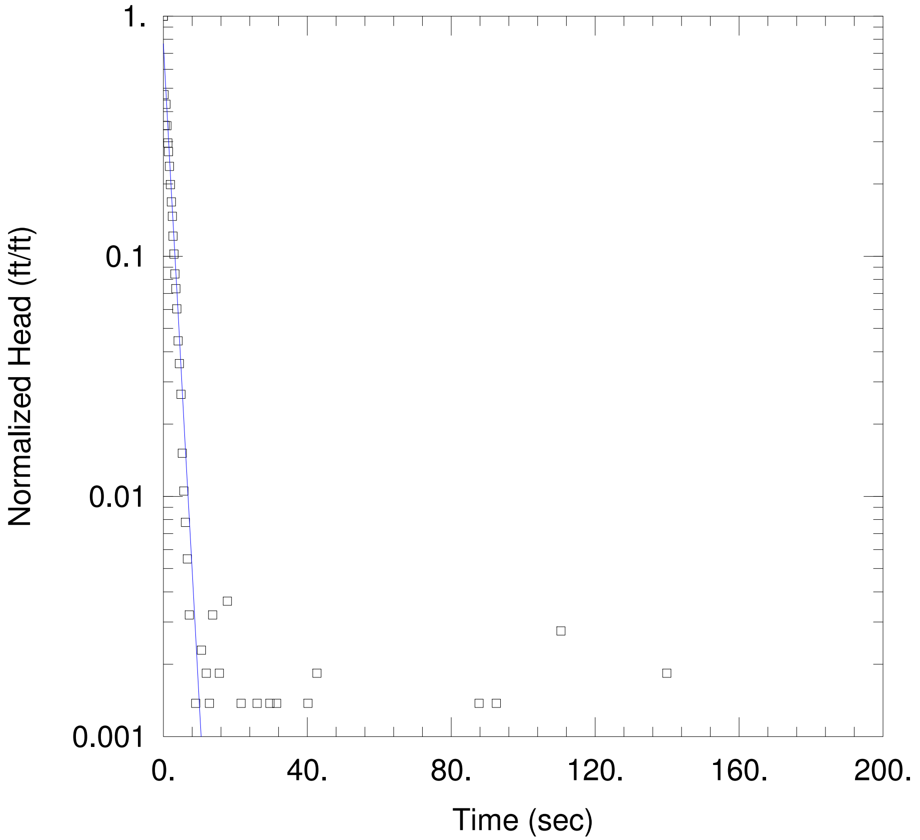
K = 0.02325 cm/sec
y0 = 1.444 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SO3)

Initial Displacement: 1.317 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SI1.aqt
Date: 10/10/17 Time: 10:24:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

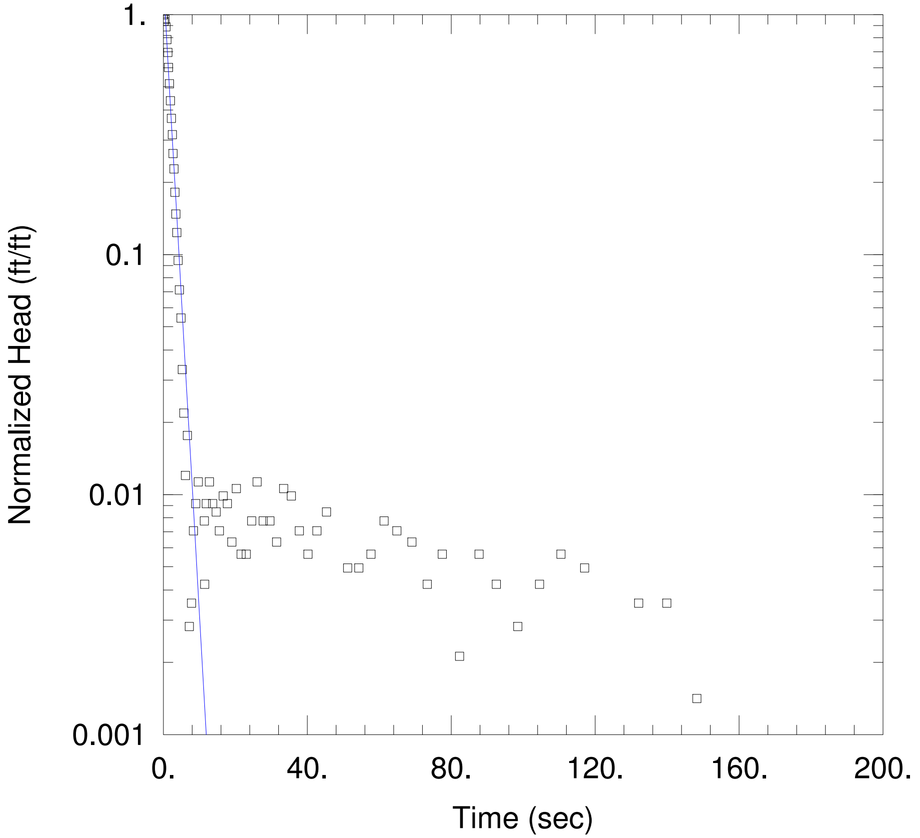
K = 0.02529 cm/sec
y0 = 1.676 ft

AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SI1)

Initial Displacement: 2.184 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SO1.aqt
Date: 10/10/17 Time: 10:28:31

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.02421 cm/sec
y0 = 1.958 ft

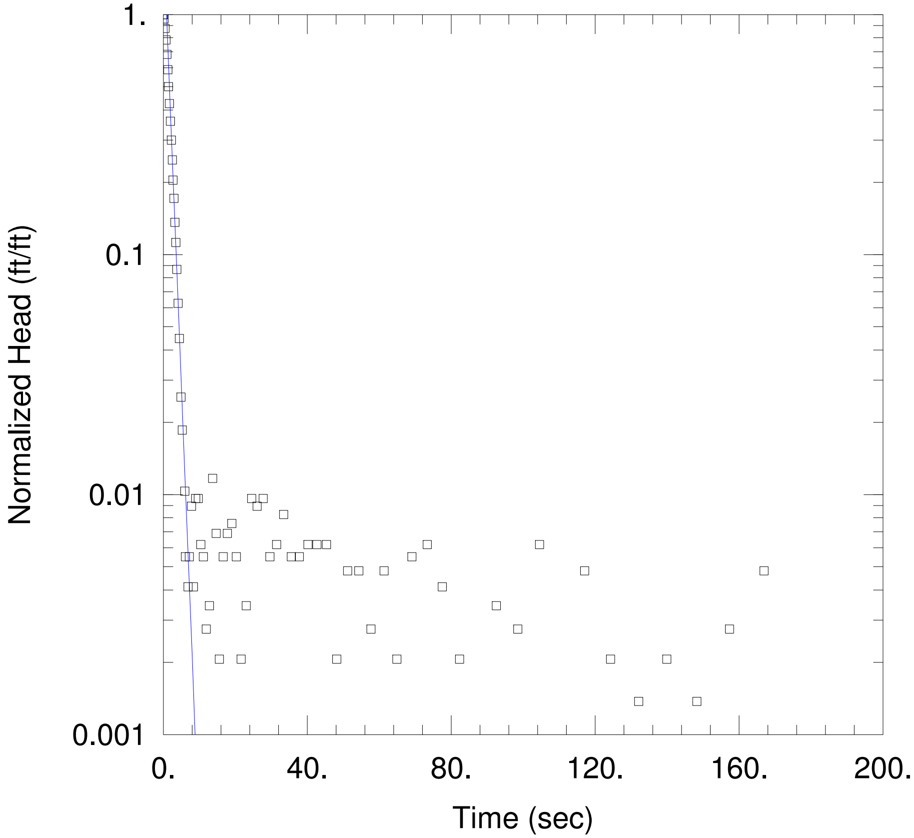
AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SO1)

Initial Displacement: 1.418 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SO2.aqt
Date: 10/10/17 Time: 10:30:34

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

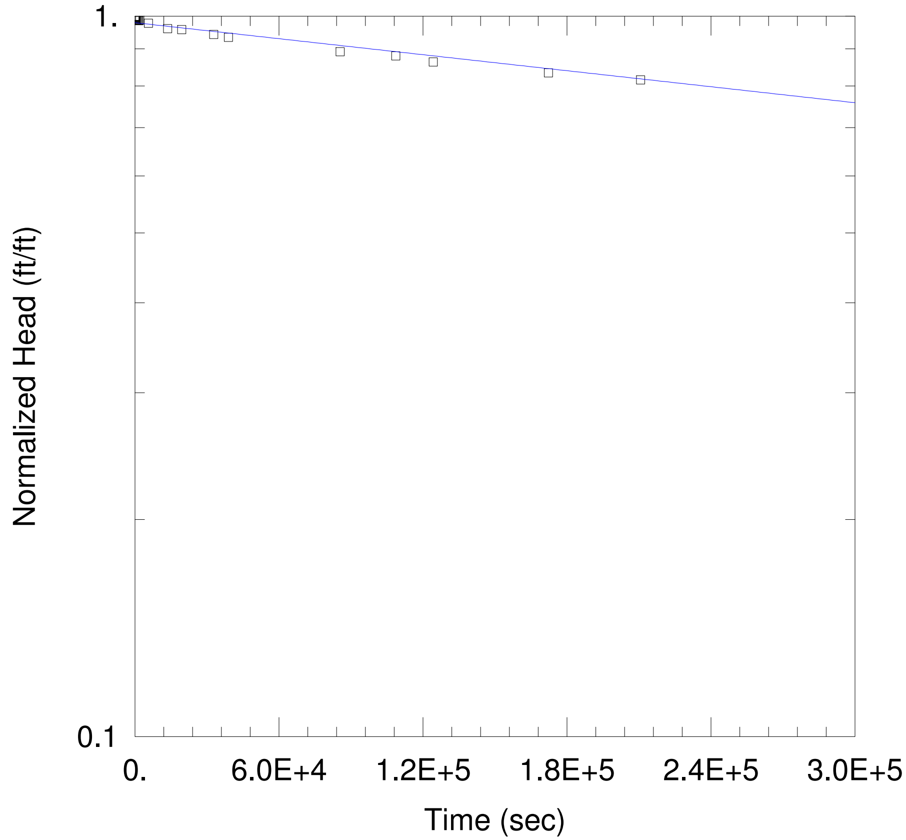
K = 0.03469 cm/sec
y0 = 3.185 ft

AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SO2)

Initial Displacement: 1.454 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G208 SO1.aqt
Date: 10/10/17 Time: 10:33:25

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G208
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

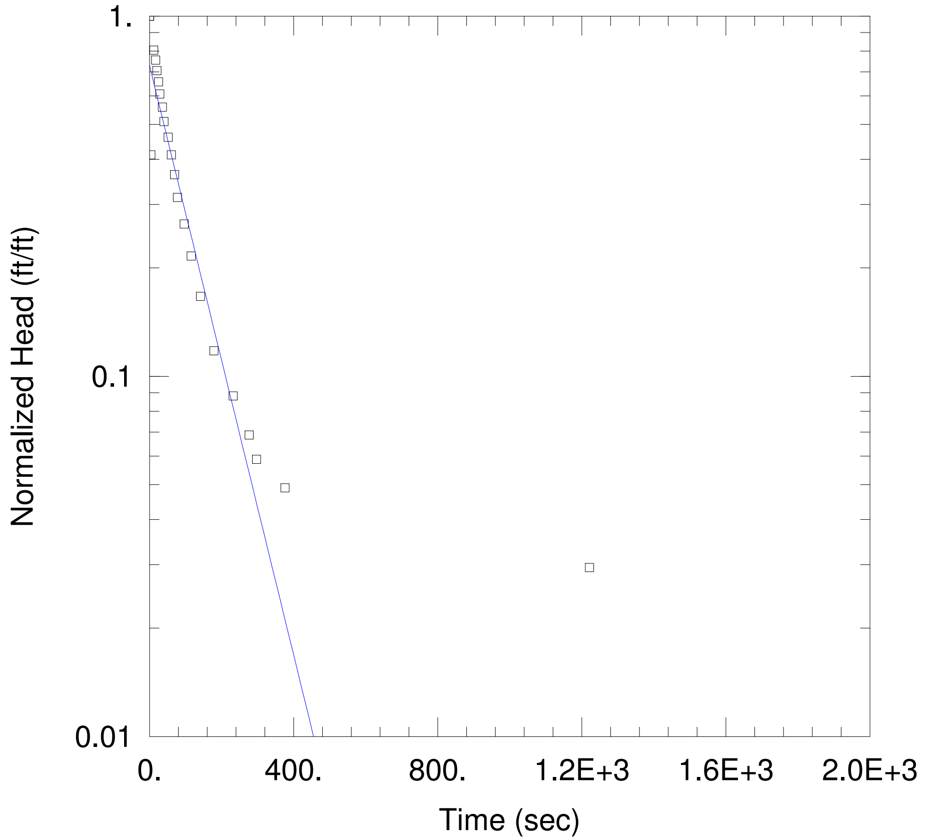
K = 1.315E-8 cm/sec
y0 = 10.16 ft

AQUIFER DATA

Saturated Thickness: 22.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G208 SO1)

Initial Displacement: 10.38 ft
Total Well Penetration Depth: 19.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 22.1 ft
Screen Length: 19.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SI1.aqt
Date: 10/10/17 Time: 10:35:45

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0002266 cm/sec
y0 = 0.743 ft

AQUIFER DATA

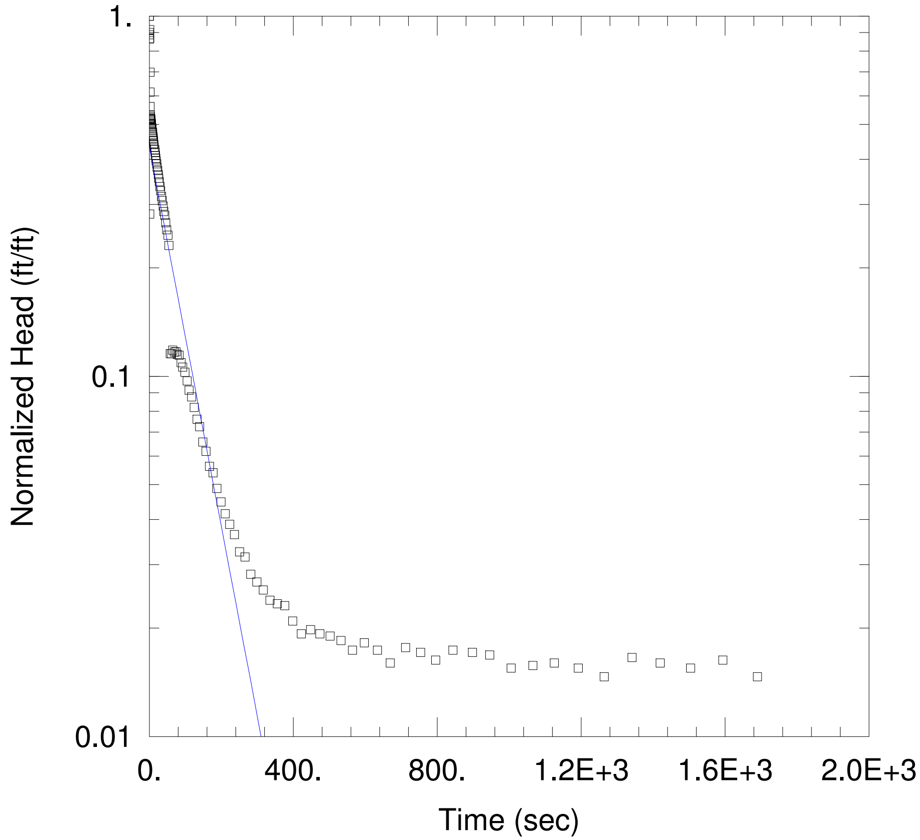
Saturated Thickness: 13. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SI1)

Initial Displacement: 1.02 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SI2.aqt
Date: 10/10/17 Time: 10:38:05

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

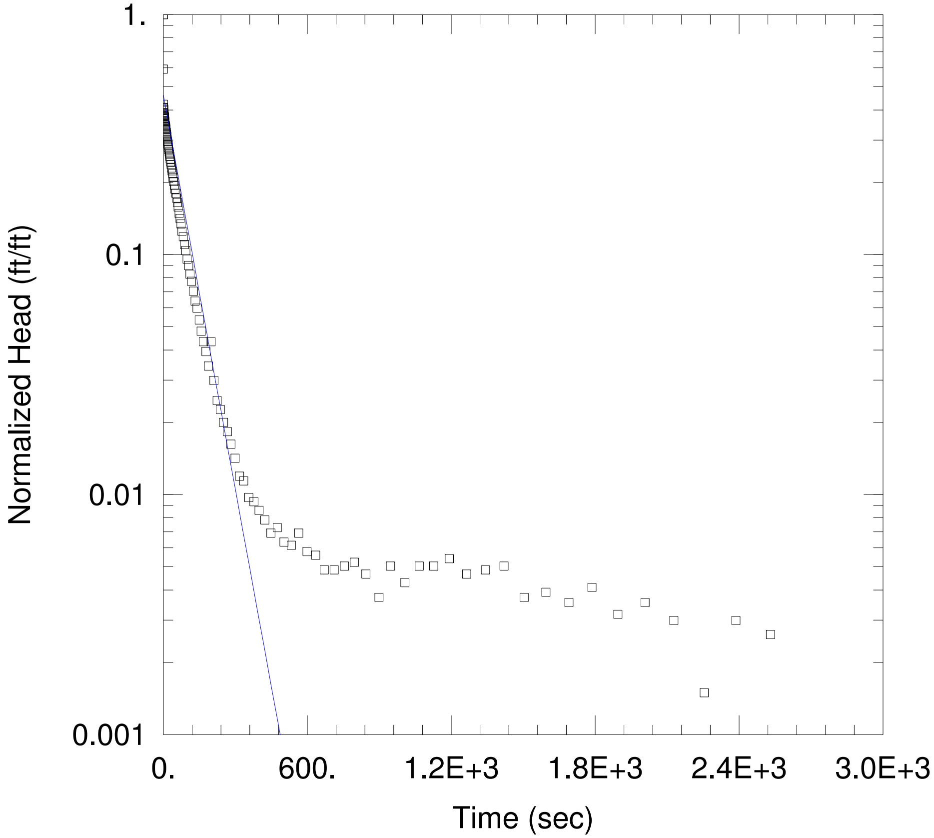
K = 0.0002919 cm/sec
y0 = 1.598 ft

AQUIFER DATA

Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SI2)

Initial Displacement: 3.685 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SO3.aqt
Date: 10/10/17 Time: 10:40:18

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

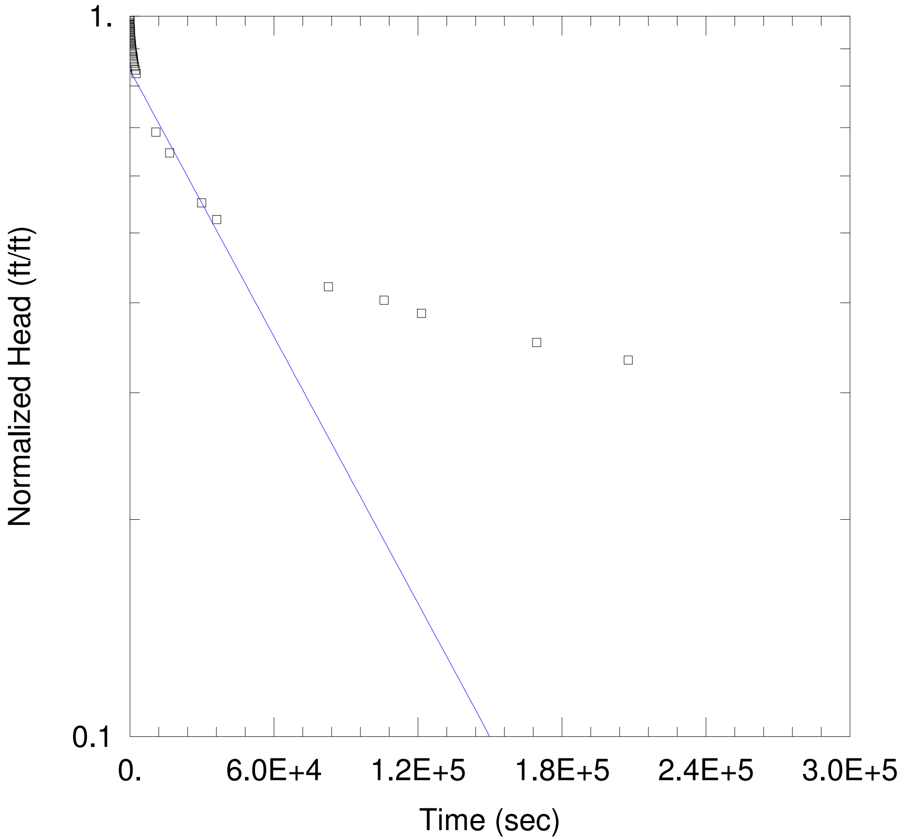
K = 0.0003032 cm/sec
y0 = 2.469 ft

AQUIFER DATA

Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SO3)

Initial Displacement: 5.362 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G220 SO1.aqt
Date: 10/10/17 Time: 10:42:50

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G220
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 3.513E-7 cm/sec
y0 = 9.098 ft

AQUIFER DATA

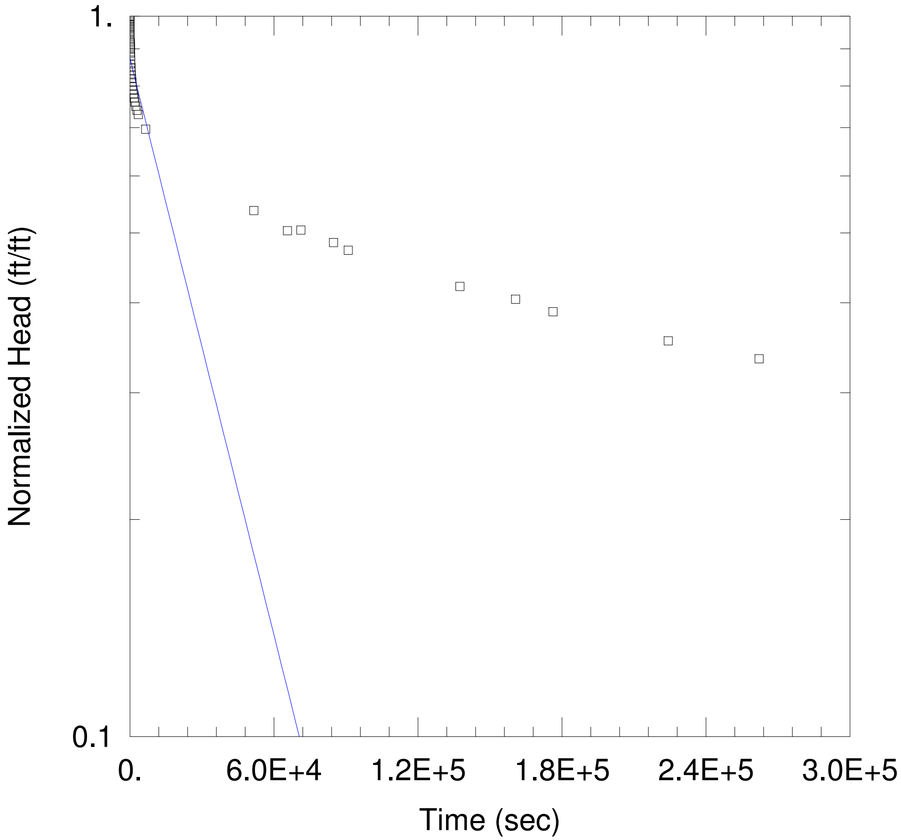
Saturated Thickness: 12. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G220 SO1)

Initial Displacement: 10.81 ft
Total Well Penetration Depth: 9.7 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 12. ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G222 SO1.aqt
Date: 10/10/17 Time: 10:49:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G222
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

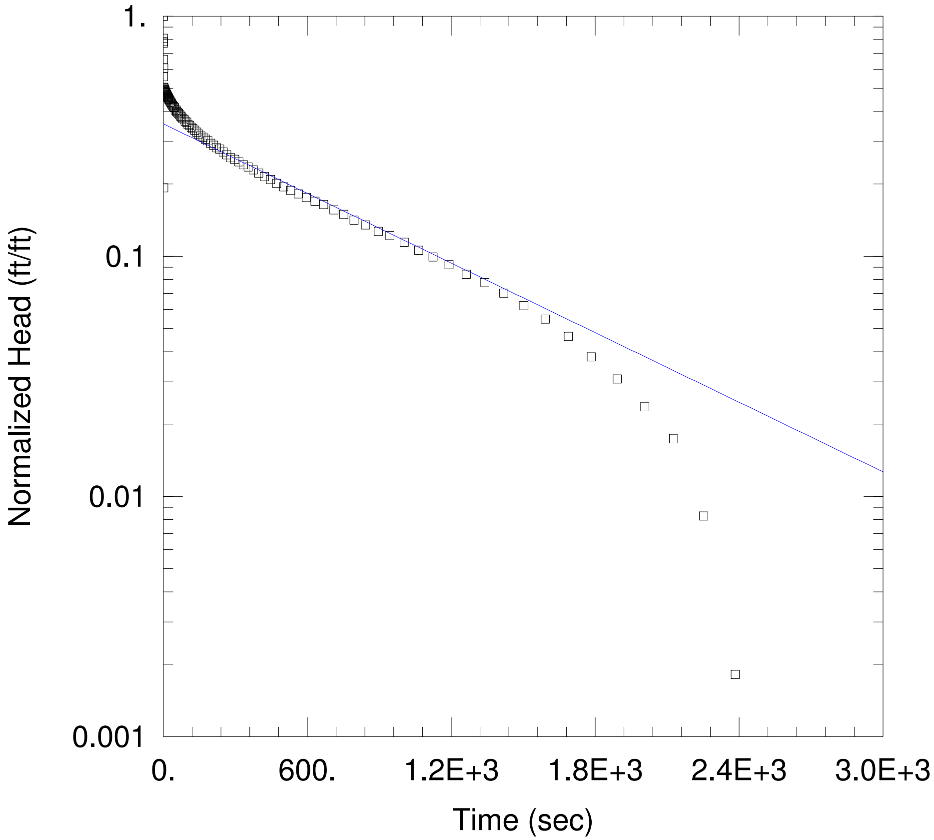
K = 1.541E-6 cm/sec
y0 = 8.832 ft

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G222 SO1)

Initial Displacement: 10.11 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 3.5 ft
Screen Length: 3.5 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SI1.aqt
Date: 10/10/17 Time: 10:55:09

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

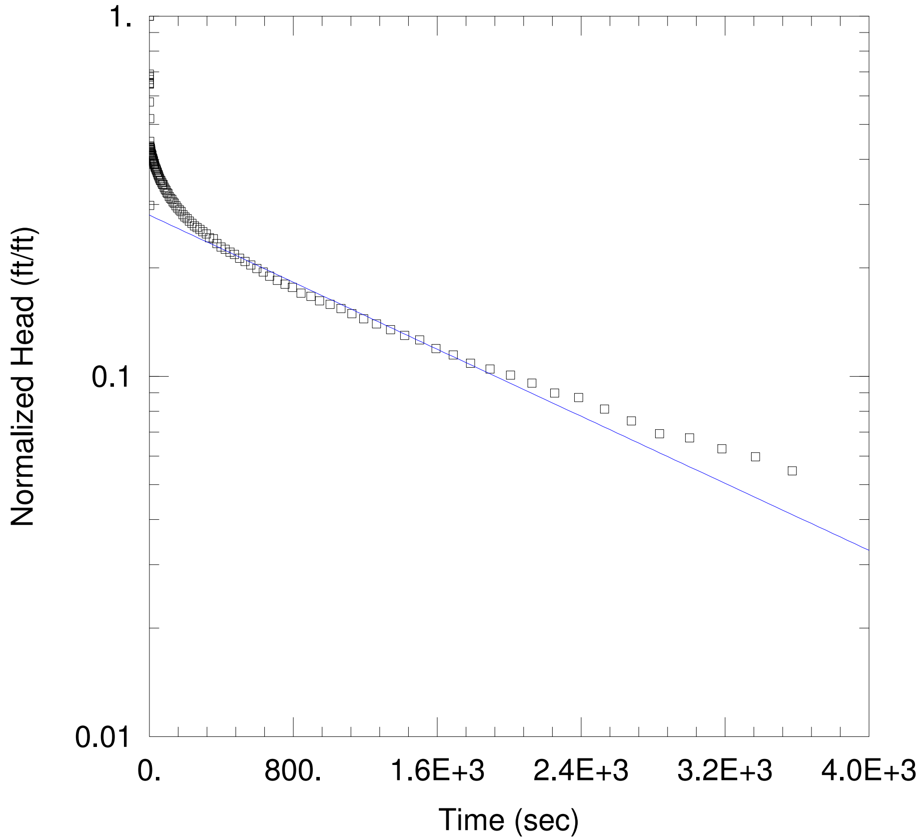
K = 5.19E-5 cm/sec
y0 = 1.374 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SI1)

Initial Displacement: 3.86 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SI2.aqt
Date: 10/10/17 Time: 10:57:35

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

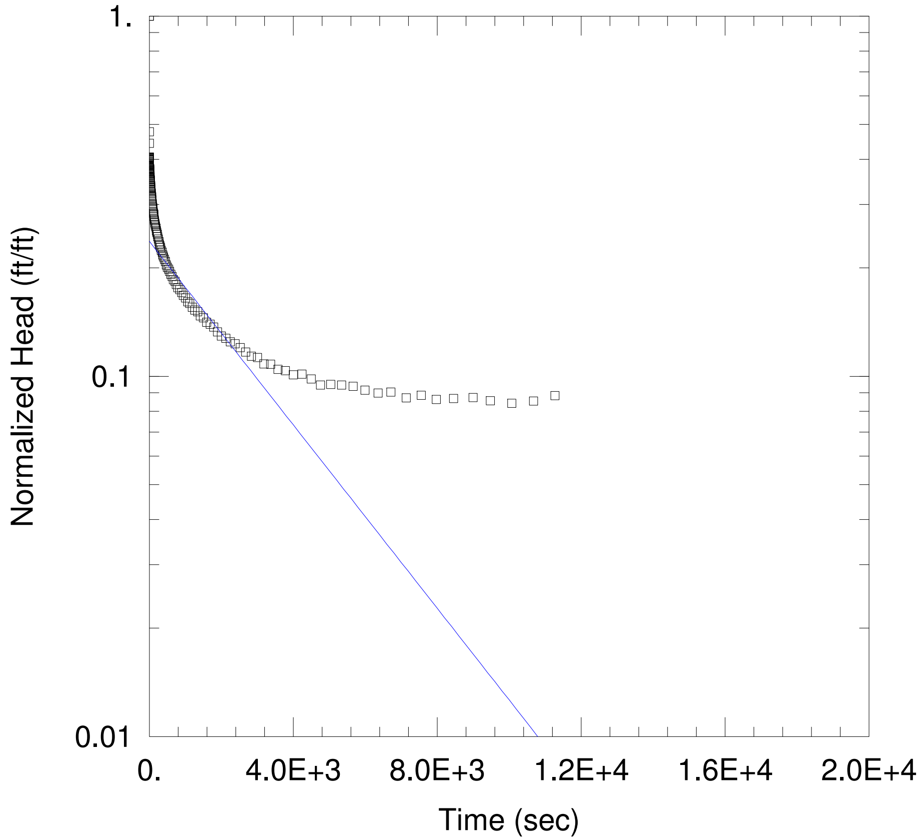
K = 2.5E-5 cm/sec
y0 = 1.251 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SI2)

Initial Displacement: 4.466 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SO1.aqt
Date: 10/10/17 Time: 11:00:37

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

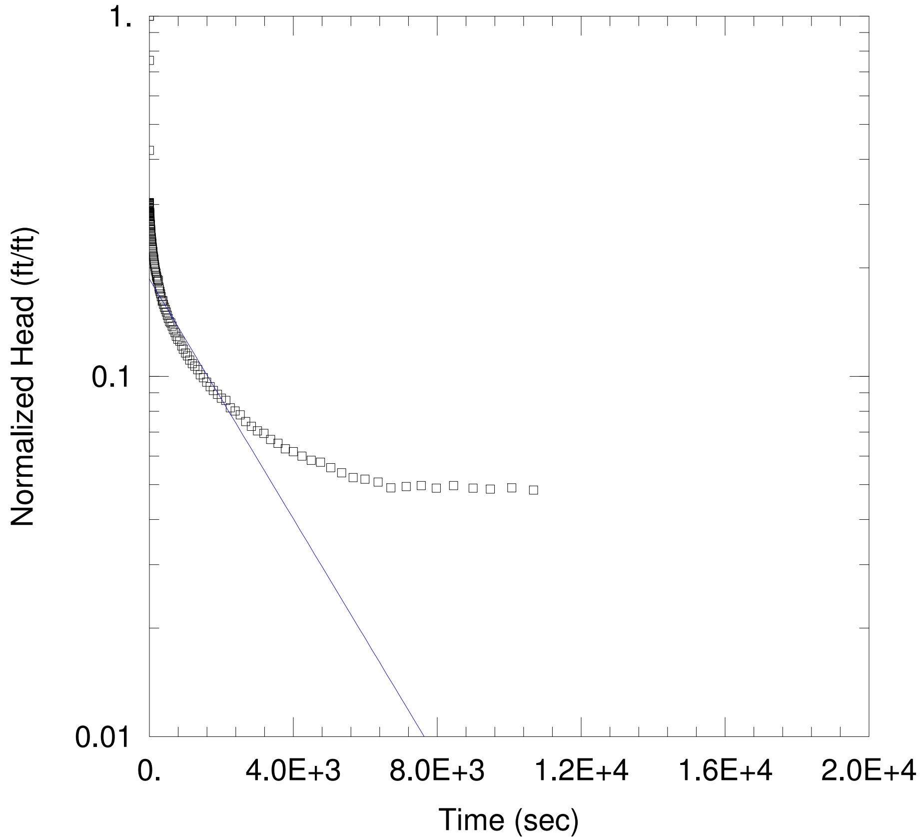
K = 1.368E-5 cm/sec
y0 = 1.281 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SO1)

Initial Displacement: 5.412 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SO2.aqt
Date: 10/10/17 Time: 11:01:58

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

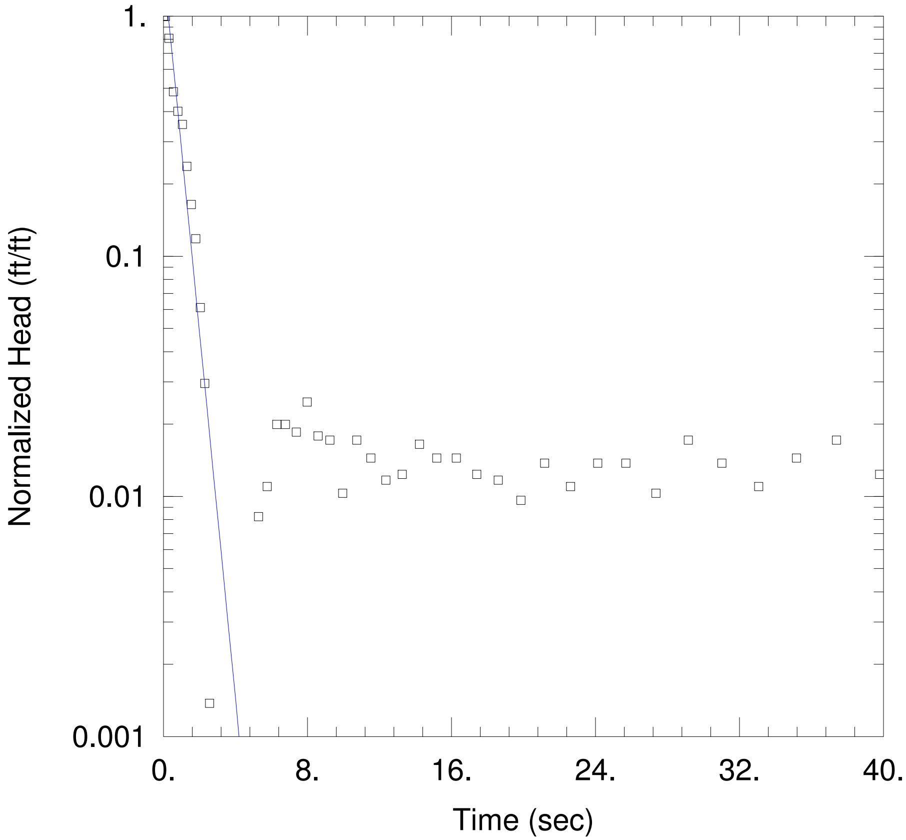
K = 1.786E-5 cm/sec
y0 = 1.359 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SO2)

Initial Displacement: 7.304 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI1.aqt
Date: 10/10/17 Time: 11:04:28

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

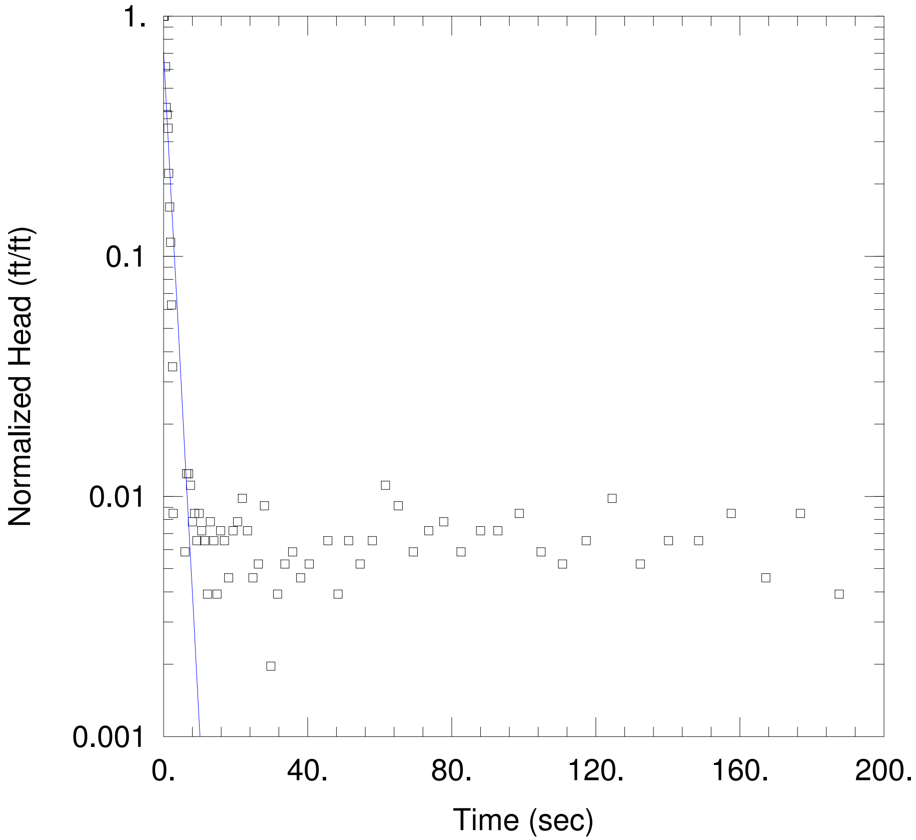
K = 0.05146 cm/sec
y0 = 2.38 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI1)

Initial Displacement: 1.457 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI2.aqt
Date: 10/10/17 Time: 11:06:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

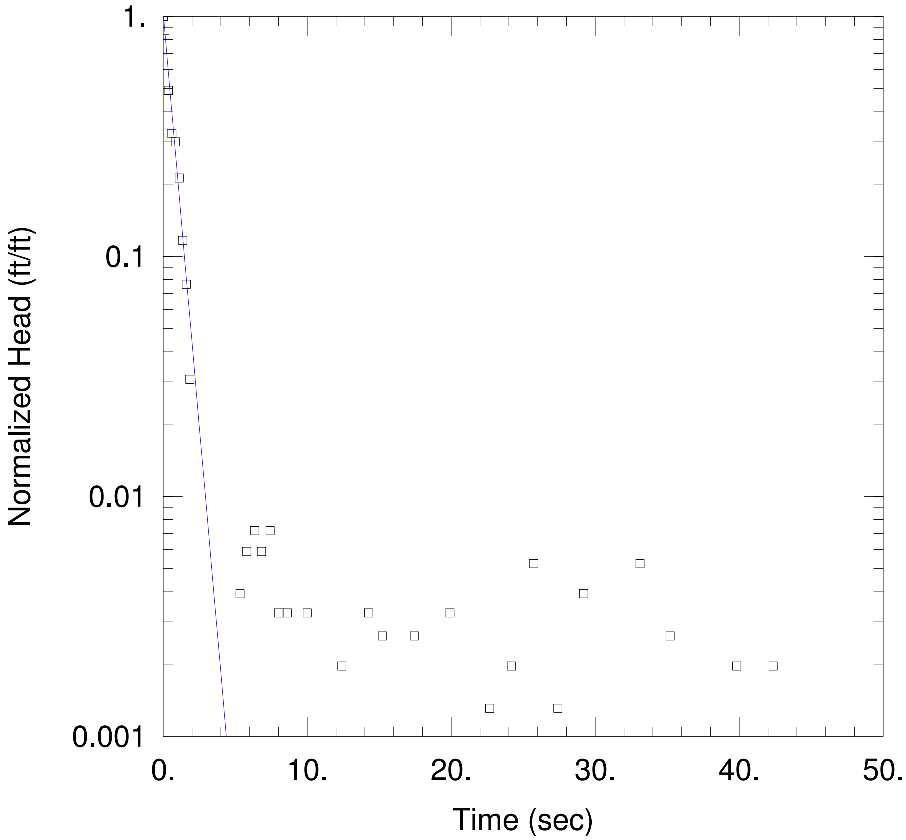
K = 0.01897 cm/sec
y0 = 1.081 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI2)

Initial Displacement: 1.531 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI3.aqt
Date: 10/10/17 Time: 11:08:48

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

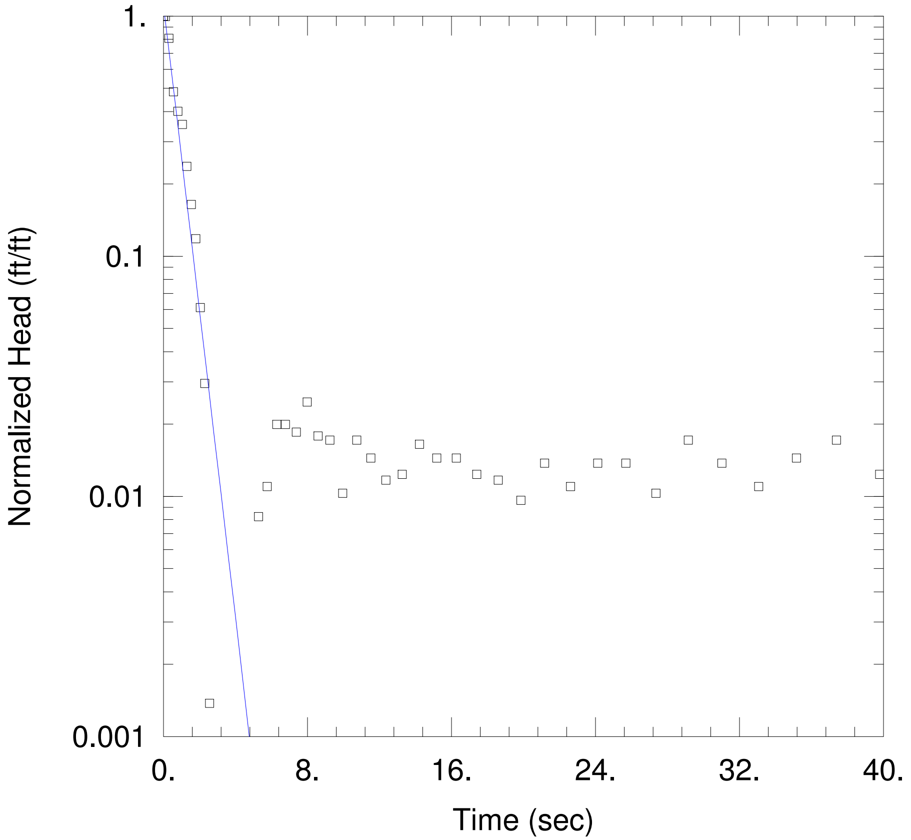
K = 0.04637 cm/sec
y0 = 1.586 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI3)

Initial Displacement: 1.529 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SO1.aqt
Date: 10/10/17 Time: 11:10:44

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

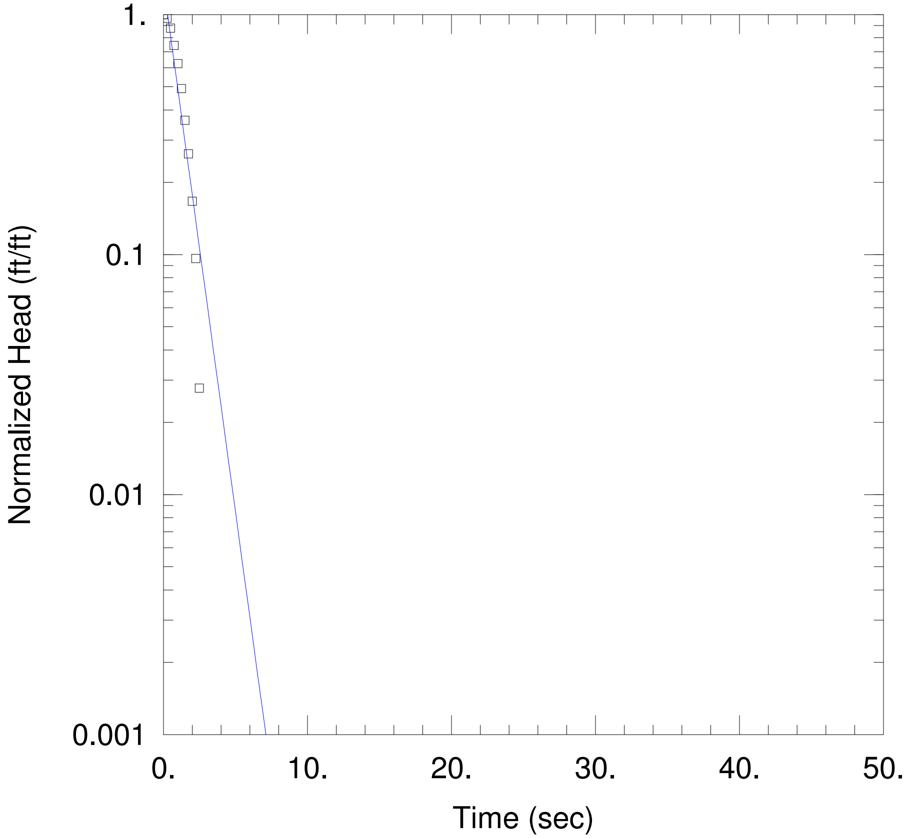
K = 0.04312 cm/sec
y0 = 1.657 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI1)

Initial Displacement: 1.457 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SO3.aqt
Date: 10/10/17 Time: 11:12:56

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0297 cm/sec
y0 = 1.264 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SO2)

Initial Displacement: 0.936 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft

APPENDIX G
FEMA FLOOD HAZARD MAP

KEY TO MAP

500-Year Flood Boundary — ZONE B
100-Year Flood Boundary
Zone Designations* — ZONE A1 / ZONE A5
100-Year Flood Boundary
500-Year Flood Boundary — ZONE B

Base Flood Elevation Line With Elevation In Feet** — 513
Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)
Elevation Reference Mark — RM7×
Zone D Boundary
River Mile — •M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Map Index.

INITIAL IDENTIFICATION:
JULY 27, 1979

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 17, 1985

FLOOD INSURANCE RATE MAP REVISIONS:

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE
2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

JASPER COUNTY,
ILLINOIS
(UNINCORPORATED AREAS)

PANEL 125 OF 150
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
170990 0125 B

EFFECTIVE DATE:
JANUARY 17, 1985

Federal Emergency Management Agency

ATTACHMENT I

Intended for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-008

GROUNDWATER MONITORING PLAN

PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT PRIMARY ASH POND

Project Name	**Newton Power Plant Primary Ash Pond**
Project No.	**1940100806-008**
Recipient	**Illinois Power Generating Company**
Document type	**Groundwater Monitoring Plan**
Revision	**FINAL**
Date	**October 25, 2021**

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Senior Managing Hydrogeologist

Eric J. Tlachac, PE
Senior Managing Engineer

Nathaniel R. Keller
Senior Hydrogeologist

Chase J. Christenson, PG
Hydrogeologist

LICENSED PROFESSIONAL CERTIFICATIONS

35 I.A.C. § 845.630 Groundwater Monitoring Systems (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system described in this document (Groundwater Monitoring Plan, Newton Power Plant Primary Ash Pond), has been designed and constructed to meet the requirements of 35 I.A.C. § 845.630. The monitoring system was developed based on information included in the Hydrogeologic Site Characterization Report (Ramboll 2021; included in the Operating Permit to which this Groundwater Monitoring Plan is attached).

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: October 25, 2021

35 I.A.C. § 845.630 Groundwater Monitoring Systems (PG)

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the groundwater monitoring system described in this document (Groundwater Monitoring Plan, Newton Power Plant Primary Ash Pond), has been designed and constructed to meet the requirements of 35 I.A.C. § 845.630. The monitoring system was developed based on information included in the Hydrogeologic Site Characterization Report (Ramboll 2021; included in the Operating Permit to which this Groundwater Monitoring Plan is attached).

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Date: October 25, 2021

CONTENTS

TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
bgs	below ground surface
CCR	coal combustion residuals
cm/s	centimeters per second
GMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
LCU	lower confining unit
LF 1	Phase 1 Landfill
LF 2	Phase 2 Landfill
LVW	low-volume wastewater
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	Number
NPDES	National Pollutant Discharge Elimination System
NPP	Newton Power Plant
NRT	Natural Resource Technology, Inc.
PAP	Primary Ash Pond
Part 845	Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845
PMP	potential migration pathway
QA/QC	quality assurance/quality control
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RL	Reporting Limit
SI	Surface Impoundment
TDS	total dissolved solids
UA	uppermost aquifer
UCU	upper confining unit
UD	upper drift
USEPA	United States Environmental Protection Agency
WLO	water level only

1. INTRODUCTION

1.1 Overview

In accordance with requirements of the Standards for the Disposal of Coal Combustion Residuals (CCR) in Surface Impoundments (SIs): Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 (Part 845) (Illinois Environmental Protection Agency [IEPA], April 15, 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Monitoring Plan (GMP) on behalf of Newton Power Plant (NPP) (**Figure 1-1**), operated by Illinois Power Generating Company (IPGC). This report will apply specifically to the CCR Unit referred to as the Primary Ash Pond (PAP), Vistra identification (ID) number (No.) 501, IEPA ID No. W0798070001-01, and National Inventory of Dams (NID) No. IL50719. This GMP includes Part 845 content requirements specific to 35 I.A.C. § 845.630 (Groundwater Monitoring System), 35 I.A.C. § 845.640 (Groundwater Sampling and Analysis), and 35 I.A.C. § 845.650 (Groundwater Monitoring Program) for the PAP at the NPP.

A checklist which identifies the specific requirements of 35 I.A.C. § 845.630, 35 I.A.C. § 845.640, and 35 I.A.C. § 845.650 is included in **Table 1-1**. The table provides references to sections, tables, and figures included in this document to locate the information that meets specific requirements of 35 I.A.C. § 845.630, 35 I.A.C. § 845.640, and 35 I.A.C. § 845.650.

1.2 Site Location and Background

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately seven miles southwest of the town of Newton (**Figure 1-1**). The NPP operates as a coal-fired power plant with three CCR units present, including the PAP which is the subject of this GMP and two landfills: the Phase 1 Landfill (LF 1) located northwest and west of the PAP, and the Phase 2 Landfill (LF 2) located to the west of the PAP. The PAP is located within Section 26 and the west half of Section 25, Township 6 North, Range 8 East. The PAP is located south of the NPP and surrounded by Newton Lake to the south, east, and west (**Figure 1-2**).

The PAP is an unlined CCR SI used to manage CCR and non-CCR waste streams at the NPP. The PAP was constructed in 1977 and has a design capacity of approximately 9,715 acre-feet. There is also a non-CCR 83.6 acre-feet Secondary Pond located immediately south of the PAP. The PAP has a surface area of 404 acres and the Secondary Pond has an area of 9.3 acres. The PAP currently receives stormwater runoff, bottom ash, fly ash, and low-volume wastewater (LVW) from the plant's two coal-fired boilers. The SI is operated per National Pollutant Discharge Elimination System (NPDES) Permit No. IL0049191, Outfall 001 (located at the Secondary Pond). Areas within the impoundment were excavated during construction for native materials used to build the containment berms.

1.3 Conceptual Model

Significant site investigation has been completed at the NPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the PAP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (HCR; included in the Operating Permit to which this Plan is attached). A site conceptual model has been developed and is discussed below.

In addition to the CCR present in the PAP, there are six layers of unlithified material present above the bedrock, which are categorized into the four hydrostratigraphic units below based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Drift (UD)/Potential Migration Pathway (PMP):** The UD is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member(*i.e.,* PMP).
  - **Hagarstown Member/PMP:** The Hagarstown Member consists of discontinuous sandier deposits of the UD, where present, and overlies the Vandalia Till.
- **Upper Confining Unit (UCU):** This unit consists of the low permeability clay and silt of the Vandalia Till Member (Vandalia Till).
- **Uppermost Aquifer:** This unit is composed of the Mulberry Grove Formation, which onsite has been classified as poorly graded sand, silty sand, clayey sand, and gravel.
- **Lower Confining Unit (LCU):** This unit is comprised of low permeability silt and clay of the Smithboro Till Member (Smithboro Till) and the Banner Formation.

Groundwater migrates downward through the UD and UCU into the uppermost aquifer. Groundwater in the uppermost aquifer flows from north to south/southwest and converges near a former drainage feature located west of the PAP (**Figure 1-3**). Groundwater elevations vary seasonally, although generally less than one foot per year. The surface water elevation at Newton Lake (at location SG02) measured between February 15 and March 9, 2021 ranged from 504.42 to 504.84 feet North American Vertical Datum of 1988 (NAVD88). Groundwater elevations in the uppermost aquifer at downgradient wells were observed around 491 feet NAVD88 (approximately 15 feet lower than the Lake elevation). The separation between measured groundwater elevations and Lake elevations (and observed downward vertical gradients) indicates groundwater does not flow into Newton Lake from the uppermost aquifer.

Part 845 parameters were monitored in uppermost aquifer and PMP monitoring wells as part of groundwater quality evaluations performed between 2015 and present. These data were supplemented with installation and sampling of additional locations in 2021. The results indicate that the following parameters were detected at concentrations greater than the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Arsenic at six uppermost aquifer wells, including downgradient wells APW08, APW09, APW15, and APW16 and background wells APW05 and APW06.
- Chloride at upgradient UD well APW05S and downgradient uppermost aquifer well APW15.
- Cobalt at PMP well APW12.
- Fluoride at downgradient uppermost aquifer well APW15 and APW18.
- Lead at downgradient uppermost aquifer wells APW08, APW11, and APW18.
- Lithium at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and two downgradient uppermost aquifer wells APW13 and APW14.
- pH values below the lower range of the GWPS were observed at four PMP wells APW02, APW03, APW04, APW12; one background UA well APW06; and two downgradient uppermost aquifer wells APW11 and APW13.

- Radium 226 and 228 combined at downgradient uppermost aquifer well APW16.
- Sulfate at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and one downgradient uppermost aquifer well APW10.
- Thallium at one background well APW06, and two downgradient uppermost aquifer wells APW11 and APW18.
- Total dissolved solids (TDS) at four PMP wells APW02, APW03, APW04, and APW12; and one Upgradient UD well APW05S.

Concentration results for the above parameters were compared directly to 35 I.A.C. § 845.600(a)(1) GWPS, without an evaluation of background concentrations. Evaluation of background groundwater quality has been completed as part of this GMP, and compliance with Part 845 will be determined following the first round of groundwater sampling. The first round of groundwater sampling for compliance will be completed the quarter following issuance of the Operating Permit and in accordance with this GMP.

2. GROUNDWATER MONITORING SYSTEMS

2.1 Existing Monitoring Well Network and Analysis

This GMP is being provided to propose a groundwater monitoring network and monitoring program specific to the PAP that will comply with Part 845. The remaining discussion in this document will include only these networks and monitoring programs that are applicable and specific to the PAP, specifically the IEPA monitoring program, the Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 network, and the proposed Part 845 monitoring network.

2.1.1 IEPA Monitoring Program

The current IEPA-required groundwater monitoring program associated with the PAP consists of four groundwater monitoring wells, including two background monitoring wells (G116 and APW02) and two compliance monitoring wells (APW03 and APW04) in accordance with the Special Condition No. 19 of the plant's NPDES Permit IL0049191. Groundwater samples are collected quarterly and analyzed for dissolved manganese, dissolved sulfate, dissolved zinc, TDS, and pH. Upon approval of the Operating Permit application (and by extension the GMP), the NPDES monitoring program Special Condition No. 19 will be discontinued following approval of a future NPDES permit modification submittal. The boring logs, well construction forms, and other related monitoring well forms for the well network are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). The well locations are shown on **Figure 2-1**.

2.1.2 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 well network for the PAP consists of six monitoring wells screened in the uppermost aquifer, including two background monitoring wells (APW05 and APW06) and four compliance monitoring wells (APW07, APW08, APW09, and APW10). The boring logs, well construction forms, and other related monitoring well forms are available in the Operating Records as required by 40 C.F.R. § 257.91 for each monitored CCR Unit or CCR Multi-Unit, and are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). The well locations are shown on **Figure 2-1**.

Groundwater is being monitored at the PAP in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94. Details of the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Sampling and Analysis Plan for the PAP (Natural Resource Technology, Inc. [NRT], 2017).

Groundwater samples are collected semi-annually and analyzed for the field and laboratory parameters from Appendix III of 40 C.F.R. § 257, summarized in **Table A** below.

Table A. 40 C.F.R. § 257 Groundwater Monitoring Program Parameters

Field Parameters[1]		
Groundwater Elevation	pH	
Appendix III Parameters (Total, except TDS)		
Boron	Chloride	Sulfate
Calcium	Fluoride	TDS

[1]Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity are recorded during sample collection.

Results and analysis of groundwater sampling are reported annually by January 31 of the following year and made available on the CCR public website as required by 40 C.F.R. § 257.

2.1.3 Part 845 Well Installation and Monitoring

In 2021, nine additional monitoring wells (APW11, APW12, APW13, APW14, APW15, APW16, APW17, APW18, and APW5S) were installed along the perimeter of the PAP to assess the vertical and horizontal lithology, stratigraphy, chemical properties, and physical properties of geologic layers to a minimum of 100 feet below ground surface (bgs) as specified in 35 I.A.C. § 845.620(b). Additionally, four leachate monitoring wells (XPW01, XPW02, XPW03, and XPW04) were installed within the PAP to characterize CCR materials and leachate.

Prospective Part 845 monitoring wells were sampled for eight rounds between February and August 2021 and the results were used for selection of the PAP Part 845 monitoring well network. Groundwater samples were collected and analyzed for 35 I.A.C. § 845.600 parameters as summarized in **Table B** below.

Table B. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Turbidity	Groundwater Elevation	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

Data and results from the Part 845 background monitoring were included in the water quality discussion included in the HCR (included in the Operating Permit to which this Plan is attached). The data collected from background locations during the Part 845 monitoring were used to evaluate and calculate background concentrations for the PAP. The evaluation and discussion are included in **Section 3.2** of this report.

Data collected from the 40 C.F.R. § 257 monitoring network from 2015 to 2020, and from the Part 845 background monitoring were used for selection of the Part 845 monitoring well network proposed in **Section 2.2**.

2.2 Proposed Part 845 Monitoring Well Network

The groundwater monitoring network proposed in this plan will include five monitoring wells screened in the UD (APW02[1], APW03[1], APW04[1], APW05S[1], and APW12[1]), 13 monitoring wells screened in the uppermost aquifer (APW05, APW06, APW07, APW08, APW09, APW10, APW11, APW13, APW14, APW15, APW16, APW17, and APW18), and two temporary water level only surface water staff gages (XSG01 and SG02). The proposed network is summarized in **Table C** on the following page and displayed on **Figure 2-1.** Eighteen wells (two background and 16 compliance) will be used to monitor groundwater concentrations within the hydrostratigraphic units.

The groundwater samples collected from the 18 wells will be used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards listed in 35 I.A.C. § 845.600(a). The proposed monitoring wells will yield groundwater samples that represent the quality of downgradient groundwater at the CCR boundary (as required in 35 I.A.C. § 845.630(a)(2)). Monitoring well depths and construction details are listed in **Table 2-1** and summarized in **Table C** on the following page.

[1] Monitoring wells APW02, APW03, APW04, APW05S, and APW12 are wells screened in the UD that have been identified to monitor the PMP.

Table C. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type[3]
APW02*	UD	9.7 - 19.7	Compliance
APW03*	UD	9.7 - 19.7	Compliance
APW04*	UD	7.7 - 17.7	Compliance
APW05	UA	62.6 - 67.4	Background
APW05S*	UD	10.0 – 20.0	Compliance
APW06	UA	67.7 - 72.5	Background
APW07	UA	77.9 - 82.7	Compliance
APW08	UA	71.4 - 81.1	Compliance
APW09	UA	56.7 - 61.5	Compliance
APW10	UA	40.7 - 45.5	Compliance
APW11	UA	60.0 - 65.0	Compliance
APW12*	UD	20.0 - 30.0	Compliance
APW13	UA	58.5 - 63.5	Compliance
APW14	UA	50.0 - 55.0	Compliance
APW15	UA	98.0 - 103.0	Compliance
APW16	UA	80.5 - 85.5	Compliance
APW17	UA	87.0 - 92.0	Compliance
APW18	UA	75.0 - 80.0	Compliance
XSG01[1,2]	CCR	NA	WLO
SG02[1,2]	Surface Water	NA	WLO

[1] Surface water level measuring points.
[2] Location is temporary pending implementation of impoundment closure per an approved Construction Permit Application.
[3] Well type refers to the role of the well in the monitoring network.
* Well in the UD that has been identified to monitor the PMP
NA = not applicable
UA = uppermost aquifer
WLO = water level only

2.3 Well Abandonment

No wells are currently proposed for abandonment.

3. APPLICABLE GROUNDWATER QUALITY STANDARDS

3.1 Groundwater Classification

Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the PAP meets the definition of a Class I - Potable Resource Groundwater based on the following criteria:

- Groundwater is located more than 10 feet bgs and within an unconsolidated silty sand and gravel unit which is five feet or more in thickness.
- Field hydraulic conductivity testing identified a geometric mean horizontal hydraulic conductivity of 6.8 x 10^{-3} centimeters per second (cm/s), which exceeds the 1 x 10^{-4} cm/s criterion.
- Groundwater is not downgradient of or underlying previously mined out areas.

Testing of the unconsolidated materials of the Mulberry Grove member averaged 21 percent fines which is greater than the 12 percent fines criterion; however, this was not deemed prohibitive of the Class I Classification.

3.2 Statistical Evaluation of Background Groundwater Data

A Statistical Analysis Plan (**Appendix A**) has been developed to describe procedures that will be used to establish background conditions and implement compliance monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. The Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in United States Environmental Protection Agency's (USEPA) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance,* March 2009), and is intended to provide a logical process and framework for conducting the statistical analysis of the data obtained during groundwater monitoring.

In accordance with 35 I.A.C. § 845.640(f)(1), the statistical method chosen for analysis of background groundwater quality was either the tolerance interval or the prediction interval procedure for each constituent listed in 35 I.A.C. § 845.600(a)(1) at this CCR unit per 35 I.A.C. § 845.640(f)(1)(C). A comparison of the statistical background concentrations and groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1) and the resulting GWPSs are summarized in **Table 3-1**.

3.3 Applicable Groundwater Protection Standards

The applicable GWPS will be established in accordance with 35 I.A.C. § 845.600(a)(1) (greater of the background concentration or numerical limit specified in 35 I.A.C. § 845.600(a)(1)). The results of the statistical analysis of background groundwater data (**Table 3-1**) indicate that most background concentrations in the UD and uppermost aquifer are less than the groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1). Therefore, for these parameters the groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1) will be applied to the results from the proposed groundwater monitoring network. The exceptions include arsenic, pH, and radium 226 and 228 combined where the background concentration/measurement is greater (or lower for pH lower limit) than the 35 I.A.C. § 845.600(a)(1) standard. In these instances, the GWPS will be the background concentration/measurement.

Under most circumstances, the GWPS will be compared to the lower confidence limit for the observed concentrations for each constituent in each compliance well. Exceptions are when there are high percentages (greater than 50 percent) of non-detects in compliance well data, for which a future mean (for 50 to 70 percent non-detects) or median (for 70 percent non-detects) will be compared to the GWPS. Consistent with the *Unified Guidance*, the same general statistical method of confidence interval testing against a fixed GWPS is recommended in compliance and corrective action programs. Confidence intervals provide a flexible and statistically accurate method to test how a parameter estimated from a single sample compares to a fixed numerical limit. Confidence intervals explicitly account for variation and uncertainty in the sample data used to construct them.

Evaluation of the applicable standards will occur in conjunction with the analysis of groundwater quality results. Background calculations and the resulting concentrations may be updated as appropriate, in accordance with the Statistical Analysis Plan included in **Appendix A.**

4. GROUNDWATER MONITORING PLAN

The groundwater monitoring plan will monitor and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards included in 40 C.F.R. § 257.94(e), 40 C.F.R. § 257.95(h), and 35 I.A.C. § 845.600(a). The groundwater monitoring program will include sampling and analysis procedures that are consistent and that provide an accurate representation of groundwater quality at the background and compliance wells as required by 35 I.A.C. § 845.630. As discussed in **Section 2,** three monitoring programs specific to the PAP exist: the IEPA-required monitoring program, the 40 C.F.R. § 257 monitoring program, and the proposed Part 845 monitoring program. These networks will continue to be monitored until USEPA approves Part 845. It is expected that upon USEPA approval of Part 845, the 40 C.F.R. § 257 monitoring program and reporting will be eliminated, and the proposed Part 845 monitoring and reporting included in this GMP will replace the current IEPA monitoring program. The Part 845 monitoring and reporting will continue until requirements of Part 845 have been achieved.

4.1 Monitoring Networks and Parameters

4.1.1 IEPA Groundwater Monitoring

The existing IEPA-required monitoring program was discussed in detail in **Section 2.1.1**. Four groundwater monitoring wells, including two background monitoring wells (G116 and APW02) and two compliance monitoring wells (APW03 and APW04), are sampled on a quarterly frequency for the parameters listed Special Condition No. 19 of NPDES Permit No. IL0049191.

4.1.2 40 C.F.R. § 257 Groundwater Monitoring

The existing 40 C.F.R. § 257 monitoring program was discussed in detail in Section **2.1.2**. Six wells (two background and four compliance) are sampled for Appendix III parameters on a semi-annual frequency. No changes are proposed to this monitoring network. Well locations and parameters will continue to be monitored and reported as required by 40 C.F.R. § 257 until USEPA approves Part 845.

4.1.3 Part 845 Groundwater Monitoring

The proposed Part 845 Monitoring Network will consist of two background monitoring wells (APW05, and APW06), 16 compliance monitoring wells (APW02, APW03, APW04, APW05S, APW07, APW08, APW09, APW10, APW11, APW12, APW13, APW14, APW15, APW16, APW17, and APW18) and two temporary water level only surface water staff gages (XSG01 and SG02) to monitor potential impacts from the PAP (**Figure 2-1**). These monitoring wells are screened within the UD (APW02[2], APW03[2], APW04[2], APW05S[2], and APW12[2]) and the uppermost aquifer (APW05, APW06, APW07, APW08, APW09, APW10, APW11, APW13, APW14, APW15, APW16, APW17, APW18) along the perimeter of the PAP. Groundwater samples will be collected and analyzed for the laboratory and field parameters in **Table D** below.

[2] Monitoring wells APW02, APW03, APW04, APW05S, and APW12 are wells screened in the UD that have been identified to monitor the PMP.

Table D. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Turbidity	Groundwater Elevation	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential will be recorded during sample collection.

All parameters listed above were sampled a minimum of eight times by October 18, 2021 to establish background groundwater quality in accordance with 35 I.A.C. § 845.650 (b)(1)(A). Discussion of background groundwater quality is included in **Section 3.2**.

4.2 Sampling Schedule

Groundwater sampling for the Part 845 monitoring well network will initially be performed quarterly according to the following schedule:

Table E. Part 845 Sampling Schedule

Frequency	Duration
Monthly (groundwater elevations only)	Begins: the quarter following approval of this plan and issuance of the Operating Permit.
	Ends: Following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii).
Quarterly (groundwater quality)	Begins: the quarter following approval of this plan and issuance of the Operating Permit.
	Ends: Following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii), or upon IEPA approval of an alternate schedule as allowed by 35 I.A.C. § 845.650(b)(4).
Semi-annual (groundwater quality)	Begins: Following 5 years of quarterly groundwater monitoring and IEPA approval of a demonstration that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and not exhibiting statistically-significant increasing trends, monitoring effectiveness is not compromised by a semi-annual schedule, and sufficient data has been collected to characterize groundwater.
	Ends: Following detection of a statistically-significant increasing trend in groundwater concentrations or an exceedance of the standards in 35 I.A.C. § 845.600 (quarterly monitoring shall be resumed in these circumstances), or following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations

	are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii).

4.3 Groundwater Sample Collection

Groundwater sampling procedures have been developed and the collection of groundwater samples is being implemented to meet the requirements of 35 I.A.C. § 845.640. In addition to groundwater well samples, quality assurance samples will be collected as described in **Section 4.5** (**Table 4-1**).

4.4 Laboratory Analysis

Laboratory analysis will be performed consistent with the requirements of 35 I.A.C. § 845.640(j) by a state-certified laboratory using methods approved by IEPA and USEPA. Laboratory methods may be modified based on laboratory equipment availability or procedures, but the Reporting Limit (RL) for all parameters analyzed, regardless of method, will be lower than the applicable groundwater quality standard. RLs for the applicable parameters are summarized in **Table 4-2**. Concentrations lower than the RL will be reported as less than the RL.

4.5 Quality Assurance Program

Consistent with the requirements of 35 I.A.C. § 845.640(a)(5), the sampling and analysis program includes procedures and techniques for quality assurance/quality control (QA/QC). Additional quality assurance samples to be collected will include the following:

- Field duplicates will be collected at a frequency of one per group of ten or fewer investigative water samples.
- One equipment blank sample will be collected and analyzed for each day of sampling. If dedicated sampling equipment is used, then equipment blank samples will not be collected.
- The duplicate and equipment blank quality assurance samples will be supplemented by the laboratory QA/QC program, which typically includes:
  - Regular generation of instrument calibration curves to assure instrument reliability
  - Laboratory control samples and/or quality control check standards that have been spiked, and analyses to monitor the performance of the analytical method
  - Matrix spike/matrix spike duplicate analyses to determine percent recoveries and relative percent differences for each of the parameters detected
  - Analysis of replicate samples to check the precision of the instrumentation and/or methodology employed for all analytical methods
  - Analysis of method blanks to assure that the system is free of contamination

Water quality meters used to measure pH and turbidity will be calibrated according to manufacturer's specifications. At a minimum, it is recommended that calibration of pH occur daily prior to sampling and checked for accuracy at the end of each day. Unusual or suspect pH measurements during sampling events will be flagged, evaluated, and additional calibration may be performed throughout the sampling events. Turbidity meters will be checked daily, prior to and following sampling. Unusual measurements or erratic meter performance will be flagged and evaluated for overall effects on the data prior to reporting.

4.6 Groundwater Monitoring System Maintenance Plan

Consistent with the requirements of 35 I.A.C. § 845.630(e)(2), maintenance will be performed as needed to assure that the monitoring wells provide representative groundwater samples. Monitoring wells will be inspected during each groundwater sampling event; inspections will consist of the following:

- Visual inspection, clearing of vegetation, replacement of markers, and painting of protective casings as needed to assure that monitoring wells are clearly marked and accessible
- Visual inspection and repair or replacement of well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved
- Visual inspection and repair or replacement of protective casings as needed to assure that they are undamaged, and that locks are present and functional
- Checks to assure that well caps are intact and vented, unless in flood-prone areas in which case caps will not be vented
- Annual measurement of monitoring well depths to determine the degree of siltation within the wells. Wells will be redeveloped as needed to remove siltation from the screened interval if it impedes flow of water into the well
- Checks to assure that wells are clear of internal obstructions, and flow freely

If maintenance of a monitoring well cannot address an identified deficiency, a replacement well will be installed.

4.7 Statistical Analysis

Statistical analysis will be consistent with procedures listed in 35 I.A.C. § 845.640(f). A Statistical Analysis Plan, provided in **Appendix A**, has been developed to summarize the statistical procedures that will be used to evaluate the groundwater results.

4.8 Data Reporting

Data reporting for the 40 C.F.R. § 257 monitoring well network will be consistent with recordkeeping, notification, and internet posting requirements described in 40 C.F.R. § 257.105 through 257.107.

Groundwater monitoring and analysis completed in accordance with the Part 845 monitoring under an approved monitoring program will be reported to IEPA within 60 days after completion of sampling and the data placed in the facility’s operating record as required by 35 I.A.C. § 845.610(b)(3)(D). Within 14 days of posting to the operating record, information will be posted to the publicly accessible internet site “Illinois CCR Rule Compliance Data and Information” as required by 35 I.A.C. § 845.810(d). Information will also be submitted to IEPA annually by January 31 as required by 35 I.A.C. § 845.550, for data collected the preceding year. The report will include the status of the groundwater monitoring and any required corrective action plan for the PAP in addition to other requirements detailed in 35 I.A.C. § 845.610(e).

4.9 Compliance with Applicable On-site Groundwater Protection Standards

In accordance with 35 I.A.C. § 845.600(a)(1), the groundwater protection standard at the waste boundary will be the higher of either the 35 I.A.C. § 845.600 standard or the concentration determined by background groundwater monitoring.

As provided in 35 I.A.C. § 845.780(c)(2), at the end of the 30-year post-closure care period, groundwater monitoring will continue to be conducted in post-closure care until the groundwater results show the concentrations are:

- Below the GWPS in 35 I.A.C. § 845.600(a)(1); and
- Not increasing for those constituents over background, using the statistical procedures and performance standards in 35 I.A.C. § 845.640(f) and (g), provided that:
  - Concentrations have been reduced to the maximum extent feasible; and
  - Concentrations are protective of human health and the environment.

Following detection of an exceedance of the GWPS, an Alternate Source Demonstration (ASD) will be evaluated as described in **Section 4.10**.

4.10 Alternate Source Demonstrations

As allowed in 35 I.A.C. § 845.650(e), following detection of an exceedance of the GWPS, an ASD will be evaluated and, if completed, submitted to IEPA within 60 days. The ASD will provide lines of evidence that a source other than the PAP caused the contamination and the PAP 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.

The ASD will include information and analysis that supports the conclusions and a certification of accuracy by a qualified professional engineer. Once the ASD is approved by IEPA, the Part 845 groundwater monitoring will continue as defined in **Section 4.1.3**.

If an ASD is not completed and submitted, or IEPA does not approve the ASD, a notification of the exceedance will be provided to IEPA and placed in the operating record. Additional actions will also be completed as required by 35 I.A.C § 845.650(d)(1) through (3); including, initiation of an assessment of corrective measures under 35 I.A.C § 845.660. As allowed in 35 I.A.C § 845.650(e)(7) a petition for review of IEPA's non-concurrence under 35 I.A.C. § 105 may also be filed.

4.11 Assessment of Corrective Measures and Corrective Action

As described in 35 I.A.C. § 845.660, if the ASD summarized in **Section 4.10** has not been approved by IEPA, an assessment of corrective measures will be initiated within 90 days of the detection of a result exceeding 35 I.A.C. § 845.600 standards (*i.e.,* receipt of laboratory data). The assessment of corrective measures will include at least the following (35 I.A.C. § 845.660 (c)):

- The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
- The time required to begin and complete the corrective action plan; and
- The institutional requirements, such as State or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the corrective action plan.

Within one year of completing the assessment of corrective measures, a corrective action plan will be developed to identify the selected remedy in accordance with 35 I.A.C. § 845.670. If closure of the CCR Unit is required, a closure alternatives analysis will be completed as specified in 35 I.A.C. § 845.710. The analysis and selected alternative will be submitted to IEPA in a Closure Plan as specified by 35 I.A.C. § 845.720. Groundwater monitoring proposed in this Addendum will continue as specified until the post closure care period has expired and IEPA has approved termination of post-closure care.

5. REFERENCES

Illinois Environmental Protection Agency, 2021. Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845, April 15, 2021.

Natural Resource Technology, Inc. (NRT), 2017. Sampling and Analysis Plan, Newton Primary Ash Pond, Newton Power Station, Newton, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. Hydrogeologic Site Characterization Report, Newton Primary Ash Pond, Newton Power Plant, 6725 North 500th St., Newton, Illinois.

United States Environmental Protection Agency (USEPA), March 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, United States Environmental Protection Agency, Washington D.C. EPA/530/R-09/007.

United States Environmental Protection Agency (USEPA), 2015. Title 40 of the Code of Federal Regulations, Part 257.

TABLES

TABLE 1-1. PART 845 REQUIREMENTS CHECKLIST
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in GMP
845.630	**Groundwater Monitoring Systems**	
845.630(a)(2)	Potential contaminant pathways must be monitored.	Sections 2.2 & 4.1.3
845.630(a) 845.630(b) 845.630(c)	At least two upgradient wells and four downgradient wells (min. 1 and 3, but requires additional documentation)	Sections 2.2 & 4.1.3 Table 2-1 Figure 2-1
845.630(a) 845.630(b) 845.630(c)	Downgradient Well Density	Figure 2-1
845.630(a)(2)	Downgradient wells at waste boundary	Figure 2-1
845.640	**Groundwater Sampling and Analysis Requirements**	
845.640(a)	Consistent sampling and analysis procedures	Section 4 Tables 4-1 & 4-2
845.640(b)	Methods are appropriate	Section 4 Tables 4-1 & 4-2
845.640(c)	Groundwater elevations must be measured in each well prior to purging, each time groundwater is sampled.	Section 4.3
845.640 (d)(e)(f)(g)(h)	Establishment of background and application of statistical methods	Sections 3 & 4.7 Appendix A
845.640(i)	Analyze total recoverable metals	Section 4.1.3
845.640(j)	Analyze groundwater samples using a certified laboratory	Section 4.4

TABLE 1-1. PART 845 REQUIREMENTS CHECKLIST

GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in GMP
845.650	**Groundwater Monitoring Program**	
845.650(a)	Must include monitoring for all constituents with a groundwater protection standard in Section 845.600(a), calcium, and turbidity	Section 4.1.3
845.650(b)(c)	Groundwater Monitoring Frequency	Sections 4.1.3 & 4.2
845.650(d)(e)	Exceedances of the groundwater protection standard	Sections 4.9, 4.10 & 4.11
845.650(b)(2) 845.650(b)(3)	Staff gauge/ piezometer to monitor head in impoundment	Sections 2.2 & 4.1.3 Figure 2-1 (XSG01)
NA	Staff gauge/ piezometer to monitor head of neighboring surface water body	Sections 2.2 & 4.1.3 Figure 2-1 (SG02)

[O: CJC 08/25/21; C: LDC 09/09/21]

Notes:
GMP = Groundwater Monitoring Plan
NA = Not Applicable

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TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
APW02	C	UD	06/19/2010	533.61	533.61	Top of Riser	529.90	9.70	19.70	520.20	510.20	20.00	509.90	10	2	38.925918	-88.293907
APW03	C	UD	06/18/2010	532.41	532.41	Top of Riser	528.37	9.70	19.70	518.67	508.67	20.00	508.40	10	2	38.922322	-88.281567
APW04	C	UD	06/19/2010	525.06	525.06	Top of Riser	521.45	7.70	17.70	513.75	503.75	18.00	503.50	10	2	38.927444	-88.273113
APW05	B	UA	10/22/2015	544.07	544.07	Top of Riser	541.08	62.64	67.44	478.44	473.64	67.84	473.10	4.8	2	38.933958	-88.280983
APW05S	C	UD	01/19/2021	543.94	543.94	Top of PVC	541.05	10.00	20.00	531.05	521.05	20.00	518.10	10	2	38.933958	-88.281033
APW06	B	UA	10/21/2015	546.07	546.07	Top of Riser	542.89	67.67	72.48	475.22	470.41	72.88	468.90	4.8	2	38.933746	-88.286276
APW07	C	UA	11/05/2015	538.37	538.37	Top of Riser	535.72	77.89	82.70	457.83	453.02	83.10	452.60	4.8	2	38.928233	-88.292076
APW08	C	UA	10/28/2015	528.97	528.97	Top of Riser	526.26	71.40	81.06	454.86	445.20	81.53	444.30	9.7	2	38.923154	-88.292286
APW09	C	UA	11/03/2015	531.52	531.52	Top of Riser	528.33	56.66	61.46	471.67	466.87	61.85	466.30	4.8	2	38.922319	-88.281585
APW10	C	UA	11/06/2015	524.25	524.25	Top of Riser	521.49	40.74	45.54	480.75	475.95	45.94	475.60	4.8	2	38.927435	-88.273127
APW11	C	UA	01/23/2021	538.63	538.63	Top of PVC	536.05	60.00	65.00	476.05	471.05	65.00	436.10	5	2	38.932811	-88.27545
APW12	C	UD	02/21/2021	546.29	546.29	Top of PVC	543.33	20.00	30.00	523.33	513.33	30.00	456.30	10	2	38.92975	-88.272058
APW13	C	UA	01/22/2021	537.99	537.99	Top of PVC	535.16	58.50	63.50	476.66	471.66	63.50	445.20	5	2	38.92566	-88.274416
APW14	C	UA	01/23/2021	526.29	526.29	Top of PVC	523.85	50.00	55.00	473.85	468.85	55.00	428.90	5	2	38.924057	-88.277994
APW15	C	UA	01/22/2021	524.69	524.69	Top of PVC	522.06	98.00	103.00	424.06	419.06	103.00	412.10	5	2	38.921593	-88.285226
APW16	C	UA	01/20/2021	531.18	531.18	Top of PVC	529.16	80.50	85.50	448.66	443.66	85.50	419.20	5	2	38.920317	-88.291291
APW17	C	UA	01/22/2021	532.52	532.52	Top of PVC	529.84	87.00	92.00	442.84	437.84	92.00	429.80	5	2	38.925916	-88.293928
APW18	C	UA	01/21/2021	543.27	543.27	Top of PVC	540.55	75.00	80.00	465.55	460.55	80.00	433.60	5	2	38.930979	-88.290122
XSG01	WLO	CCR	--	--	536.17	Staff gauge	--	--	--	--	--	--	--	--	--	38.923218	-88.29067
SG02	WLO	SW	--	--	506.89	Staff gauge	--	--	--	--	--	--	--	--	--	38.921234	-88.292057

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
Type refers to the role of the well in the monitoring network: background (B), compliance (C), or water level measurements only (WLO)
WLO wells are temporary pending implementation of impoundment closure per an approved Construction Permit application
-- = data not available
BGS = below ground surface
CCR = Coal Combustion Residual
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
SW = surface water
UA = uppermost aquifer
UD = upper drift

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TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.003	0.006	0.006	mg/L
Arsenic, total	0.059	0.010	0.059	mg/L
Barium, total	0.3	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	0.26	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	52	200	200	mg/L
Chromium, total	0.011	0.1	0.1	mg/L
Cobalt, total	0.0043	0.006	0.006	mg/L
Fluoride, total	0.633	4.0	4.0	mg/L
Lead, total	0.0074	0.0075	0.0075	mg/L
Lithium, total	0.03	0.04	0.04	mg/L
Mercury, total	0.0002	0.002	0.002	mg/L
Molybdenum, total	0.018	0.1	0.1	mg/L
pH (field)	7.8 / 6.4	9.0 / 6.5	9.0 / 6.4	SU
Radium 226 and 228 combined	6.9	5	6.9	pCi/L
Selenium, total	0.001	0.05	0.05	mg/L
Sulfate, total	36	400	400	mg/L
Thallium, total	0.001	0.002	0.002	mg/L
Total Dissolved Solids	628	1200	1200	mg/L

Notes:
For pH, the values presented are the upper / lower limits
Groundwater protection standards for calcium and turbidity do not apply per 35 I.A.C. § 845.600(b)
mg/L = milligrams per liter
SU = standard units
pCi/L = picocuries per liter

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TABLE 4-1. SAMPLING AND ANALYSIS SUMMARY
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Parameter	Analytical Method [1]	Number of Samples	Field Duplicates [2]	Field Blanks [3]	Equipment Blanks [3]	MS/MSD [4]	Total	Container Type	Minimum Volume [5]	Preservation (Cool to 4 °C for all samples)	Sample Hold Time from Collection Date
Metals											
Metals [6]	6020, Li - EPA 200.7	18	2	0	0	1	21	plastic	600 mL	HNO_3 to pH<2	6 months
Mercury	7470A or 6020	18	2	0	0	1	21	plastic	400 mL	HNO_3 to pH<2	28 days
Inorganic Parameters											
Fluoride	9214 or EPA 300	18	2	0	0	1	21	plastic	300 mL	Cool to 4 °C	28 days
Chloride	9251 or EPA 300	18	2	0	0	1	21	plastic	100 mL	Cool to 4 °C	28 days
Sulfate	9036 or EPA 300	18	2	0	0	1	21	plastic	50 mL	Cool to 4 °C	28 days
Total Dissolved Solids	SM 2540 C	18	2	0	0	1	21	plastic	200 mL	Cool to 4 °C	7 days
Radium											
Radium 226	9315 or EPA 903	18	0	0	0	0	18	plastic	1000 mL	HNO_3 to pH<2	6 months
Radium 228	9320 or EPA 904	18	0	0	0	0	18	plastic	1000 mL	HNO_3 to pH<2	6 months
Field Parameters											
pH	SM 4500-H+ B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Dissolved Oxygen [8]	SM 4500-O/405.1	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Temperature [8]	SM 2550	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Oxidation/Reduction Potential [8]	SM 2580 B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Specific Conductance [8]	SM 2510 B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Turbidity [7]	SM 2130 B	18	NA	NA	NA	NA	18	flow-through cell or hand-held turbidity meter	NA	none	immediately

[O: CJC 08/25/21; C: LDC 09/09/21]

Notes:
[1] Analytical method numbers are from SW-846 unless otherwise indicated. Analytical methods may be updated with more recent versions as appropriate.
[2] Field duplicates will be collected at a frequency of one per group of 10 or fewer investigative water samples. Field duplicates will not be collected for radium analysis.
[3] Field blanks will be collected at the discretion of the project manager; Equipment blanks will be collected at a rate of 1 per sampling event if non-dedicated equipment is used.
[4] Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will be collected at a frequency of one per group of 20 or fewer investigative water samples per CCR unit/multi-unit. Additional volume to be determined by laboratory.
[5] Sample volume is estimated and will be determined by the laboratory.
[6] Metals = antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium. Metals may be analyzed via ICP/ ICP-MS USEPA methods 6010 or 6020 depending on laboratory instrument availability.
[7] If turbidity exceeds 10 NTUs, a duplicate sample filtered through a .45 micron filter may be collected for metals analysis in addition to the unfiltered sample. Both samples would be submitted for analysis.
[8] Parameter collected for quality assurance and quality control for field sampling purposes only; not required to be collected or reported under Part 845; collection of parameter may be discontinued without notification.
< = less than
°C = degrees Celsius
HNO_3 = nitric acid
mL = milliliter
NA = not applicable
NTU = nephelometric turbidity unit

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TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Constituent	CAS	Unit	Analytical Methods [1]	USEPA MCL [2]	35 I.A.C. § 845.600	RL [4, 5]	MDL [5]
Metals							
Antimony	7440-36-0	mg/L	6020	0.006	0.006	0.003	0.00036
Arsenic	7440-38-2	mg/L	6020	0.01	0.01	0.001	0.00013
Barium	7440-39-3	mg/L	6020	2	2	0.001	0.00028
Beryllium	7440-41-7	mg/L	6020	0.004	0.004	0.001	0.000017
Boron	7440-42-8	mg/L	6020	NS	2	0.01	0.0023
Cadmium	7440-43-9	mg/L	6020	0.005	0.005	0.001	0.000042
Calcium	7440-70-2	mg/L	6020	NS	NS	0.15	0.15
Chromium	7440-47-3	mg/L	6020	0.1	0.1	0.004	0.00027
Cobalt	7440-48-4	mg/L	6020	0.006	0.006	0.002	0.000017
Lead	7439-92-1	mg/L	6020	0.015	0.0075	0.001	0.000025
Lithium	7439-93-2	mg/L	6020 or EPA 200.7	0.04	0.04	0.02	0.0001
Mercury	7439-97-6	mg/L	6020 or 7470A	0.002	0.002	0.0002	0.000078
Molybdenum	7439-98-7	mg/L	6020	0.1	0.1	0.001	0.000063
Selenium	7782-49-2	mg/L	6020	0.05	0.05	0.001	0.00032
Thallium	7440-28-0	mg/L	6020	0.002	0.002	0.001	0.000062
Inorganics							
Fluoride	7681	mg/L	9214 or EPA 300	4	4	0.25	0.065
Chloride	16887-00-6	mg/L	9251 or EPA 300	250 [3]	200	1	0.15
Sulfate	18785-72-3	mg/L	9036 or EPA 300	250 [3]	400	1	0.24
Total Dissolved Solids	10052	mg/L	SM 2540C	500 [3]	1200	17	--
Other							
Radium 226 and 228 combined	7440-14-4	pCi/L	9315/9320 or EPA 903/904	5	5	-- [6]	-- [7]
Field							
pH	NA	SU	SM 4500-H+ B	NS	6.5-9.0	NA	NA
Oxidation/Reduction Potential	NA	mV	SM 2580 B	NS	NS	NA	NA
Dissolved Oxygen	NA	mg/L	SM 4500-O/405.1	NS	NS	NA	NA
Temperature	NA	°C	SM 2550	NS	NS	NA	NA
Specific Conductivity	NA	µS/cm	SM 2510 B	NS	NS	NA	NA
Turbidity	NA	NTU	SM 2130 B	NS	NS	NA	NA

[O: CJC 08/25/21; C: LDC 09/09/21]

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TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Notes:

[1] Analytical method numbers are from SW-846 unless otherwise indicated. Metals will be analyzed via Method 6020 or 6010 depending on laboratory equipment availability. Selected method will ensure reporting limits (RL) are below Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600 groundwater protection standards.
[2] USEPA MCL = United States Environmental Protection Agency Maximum Contaminant Level.
[3] USEPA SMCL = United States Environmental Protection Agency Secondary Maximum Contaminant Level.
[4] RLs will be less than the 35 I.A.C. § 845.600 groundwater protection standards.
[5] RLs and method detection limits (MDL) will vary depending on the laboratory performing the work.
[6] All radium results will be reported (values may be positive or negative) and will include uncertainty and the calculated MDC.
[7] Laboratories calculate a minimum detectable concentration (MDC) based on the sample.
°C = degrees Celsius
µS/cm = microSiemens per centimeter
CAS = Chemical Abstract Number
MDL = Method detection limit as established by the laboratory
mg/L = milligrams per liter
mV = millivolts
NS = No standard
NTU = nephelometric turbidity unit
pCi/L = picoCuries per liter
RL = Reporting limit as established by the laboratory
SM = Standard Methods for the Examination of Water and Wastewater
SU = standard units

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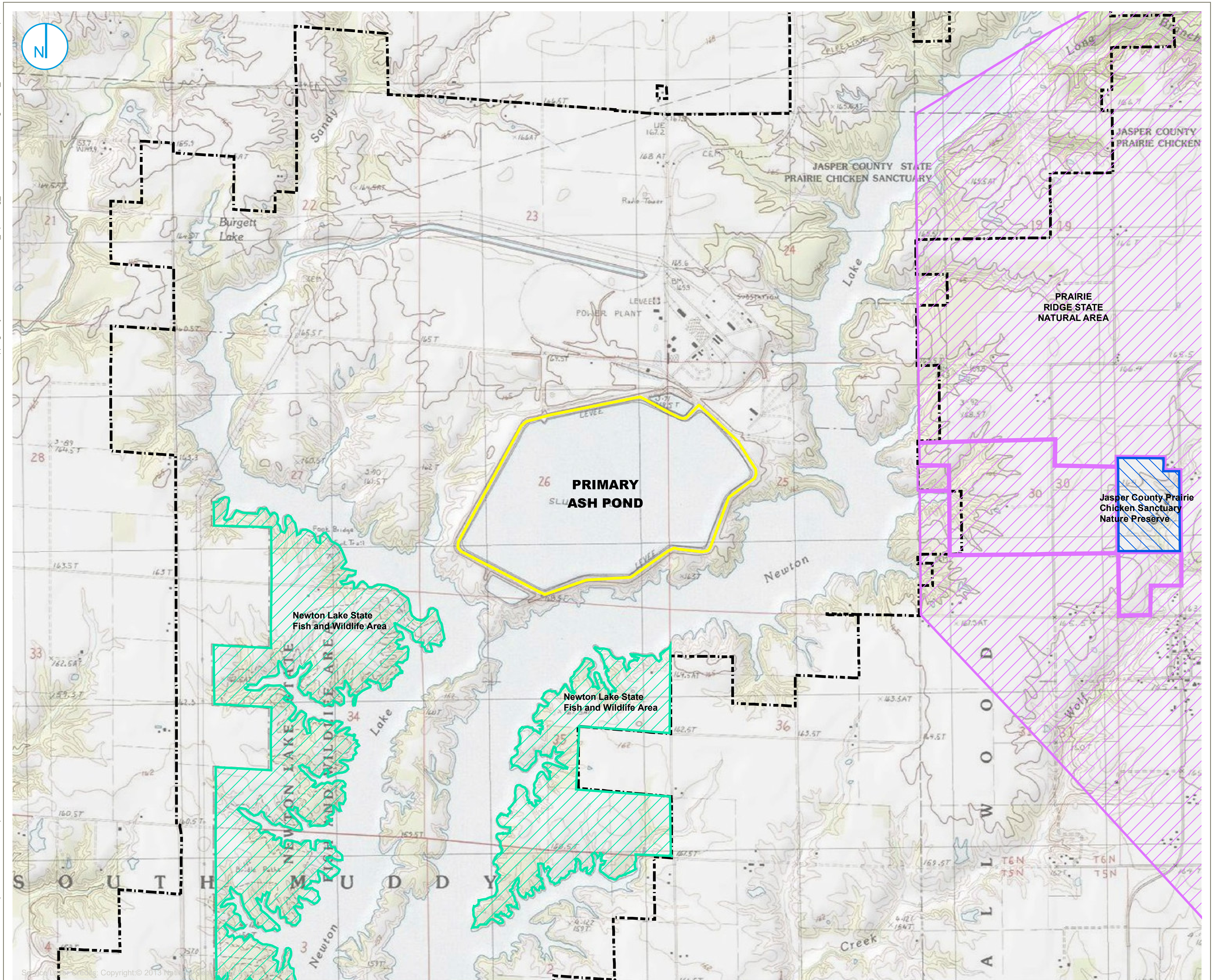
FIGURES



PART 845 REGULATED UNIT FACILITY BOUNDARY
JASPER COUNTY PRAIRIE CHICKEN SANCTUARY NATURE PRESERVE
NEWTON LAKE STATE FISH AND WILDLIFE AREA
PRAIRIE RIDGE STATE NATURAL AREA
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-1_Site Location Map.mxd

PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE
PROPERTY BOUNDARY

0 500 1,000 Feet

SITE MAP

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-2_Site Map.mxd

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE

NOTES:
1.ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988

0 400 800 Feet

UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS
APRIL 27, 2021

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-3_GWE_Contours_20210427.mxd

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 2-1_Proposed Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

COMPLIANCE WELL
BACKGROUND WELL
STAFF GAUGE
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

0 500 1,000 Feet

PROPOSED MONITORING WELL NETWORK

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

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APPENDIX A
STATISTICAL ANALYSIS PLAN

Prepared for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-008

STATISTICAL ANALYSIS PLAN

PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

STATISTICAL ANALYSIS PLAN
NEWTON POWER PLANT PRIMARY ASH POND

Project Name	**Newton Power Plant Primary Ash Pond**
Project No.	**1940100806-008**
Recipient	**Illinois Power Generating Company**
Document Type	**Statistical Analysis Plan**
Version	**FINAL**
Date	**October 25, 2021**

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Project Statistician

LICENSED PROFESSIONAL CERTIFICATIONS

This certification is based on the description of the statistical methods selected to evaluate groundwater as presented in the following Statistical Analysis Plan; Newton Power Plant Primary Ash Pond. The procedures described in the plan will be used to establish background conditions and implement compliance monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. The Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in the United States Environmental Protection Agency (USEPA)'s *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance,* March 2009), and is intended to provide a logical process and framework for conducting the statistical analysis of the data obtained during groundwater monitoring. In accordance with 35 I.A.C. § 845.640(f)(1), the statistical method chosen for analysis of background groundwater quality will be either the tolerance interval or the prediction interval procedure for each constituent listed in 35 I.A.C. § 845.600(a)(1) at this CCR unit per 35 I.A.C. § 845.640(f)(1)(C). Groundwater Protection Standards (GWPS) will be established in accordance with 35 I.A.C. § 845.600(a) (greater of the background concentration or numerical limit specified in 35 I.A.C. § 845.600(a)(1)). The GWPS will be compared to the lower confidence limit for the observed concentrations for each constituent in each compliance well. Consistent with the *Unified Guidance*, the same general statistical method of confidence interval testing against a fixed GWPS is recommended in compliance and corrective action programs. Confidence intervals provide a flexible and statistically accurate method to test how a parameter estimated from a single sample compares to a fixed numerical limit. Confidence intervals explicitly account for variation and uncertainty in the sample data used to construct them.

Description of the statistical methods chosen for analysis of groundwater monitoring data and application of these methods for determining exceedances of the GWPS identified in 35 I.A.C. § 845.600(a) is provided in this Statistical Analysis Plan.

35 I.A.C. § 845.640 Statistical Analysis (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the statistical methods summarized above and described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § 845.640.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: October 25, 2021

LICENSED PROFESSIONAL ENGINEER
ERIC J. TLACHAC
062-063091
STATE OF ILLINOIS

35 I.A.C. § 845.640 Statistical Analysis (PG)

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the statistical methods described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § *845.640.*

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Date: October 25, 2021

LICENSED PROFESSIONAL GEOLOGIST
BRIAN G. HENNINGS
196.001482
ILLINOIS

35 I.A.C. § 845.640 Statistical Analysis

I, Rachel A. Banoff, a qualified professional, certify that the statistical methods described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond), are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § *845.640.*

Rachel A. Banoff, EIT
Project Statistician
Date: October 25, 2021

CONTENTS

TABLES (IN TEXT)

ACRONYMS AND ABBREVIATIONS

§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
ANOVA	analysis of variance
CCR	coal combustion residuals
COC	constituents of concern
GWPS	groundwater protection standard
IEPA	Illinois Environmental Protection Agency
LCL	lower confidence limit
LTL	lower tolerance limit
MSE	mean squared error
P	probability
Part 845	Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	regression on order statistics
SI	surface impoundment
SSI	statistically significant increase
SWFPR	site-wide false positive rate
Unified Guidance	*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009)
UPL	upper prediction limit
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

1. INTRODUCTION

In April 2021, the Illinois Environmental Protection Agency (IEPA) issued a final rule for the regulation and management of Coal Combustion Residuals (CCR) in surface impoundments (SIs) under the Standards for the Disposal of CCR in Surface Impoundments: Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 (Part 845). Facilities regulated under Part 845 are required to develop and sample a groundwater monitoring well network to evaluate whether impounded CCR materials are impacting downgradient groundwater quality. The groundwater quality evaluation must include selection and certification by a qualified professional engineer of the statistical procedures to be used. The procedures described in the evaluation will be used to establish background conditions and implement compliance and corrective action monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. This Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in United States Environmental Protection Agency's (USEPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance*) (March 2009).

This Statistical Analysis Plan does not include procedures for groundwater sample collection and analysis, as these activities are conducted in accordance with the Sampling and Analysis Plan prepared for each CCR unit in accordance with 35 I.A.C. § 845.640. This Statistical Analysis Plan will be used as the primary reference for evaluating groundwater quality during operation and post-closure care.

1.1 Statistical Analysis Objectives

This Statistical Analysis Plan is intended to provide a logical process and framework for conducting the statistical analyses of data obtained during groundwater monitoring conducted in accordance with the Sampling and Analysis Plan for each CCR unit. The Statistical Analysis Plan will enable a qualified professional engineer to certify that the selected statistical methods are appropriate for evaluating the groundwater monitoring data for the applicable CCR unit(s).

1.2 Statistical Analysis Plan Approach

The main sections of this Statistical Analysis Plan should be viewed as a "generic" outline of statistical methods utilized for each CCR unit and constituent required to be monitored. The statistical analysis of the groundwater monitoring data, however, will be conducted on an individual-constituent or well basis, and may involve the use of appropriate statistical procedures depending on multiple factors such as detection frequency and normality distributions.

The CCR Rule outlines two phases of groundwater monitoring:

- Background Monitoring in accordance with 35 I.A.C. § 845.650(b)(1)
- Compliance Monitoring in accordance with 35 I.A.C. § 845.650

Each phase of the groundwater monitoring program requires specific statistical procedures to accomplish the intended purpose. During the background monitoring phase, background groundwater quality will be established utilizing upgradient and background wells and downgradient groundwater quality data will be collected to facilitate statistics in subsequent phases. Compliance Monitoring is then initiated through the evaluation of the downgradient groundwater monitoring data for exceedances of the groundwater protection standard (GWPS) established by Part 845 (concentration specified in 35 I.A.C. § 845.600 or an IEPA-approved background concentration). The developed statistical analysis plan will be implemented for each monitoring phase and in accordance with the statistical procedures.

2. BACKGROUND MONITORING AND DATA PREPARATION

The background and compliance monitoring wells were sampled and analyzed for constituents, as listed in Part 845 (antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, pH, radium 226 and 228 combined, selenium, sulfate, thallium, total dissolved solids, and turbidity), during the baseline phase of the groundwater monitoring program.

The background monitoring well(s) were placed upgradient of the CCR unit, or at an alternative background location, where they are not affected by potential leakage from the CCR unit. Compliance monitoring wells were placed at the waste boundary of the CCR unit, along the same groundwater flow path. As 35 I.A.C. § 845.630(a) specifies, the location of these wells ensures that background accurately represents the quality of unaffected groundwater, while compliance wells accurately represent groundwater quality at the waste boundary and monitor all potential contaminant pathways.

As required by 35 I.A.C. § 845.650(a)(1), eight sampling events were completed within 180 days of April 21, 2021. As outlined, groundwater sampling procedures included sampling of the background and compliance wells using low-flow sampling methods, collection of one field quality control sample per event, and groundwater samples were not field filtered before laboratory analysis of total recoverable metals.

Following completion of the eight sampling events, background groundwater quality was established for Part 845 constituents. Groundwater monitoring will be conducted quarterly for at least the first five years. In accordance with 35 I.A.C. § 845.650(b)(4), after the first five years, a request to reduce the monitoring frequency to semiannual may be submitted to IEPA if all of the following can be demonstrated:

- Groundwater monitoring effectiveness will not be compromised by the reduced frequency
- Sufficient data has been collected to characterize groundwater
- Monitoring to date does not show any statistically significant increasing trends
- The concentrations of monitored constituents at the compliance monitoring wells are below the applicable GWPSs established in 35 I.A.C. § 845.600

The following subsections outline the statistical tests and procedures (methods) that will be utilized to evaluate data collected for each constituent in both background and compliance wells for Background and Compliance Monitoring. When necessary and contingent upon equivalent statistical power, an alternative test not included in this Statistical Analysis Plan may be chosen due to site-specific data requirements.

2.1 Sample Independence

Independence of sample results is a major assumption for most statistical analyses. To ensure physical independence of groundwater sampling results, the minimum time between sampling events must be longer than the time required for groundwater to move through the monitoring well. The sampling schedules for both the baseline and compliance monitoring periods are specified in 35 I.A.C. § 845.650(b) and may conflict with the statistical assumption of independence of sample results.

2.2 Non-Detect Data Processing

The reporting limit (RL) will be used as the lower level for the reporting of non-detected groundwater quality data. For all summary statistics (box plots, timeseries, etc.), the RL will be substituted for concentrations reported below the RL, including non-detects. With professional judgement, analytical results between the RL and the method detection limit, *i.e.,* estimated values, typically identified with a "J" flag, may be utilized if provided by the laboratory.

For all statistical test procedures:

- If the frequency of non-detect data are less than or equal to 15 percent, half of the RL will be substituted for these data
- If the non-detect frequency is between 15 percent and 50 percent, either the Kaplan-Meier or robust regression on order statistics (ROS) will be used to estimate the mean and standard deviation adjusted for the presence of left-censored values
- If the non-detect frequency is greater than 50 percent, a non-parametric test will be used
- If only one background result is detected that value will be used as the non-parametric upper prediction limit (UPL)

2.3 Testing for Normality

Many statistical analyses assume that sample data are normally distributed (parametric). However, environmental data are frequently not normally distributed (nonparametric). 35 I.A.C. § 845.640(g) requires the knowledge of the background data distribution for comparison to compliance results. The *Unified Guidance* document recommends the Shapiro-Wilk normality test for sample sizes of 50 or less, and the Shapiro-Francia normality test for sample sizes greater than 50.

When possible, transformation of datasets to achieve normal distributions is preferred.

2.4 Testing for Outliers

Part 845 constituents will be screened for the existence of outliers using a method described by the *Unified Guidance*. Outliers are extreme data points that may represent an anomaly or erroneous data point. To test for outliers, one or more of the following outlier tests will be utilized:

- Dixon's test, for well-constituent pairs with less than 25 samples, assumes normally distributed data.
- Rosner's test, for well-constituent pairs with more than 20 samples, assumes normally distributed data.
- Grubb's test for well-constituent pairs with seven or more samples, assumes normally distributed data.
- Time series, box-whisker plots, and probability plots provide visual tools to identify potential outliers, and evaluation of seasonal, spatial, or temporal variability for both normally and non-normally distributed data.

Data quality control, groundwater geochemistry, and sampling procedures will be evaluated as potential sources of error leading to an outlier result. The outlier tests cannot be used alone to determine whether a value is a true outlier that should be excluded from future statistical analysis. Corroborating evidence needed to exclude values includes a discrete data reporting or analytical error, or potential laboratory bias. Absent corroborating evidence, the flagged values are considered true, but extreme, values in the data set. Professional judgement will be used to exclude extreme outliers from further statistical analyses. Outliers will be retained in the database.

With professional judgement, a confirmatory sample may be collected to allow for the distinction between an outlier and a true representation of groundwater quality at the monitoring point. If re-sampling is conducted, this sample will be collected within 90 days following outlier identification. If the confirmatory sample indicates the original result as an outlier, it will be reported as such.

2.5 Trend Analysis

Statistical analyses supporting the lack of trend are a fundamental step to confirm the assumption that groundwater quality values are stationary or constant over time at a CCR unit. These analyses allow for evaluation of variation in the background and compliance data for each constituent over time. A statistically significant increasing trend in background data could indicate an existing release from the CCR unit or alternate source, requiring further investigation. In addition, statistically significant trending background data can result in increased standard deviation and, therefore, greater prediction or control limits. Consequently, the increased prediction or control limit will have less power or ability to identify a release from the CCR unit.

A linear regression, coupled with a t-test for slope significance at a 95 percent confidence level (0.05 significance level), may be used on datasets for each constituent with few non-detects and a normally distributed variance of the mean to evaluate time trends. The Theil-Sen trend line, coupled with the Mann-Kendall test for slope significance at a 95 percent confidence level (0.05 significance level), will be used for datasets with frequent non-detects or non-normal variance. Similarly, trend analyses could also be used on compliance data to evaluate a possible release from the CCR unit.

2.6 Spatial Variation

Spatial trends and/or variation between background wells could indicate an existing release from a CCR unit. If the spatial variability is not due to an existing release, intrawell comparisons in compliance wells may be used to account for spatial variability and monitor for a future release. However, the CCR unit being monitored was placed into service prior to the start of groundwater monitoring and it is unknown whether a previous release has occurred. Accordingly, intrawell comparisons in compliance wells cannot be used to determine the occurrence of a future release. Interwell comparisons between compliance wells and background wells will be used.

2.7 Temporal Variation

Time series plots can be used to identify temporal dependence. Potentially significant temporal components of variability can be identified by graphing single constituent data from multiple wells together on a time series plot. With temporal dependence, the time series plot as a pattern of parallel traces, in which the individual wells will tend to rise and fall together across the sequence of sampling dates. Time series plots can be helpful by plotting multiple constituents over time for the same well, or averaging values for each constituent across wells on each sampling event and then plotting the averages over time. In either case, the plots can signify whether the general concentration pattern over time is simultaneously observed for different constituents. If so, it may indicate that a group of constituents is highly correlated in groundwater or that the same artifacts of sampling and/or lab analysis impacted the results of several monitoring parameters.

Hydrologic factors such as drought, recharge patterns or regular (*e.g.,* seasonal) water table fluctuations may be responsible for the temporal variation. In these cases, it may be useful to test for the presence of a significant temporal effect by first constructing a parallel time series plot and then running a formal one-way analysis of variance (ANOVA) ($\alpha = 0.05$) for temporal effects. A one-way ANOVA for temporal effects considers multiple well data sets for individual sampling events or seasons as the relevant statistical factor. If event-specific analytical differences or seasonality appear to be an important temporal factor, the one-way ANOVA for temporal effects can be used to formally identify seasonality, parallel trends, or changes in lab performance that affect other temporal effects. The one-way ANOVA for temporal effects assumes that the data groups are normally distributed with constant variance. It is also assumed that for each of a series of background wells, measurements are collected at each well on sampling events or dates common to all the wells. Results of the ANOVA can also be used to create temporally stationary residuals, where the temporal effect has been 'subtracted from' the original measurements. These stationary residuals may be used to replace the original data in subsequent statistical testing.

If the data cannot be normalized, a similar test for a temporal or seasonal effect can be performed using the Kruskal-Wallis test ($\alpha = 0.05$). Each sampling event should be treated as a separate 'well,' while each well is treated as a separate 'sampling event.' In this case, no residuals can be computed since the Kruskal-Wallis test employs ranks of the data rather than the measurements themselves.

Where both spatial and temporal variation occur, two-way ANOVA can be considered where both well location and sampling event/season are treated as statistical factors. This procedure is described in Davis (1994).

2.8 Updating Background

Updating the background dataset periodically by adding recent results to an existing background dataset can improve the statistical power and accuracy of the statistical analysis, especially for non-parametric prediction intervals. The *Unified Guidance* recommends updating statistical limits (background) when at least four to eight new measurements (every 1 to 2 years under a quarterly monitoring program), are available for comparison to historical data. Professional judgement will be used to evaluate whether any background data appear to be affected by a release and need to be excluded from a background update. A t-test for equal means (if normal data distribution) or appropriate non-parametric test (if non-normal data distribution) such as a Mann-Whitney (or Wilcoxon) rank-sum or box-whisker plots, will be conducted to evaluate whether the two groups of background sample populations are statistically different prior to updating any background datasets. A 0.05 significance level will be utilized when evaluating the two populations, with the null hypothesis that they are equivalent. In addition, time series graphs or other trend evaluation statistics will be conducted on the new background dataset to verify the absence of a release or changing groundwater quality. If the tests indicate that there are no statistical differences between the two background populations, the new data will be combined with the existing dataset. If the two populations are found to be different, the data will be reviewed to evaluate the cause of the difference. If the differences appear to be caused by a release (if the new data are significantly higher, or lower for pH), then the previous background dataset may continue to be used. Furthermore, verified outliers will not be added to an existing background dataset. In accordance with the *Unified Guidance*, continual background updates will not be conducted due to the lack of sufficient samples for a statistical comparison.

3. COMPLIANCE MONITORING

Compliance monitoring is designed to monitor groundwater for evidence of a release by comparing Part 845 constituents in compliance wells to both background concentrations and the GWPS. Compliance Monitoring will begin the 1st quarter following approval of this Groundwater Monitoring Plan and issuance of the Operating Permit. The selected Compliance Monitoring statistical method used to compare compliance groundwater quality data for each constituent to the GWPS will provide for adequate statistical power, error levels and individual test false positive rates, and be appropriate for the distribution and detection frequency of the background dataset. Statistical power is the ability of a statistical test to detect a true exceedance.

In accordance with 35 I.A.C. § 845.610(b)(3)(D), compliance monitoring statistical analyses will be completed and submitted to IEPA within 60 days after completion of sampling.

3.1 GWPS Establishment and Exceedance Determination

In accordance with 35 I.A.C. § 845.600(a), the GWPS will be the constituent concentrations specified in 35 I.A.C. § 845.600(a)(1) except for when the background concentration is greater, or no concentration is specified (*i.e.,* for calcium and turbidity), in which case the GWPS will be the background concentration. The GWPS based on background concentration will be calculated using a parametric upper tolerance limit (UTL), a parametric UPL for a future mean, or a non-parametric UPL for a future median.

Statistical calculations that will be utilized in Compliance Monitoring procedures are summarized in **Table A** below and listed in **Sections 3.1.1** through **3.1.7**. Depending on the distribution of the data and the percentage of non-detects, it may be more appropriate to use a parametric model over a non-parametric model. As necessary, other techniques as mentioned in the *Unified Guidance* and/or new methods will be implemented.

Table A. Statistical Calculations Used in Compliance Monitoring Procedures

Compliance Monitoring						
Significant Trend?	Background Data			Compliance Data		
	Percent Non-Detects	Distribution	GWPS Determination	Percent Non-Detects	Distribution	Method to Determine Exceedance
No	0 ≤ 50	Normal	35 I.A.C § 845.600(a)(1) constituent concentration or The Upper Tolerance Limit	≤75	Normal	Parametric Lower Confidence Limit around a Normal Mean
				≤75	Log-Normal	Parametric Lower Confidence Limit around a Lognormal Geometric Mean
				NA	Non-Normal	Non-Parametric Lower Confidence Limit around a Median
				>75	Unknown/ Cannot be determined	
	50 ≤ 70	Normal	The Upper Prediction Limit for a Future Mean	NA	NA	Future mean
	>70	Non-Normal	Upper Prediction Limit for a Future Median	NA	NA	Future median
	100	Non-Normal	Double Quantification Rule	NA	NA	Individual Retesting Values
Yes	0 ≤ 50	Normal	UCL of Confidence Band around Linear Regression	≤75	Residuals after subtracting trend are normal, equal variance	Lower Limit from Confidence Band around Linear Regression
	50 ≤ 100	Non-Normal	UCL of Confidence Band around Thiel-Sen trend line	≤75	Residuals not normal	Lower Limit from Confidence Band around Thiel-Sen

3.1.1 The Upper Tolerance Limit

The UTL will be used to calculate the GWPS when pooled background data are normally distributed, with a non-detect frequency of 50 percent or less. When non-detect frequency is 15 percent or less, half the RL will be substituted for non-detects. The *Unified Guidance* recommends 95 percent confidence level and 95 percent coverage (95/95 tolerance interval).

- When non-detect frequency is 15 percent or less, half the RL will be substituted for non-detects (simple substitution), and the normal mean and standard deviation will be calculated.

- The Kaplan-Meier or the ROS method will be used when the detection frequency is between 15 percent and 50 percent. The Kaplan-Meier method assesses the linearity of a censored probability plot to determine whether the background sample can be approximately normalized. If so, then the Kaplan-Meier method will be used to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. The Kaplan-Meier or ROS estimate of the mean and standard deviation will be substituted for the sample mean and standard deviation.
- If background normality cannot be achieved, non-parametric UTLs will not be calculated until a minimum of 60 background samples have been collected (to achieve 95 percent coverage).

The parametric UTL on a future mean will be calculated from the background dataset as follows:

$$UTL = \overline{x} + \kappa\,(n, \gamma, \alpha - 1) \cdot s$$

$\overline{x}$ = background sample mean

s = background sample standard deviation

$\kappa\,(n, \gamma, \alpha - 1)$ = one-sided normal tolerance factor based on the chosen coverage (γ) and confidence level (α -1) and the size of the background dataset (n). Values are tabulated in Table 17-3 in Appendix D of the *Unified Guidance*. If exact values are not provided, then κ values can be estimated by linear interpolation.

If the UTL is constructed on the logarithms of original observations to achieve normality, where $\overline{y}$ and s_y are the log-mean and log-standard deviation, the limit will be exponentiated for back-transformation to the concentration scale as follows:

$$UTL = \exp\left[\overline{y} + \kappa\,(n, \gamma, \alpha - 1) \cdot s_y\right]$$

$\overline{y}$ = background sample log-mean

s_y = background sample log-standard deviation

When the GWPS is based on the 35 I.A.C. § 845.600(a)(1) constituent concentrations or a UTL derived from the background dataset, an exceedance in compliance wells relative to the GWPS will be evaluated using confidence intervals. A confidence interval defines the upper and lower bound of the true mean of a constituent concentration in groundwater within a specified confidence range.

- Non-detects in compliance data will be handled similarly to upgradient analyses, with half the RL substituted for non-detects when the frequency is 15 percent or less.
- The Kaplan-Meier, or the ROS method, will be used when the detection frequency is between 15 percent and 50 percent to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. These estimates will then be substituted for the sample mean and standard deviation.

Once the GWPS is established for background data using the UTL, either parametric or non-parametric confidence intervals will be computed for each constituent in compliance wells to identify GWPS exceedances.

3.1.2 Parametric Confidence Intervals around a Mean

If compliance data are approximately normal, one-sided parametric confidence intervals around a sample mean will be constructed for each constituent and well pair. The lower confidence limit (LCL) will be calculated as:

$$LCL_{1-\alpha} = \bar{x} - t_{1-\alpha,n-1} \cdot \frac{s}{\sqrt{n}}$$

$\bar{x}$ = compliance sample mean

s = compliance sample standard deviation

n = compliance sample size

$t_{1-\alpha,n-1}$ = obtained from a Student's t-table with (n–1) degrees of freedom (Table 16-1 in Appendix D of the *Unified Guidance*)

The chosen t value will aim to achieve both a low false-positive rate, and high statistical power. Minimum α values are tabulated in Table 22-2 of Appendix D of the *Unified Guidance*. The selected minimum α value, from which the t value will be derived, will have at least 80 percent power (1-β = 0.8) when the underlying mean concentration is twice the GWPS.

If compliance data are distributed lognormally, the LCL will be computed around the lognormal geometric mean as:

$$LCL_{1-\alpha} = \exp\left(\bar{y} - t_{1-\alpha,n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

$\bar{y}$ = compliance sample log-mean

s_y = compliance sample log-standard deviation

3.1.3 Non-Parametric Confidence Intervals around a Median

Non-parametric confidence intervals around the median will be computed if the compliance data contain greater than 50 percent non-detects or are not normally distributed. The mathematical algorithm used to construct non-parametric confidence intervals is based on the probability (*P*) that any randomly selected measurement in a sample of n concentration measurements will be less than an unknown *P* x 100th percentile of interest (where *P* is between 0 and 1). Then the probability that the measurement will exceed the *P* x 100th percentile is (1–*P*). The number of sample values falling below the *P* x 100th percentile out of a set of n should follow a binomial distribution with parameters n and success probability *P*, where 'success' is defined as the event that a sample measurement is below the *P* x 100th percentile. The probability that the interval formed by a given pair of order statistics will contain the percentile of interest will then be determined by a cumulative binomial distribution *Bin(x;n,p)*, representing the probability of *x* or fewer successes occurring in *n* trials with success probability p. *P* will be set to 0.50 for an interval around the median.

The sample size n will be ordered from least to greatest. Given *P* = 0.50, candidate interval endpoints will be chosen by ordered data values with ranks close to the product of (n+1) x 0.50. If the result of (n+1) x 0.50 is a fraction (for even-numbered sample sizes), the rank values immediately above and below will be selected as possible candidate endpoints. If the result of (n+1) x 0.50 is an integer (for odd-numbered sample sizes), one will be added to and subtracted from the result to get the upper and lower candidate endpoints. The ranks of the endpoints will be denoted L* and U*. For a one-sided LCL, the confidence level associated with endpoint L* will be computed as:

$$1 - \alpha = Bin(L^{*} - 1; n, 0.50) = \sum_{x=L^{*}}^{n} \binom{n}{x} \left(\frac{1}{2}\right)^{n}$$

If the candidate endpoint(s) do not achieve the desired confidence level, new candidate endpoints (L*–1) and (U*+1) and achieved confidence levels will be calculated. If one candidate endpoint equals the data minimum or maximum, only the rank of the other endpoint will be changed. Achievable confidence levels are tabulated using these equations in Table 21-11 in Appendix D of the *Unified Guidance*.

Both parametric and non-parametric confidence limits will then be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance monitoring wells. A GWPS exceedance is determined if the LCL exceeds the GWPS.

3.1.4 The Upper Prediction Limit for a Future Mean

The parametric UPL for a future mean will be used to calculate the GWPS if the pooled background data contain 50 to 70 percent non-detects and normality can be achieved. The Kaplan-Meier or ROS methods will be used to estimate the mean and standard deviation. The non-parametric UPL for a future median will be calculated as the GWPS if background samples cannot be normalized or contain greater than 70 percent non-detects. The parametric UPL for a future mean will be calculated from the background dataset at follows:

$$UPL_{1-\alpha} = \overline{x} + \kappa s$$

$\overline{x}$ = background sample mean

s = background standard deviation

κ = multiplier based on the order (p) of the future mean to be predicted, the number of compliance wells to be tested (w), the background sample size (n) the number (c) of constituents of concern (COCs), the "1-of-m" retesting scheme, and the evaluation schedule (annual, semi-annual, quarterly). Values are tabulated in 19-5 to 19-9 in Appendix D of the *Unified Guidance*.

The mean of order p will be computed for each well and compared against the UPL. For any compliance point mean that exceeds the limit, p additional resamples may be collected at that well for a 1-of-2 retesting scheme. Resample means will then be compared to the UPL. A GWPS exceedance has been deemed to occur at a compliance well when the initial mean and all resample means exceed the UPL.

3.1.5 The Non-Parametric Upper Prediction Limit for a Future Median

The non-parametric UPL for a future median will be used to calculate the GWPS if the pooled background data contain greater than 70 percent non-detects and normality cannot be achieved. Non-parametric methods assume that the data does not have an underlying distribution. To calculate the non-parametric UPL on a future value, the target per-constituent false positive rate (α_{const}) will be determined as follows:

$$\alpha_{const} = 1 - (1 - \alpha)^{1/c}$$

α = the site-wide false positive rate (SWFPR) of 0.10 recommended by the *Unified Guidance*

c = the number of monitoring constituents

The number of yearly statistical evaluation (nE) will be multiplied by the number of compliance wells (w) to determine the look-up table entry, w*. The background sample size (n) and w* will be used to select an achievable per-constituent false positive rate value in Table 19-24 of Appendix D in the *Unified Guidance*. The chosen achievable per-constituent false positive rate value will determine the type of non-parametric prediction limit (maximum or 2nd highest value in background) and a retesting scheme for a future median. The background data will be sorted in ascending order, and the upper prediction limit will be set to the appropriate order statistic previously determined by the achievable per-constituent false positive rate value in Table 19-24. If all constituent measurements in a background sample are non-detect, the Double Quantification rule will be used. The use of the Double Quantification rule in Compliance Monitoring will only be applicable if the RL is above the 35 I.A.C. § 845.600(a)(1) constituent concentration or a constituent concentration is not specified in § 845.600(a)(1). This scenario is highly unlikely. The constituent will also be removed from calculations identifying the target false positive rate.

Two initial measurements per compliance well will be collected. If both do not exceed the upper prediction limit, a third initial measurement will not be collected since the median of order 3 will also not exceed the limit. If both exceed the prediction limit, a third initial measurement will not be collected since the median will also exceed the limit. If one initial measurement is above and one below the limit, a third initial observation may be collected to determine the position of the median relative to the UPL. Up to three resamples will be collected in order to assess the resample median. In all cases, if two or more of the compliance point observations are non-detect, the median will be set equal to the RL. The median value for each compliance well will be compared to the UPL. For the 1-of-2 retesting scheme, if any compliance point median exceeds the limit, up to three additional resamples will may be collected from that well. The resample median will be computed and compared to the UPL. A GWPS exceedance has been deemed to occur at a compliance well when either the initial median, or both the initial median and resample median exceed the UPL.

If the concentrations of detected constituents are below the established GWPS, Compliance Monitoring will continue.

3.1.6 Parametric Linear Regression and Confidence Band

If the t-test detects a significant trend in the parametric linear regression line using either background or compliance data for a particular constituent, confidence bands accounting for trends will be constructed to account for the trend-induced variation. If this is not accounted for, a wider confidence interval will inevitably be calculated for a given confidence level and sample size (n). A wider confidence interval will result in less statistical power, or ability to demonstrate an exceedance or return to compliance. When a linear trend line has been estimated, a series of confidence intervals is estimated at each point along the trend. This creates a simultaneous confidence band that follows the trend line. As the underlying population mean increases or decreases, the confidence band does also to reflect this change at that point in time.

Linear regression will be used when background or compliance data are approximately normally distributed, with a constant sample variance around the mean, and the frequency of non-detects is low. The linear regression of concentration against sampling date (time) will be computed as follows:

$$\hat{b} = \sum_{i=1}^{n}(t_i - \bar{t}) \cdot x_i/(n-1) \cdot s_t^2$$

x_i = i^{th} concentration value and

t_i = i^{th} sampling date

$\bar{t}$ = sampling mean date

s_t^2 = variance of the sampling dates

This estimate leads to the following regression equation:

$$\hat{x} = \bar{x} + \hat{b} \cdot (\mathrm{t} - \bar{t})$$

$\bar{x}$ = mean concentration level

$\hat{x}$ = estimated mean concentration at time t

The regression residuals will also be computed at each sampling event to ensure uniformity and lack of significant skewness. Regression residuals will be computed at each sampling event as follows:

$$r_i = x_i - \hat{x}_i$$

The estimated variance around the regression line, or mean squared error (MSE) will be computed as follows:

$$s_e^2 = \frac{1}{n-2}\sum_{i=1}^{n} r_i^2$$

The confidence intervals around a linear regression trend line given confidence level (1-ɑ) and a point in time (t_0), will be computed as follows:

$$LCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-1} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2}\right]}$$

$$UCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-2} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2}\right]}$$

$\hat{x}_0$ = estimated mean concentration from the regression equation at time t_0

$F_{1-2\alpha,2,\mathrm{n}-2}$ = upper $(1\text{-}2\alpha)^{th}$ percentage point from an F-distribution with 2 and (n-2) degrees of freedom

For background data, the UCL around the linear regression line will be used as the GWPS for the trending constituent. For compliance data, confidence bands around the linear regression line will be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance wells. A GWPS exceedance is determined when the LCL based on the trend line first exceeds the GWPS.

3.1.7 Non-Parametric Thiel-Sen Trend Line and Confidence Band

If the Mann-Kendall test detects a significant trend in the non-parametric Thiel-Sen line using either background or compliance data for a particular constituent, confidence bands accounting for trends will be constructed to account for the trend-induced variation. The Thiel-Sen trend line will be used as a non-parametric alternative to linear regression when trend residuals cannot be normalized or if there are a higher percentage of non-detects in either background or compliance data. The Thiel-Sen trend line estimates the median concentration over time by combining the median pairwise slope with the median concentration value and the median sample date. To compute the Thiel-Sen line, the data will first be ordered by sampling event x1, x2, xn. All possible distinct pairs of measurements (x_i, x_j) for j > i will be considered and the simple pairwise slope estimate will be computed for each pair as follows:

$$m_{ij} = (x_j - x_i)/(j - i)$$

With a sample size of n, there will be a total of N = n(n-1)/2 pairwise estimates (m_{ij}). If a given observation is a non-detect, half the RL will be substituted. The N pairwise slope estimates (m_{ij}) will be ordered from least to greatest (renamed m(1), m(2),..m(N)). The Thiel-Sen estimate of slope (Q) will be calculated as the median value of the list depending on whether N is even or odd as follows:

$$Q = \begin{cases} m_{([N+1]/2)} \; if \; N \; is \; odd \\ (m_{(N/2)} + m_{([N+2]/2)})/2 \; if \; N \; is \; even \end{cases}$$

The sample concentration magnitude will be ordered from least to greatest, x(1), x(2), to x(n) and the median concentration will be calculated as follows:

$$\tilde{x} = \begin{cases} x_{([n+1]/2)} \; if \; n \; is \; odd \\ (x_{(n/2)} + x_{([n+2]/2)})/2 \; if \; n \; is \; even \end{cases}$$

The median sampling date ($\tilde{t}$) with ordered times (t(1), t(2), to t(n)) will also be determined in this way. The Thiel-Sen trend line will then be computed for an estimate at any time (t) of the expected median concentration (x) as follows:

$$x = \tilde{x} + Q \cdot (\mathrm{t} - \tilde{t}) = (\tilde{x} - Q \cdot \tilde{t}) + Q \cdot \mathrm{t}$$

To construct a confidence band around the Thiel-Sen line, sample pairs (ti, xi) will be formed with a sample date (ti) and the concentration measurement from that date (xi). Bootstrap samples (B) will be formed by repeatedly sampling n pairs at random with replacement from the original sample pairs. This will be repeated 500 times. For each bootstrap sample, a Thiel-Sen trend line will be constructed using the equation above. A series of equally spaced time points (tj) will be identified along the range of sampling dates represented in the original sample, j =1 to m. The Thiel-Sen trend line associated with each bootstrap replicate will be used to compute an estimated concentration ($\hat{x}_j^B$). An LCL will be constructed for the lower α^{th} percentile $\hat{x}_j^{[\alpha]}$ from the distribution of estimated concentrations at each time point (tj). For a UCL, compute the upper $(1-\alpha)^{th}$ percentile, $\hat{x}_j^{[1-\alpha]}$ at each time point (tj).

For background data, the UCL around the Thiel-Sen trend line will be used as the GWPS for the trending constituent. For compliance data, confidence bands around the Thiel-Sen trend line will be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance wells. A GWPS exceedance is confirmed when the LCL based on the trend line first exceeds the GWPS.

3.2 Determination of Statistically Significant Increases over Background

In accordance with 35 I.A.C. §§ 845.610(b)(3)(B) and 845.640(h), individual monitoring event concentrations for each constituent detected in the compliance monitoring wells during compliance monitoring sampling events will be compared to the background concentration as determined by the methods described above. An exceedance of the background concentration for any constituent measured at any compliance monitoring well, or constituent detection if not detected in the background samples, constitutes a Statistically Significant Increase (SSI). An exception to this method is pH, where two-sided (upper and lower) tolerance limits are established from the distribution of the background groundwater quality data. An exceedance of either the UTL or lower tolerance limit (LTL) would constitute an SSI for pH.

4. REFERENCES

Davis, C.B., 1994. *Environmental Regulatory Statistics.* In GP Patil & CR Rao (Eds.) *Handbook of Statistics, Volume 12: Environmental Statistics*, Chapter 26. New York: Elsevier Science B.V.

United States Environmental Protection Agency (USEPA), 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance*. EPA 530-R-09-007. March 2009.

ATTACHMENT J

Memorandum

Date: 25 October 2021

Subject: IEPA Part 845 – Slope Maintenance Documentation for Ash Pond at Newton Power Plant

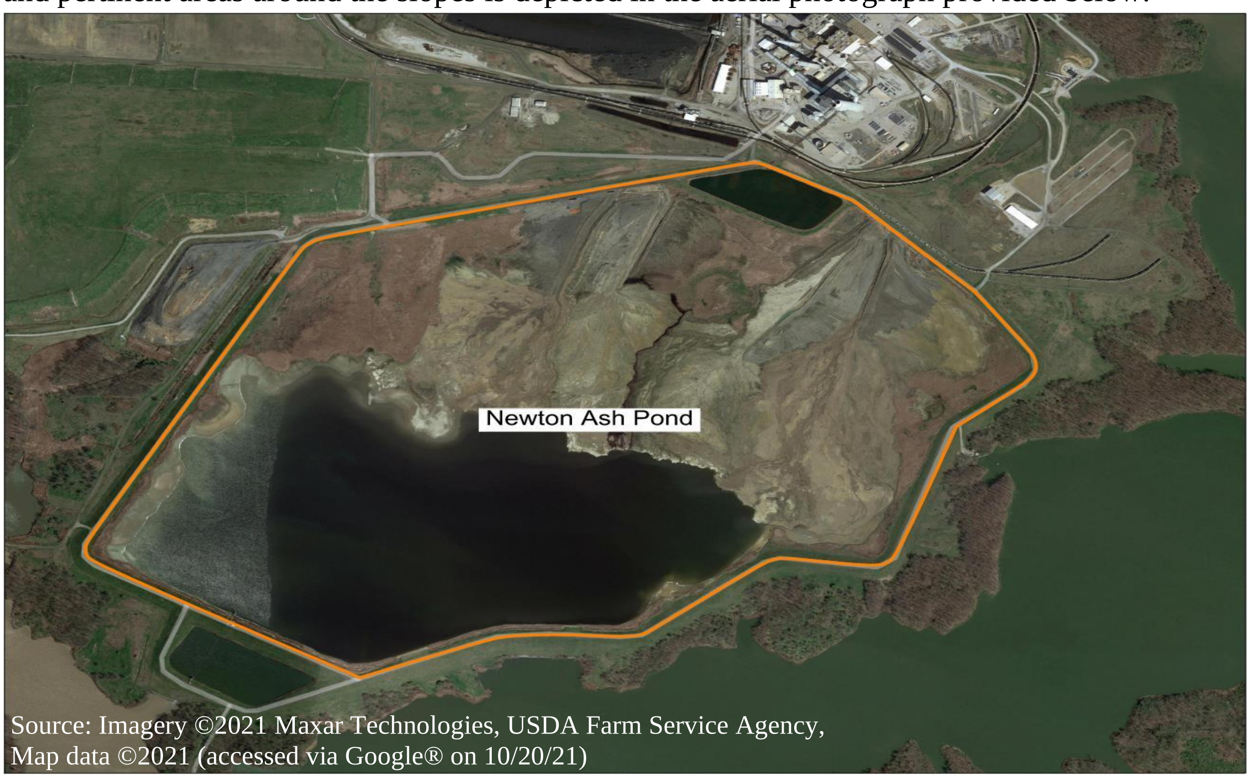
Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an inactive surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

Pursuant to Part 845, Section 845.230(d)(2)(F), the initial operating permit application for existing or inactive CCR surface impoundments that have not completed an Agency approved closure before prior to July 30, 2021, must contain documentation that the CCR surface impoundment, if not incised, will be operated, and maintained with one of the forms of slope protection specified in Section 845.430. This statement addresses the requirements of Part 845, Section 845.430 Slope Maintenance, which states:

> <u>Section 845.430:</u> *The slopes and pertinent surrounding areas of the CCR surface impoundment must be designed, constructed, operated, and maintained with one of the forms of slope protection specified in subsection (a) that meets all the performance standards of subsection (b).*
>
> <u>Section 845.430(a):</u> *Slope protection must consist of one of the following: 1) A vegetative cover consisting of grassy vegetation; 2) An engineered cover consisting of a single form or combination of forms of engineered slope protection measures; or 3) A combination of the forms of cover specified in subsections (a)(1) or (a)(2).*
>
> <u>Section 845.430(b):</u> *Any form of cover for slope protection must meet the following performance standards: 1) The cover must be installed and maintained on the slopes and pertinent surrounding areas of the CCR surface impoundment; 2) The cover must provide protection against surface erosion, wave action, and adverse effects of rapid drawdown; 3) The cover must be maintained to allow for the observation of, and access to, the slopes and pertinent surrounding areas during routine and emergency events; 4) Woody vegetation must be removed from the slopes or pertinent surrounding areas. Any removal of woody vegetation with a diameter greater than 1/2 inch must be directed by a person familiar with the design and operation of the CCR surface impoundment and in consideration of the complexities of removal of a tree or a shrubbery, who must ensure the removal does not create a risk of destabilizing the CCR surface impoundment or otherwise adversely affect the stability and safety of the CCR surface impoundment or*

> *personnel undertaking the removal; and 5) The height of vegetation must not exceed 12 inches.*

Slope protection, consisting of vegetative cover, was installed on the slopes and pertinent surrounding areas of the Newton Ash Pond, and is inspected, maintained and repaired as needed. Based on observations from weekly inspections conducted in accordance with Section 845.540(a), and the 2020 annual inspections conducted by Hanson Professional Services Inc., the vegetative cover is described to be in good working condition with a maximum vegetation height of 12 inches. The owner's Operations and Maintenance Plan (O&M Plan) provides details for maintaining grass and removing woody vegetation and addressing erosion features on the slopes. Based on a review of the documentation described above, the owner is implementing the O&M Plan, including the completion of repairs and maintenance as needed and when issues are identified during weekly and/or annual inspections. The slope maintenance portion of the O&M Plan and the Annual Inspection performed by Hanson in 2020 are included in Attachment J. The surface impoundment slope protection (vegetative cover) installed and maintained on the slopes and pertinent areas around the slopes is depicted in the aerial photograph provided below.



Source: Imagery ©2021 Maxar Technologies, USDA Farm Service Agency, Map data ©2021 (accessed via Google® on 10/20/21)

Excerpt from the Newton Operations and Maintenance Manual

1.1 Maintenance Program - The plant's impoundment and flood prevention structures shall be inspected and maintained in a manner to ensure safe and environmentally responsible operations. A regular maintenance program shall be performed and shall consist of the following inspection items:

1. Earth embankments: Walk the crest, side slopes, and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. Frequency of inspection: Quarterly.
2. Vegetation: Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion form occurring. Note the height of the grass, if greater than 1-foot a mowing of the area should be scheduled before the next inspection. There should be NO trees on the earth embankment and none within a minimum of 20 feet of the embankment toe or other structures. Frequency of inspection: Weekly.
3. Pond Outlet Structure: Check for any debris or other obstructions around the concrete inlet which may block or restrict the flow of water. Check for the development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check for settlement or cracking in the walkway structure. Frequency of inspection: Monthly.
4. Outlet Pipe Slide Gate: Check the structure for development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check the slide gate stem, grease the stem, and operate the slide gate through its full range of motion to ensure proper operation. Check for buildup of debris in the manhole. Frequency of inspection: Quarterly.
5. Pond/Levee Perimeter: Check the perimeter of the embankment and levee for a distance of at least 100 feet from the toe for signs of seepage or boils. Inspection frequency for levee will be determined by Dam Safety Engineer during flood events. Frequency of ash pond embankment inspection: Quarterly for ash pond embankment.
6. Special Inspections – Special inspections of ash pond berms shall be performed after earthquakes, floods, water level exceedance in the ponds, or heavy rainfall events. Inspection and report shall be equal to an annual inspection level of detail. Water level in the pond should be noted after a heavy rainfall. Dam Safety staff shall accompany plant personnel on special inspections. Frequency: As required.

Engineering | Architecture | Planning | Allied Services

Hanson Professional Services Inc.
1525 South 6th Street
Springfield, Illinois 62707
(217)788-2450
Fax: (217) 788-5241
www.hanson-inc.com

December 4, 2020

Jason Campbell
Dam Safety Manager
Operations Support
Dynegy Inc.
133 South 4th Street, Suite 306
Springfield, Illinois 62701-1232

RE: Report on Dam Inspections
Dynegy Midwest Generation
6725 N.500th Street
Newton, IL 62448

Dear Mr. Campbell:

The reports prepared for the 2020 inspections of the Newton Lake Dam, Ash Pond, Supplemental Cooling Pond, Landfill, and Butler Pond are attached. Data from the survey and monitoring completed during the past year for the Newton Lake Dam are also attached. Items requiring minor maintenance and observation are noted and summarized below. Please forward a copy of the inspection forms and photographs for permitted dams to the IDNR-OWR as required by your operation permits.

Summary of items requiring observation or maintenance:

Newton Lake Dam

- Repair slab in chute above stilling basin. Fill joint where wall meets slab on west side of chute and observe for deterioration of concrete. Repair joint in slab at stilling basin.
- Remove displaced riprap from outlet channel to allow stilling basin to drain to normal tail water level.
- Observe surface cracking in slab of chute and repair if condition deteriorates.
- Fill holes adjacent/under all concrete ditches.
- Remove woody vegetation growing adjacent to spillway chute and stilling basin.
- Remove woody vegetation in riprap at stilling basin outlet.
- Spray/remove vegetation growing on walls of spillway.
- Extend drain outlet in west ditch past joint.
- Repair drain conduit valve or revise O&M plan to delete references to drain.
- Instruct mowers to avoid driving on paved ditches – mower could fracture concrete ditch where there are voids under ditch.
- Repair damaged piezometer and witness post.

Hanson Professional Services Inc.
1525 South 6th Street
Springfield, Illinois 62707
(217)788-2450
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Ash Pond

- Remove woody vegetation from upstream slope – primary and secondary ponds.
- Repair minor erosion in embankment ditches on south downstream slope.
- Repair slides/bench erosion on interior slopes – primary pond.
- Repair bench erosion on interior slopes – secondary pond.

Supplemental Cooling Pond

- Remove woody vegetation adjacent to spillway.
- Operate gate on a regular schedule.

Butler Pond

- Mow on regular schedule.

Landfill

- Mow on regular schedule.

Please contact me if you have any questions.

Sincerely,

HANSON PROFESSIONAL SERVICES INC.

James P. Knutelski, P.E.
Geotechnical Engineer

Dam Inspection Report

Name of Dam: Newton Power Station Ash Pond   Dam ID No. NA

Permit Number: NA   Class of Dam: II

Location ______ Section 25 & 26 Township 5N Range 8E

Owner: Dynegy Midwest Generation (Name)   618-783-0395 (Telephone Number (Day))

6725 N. 500th Street (Street)   618-783-0395 (Telephone Number (Night))

Newton (City)   62448 (Zip Code)   County Jasper

Type of Dam: Earth Embankment

Type of Spillway: Drop inlet with conduit outflow

Date(s) Inspected: 29-Oct-20

Weather When Inspected: Cloudy

Temperature When Inspected: 60 F

Pool Elevation When Inspected: 535.9

Tailwater Elevation When Inspected: 504.3

LICENSED PROFESSIONAL ENGINEER
JAMES P. KNUTELSKI
062-054206
OF ILLINOIS

12/4/2020

Professional Engineer's Seal

EXP 11/30/21

Inspection Personnel:

Name	Title
James Knutelski, P.E.	Geotechnical Engineer
Jason Campbell, P.E.	Dynegy Dam Safety Manager
Paul Mauer, P.E.	IDNR-OWR

CONDITION CODES

NE - No evidence of a problem

GC - Good condition

MM - Item needing minor maintenance and/or repairs within the year, the safety or integrity of the item is not yet imperiled

IM - Item needing immediate maintenance to restore or ensure its safety or integrity

EC - Emergency condition which if not immediately repaired or other appropriate measures taken could lead to failure of the dam

OB - Condition requires regular observation to ensure that the condition Earth Embankment

NA - Not applicable to this dam

NI - Not inspected - list the reason for non-inspection under deficiencies

EARTH EMBANKMENT

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Surface Cracks	NE		
Vertical and Horizontal Alignment of Crest	GC		
Unusual Movement or Cracking At or Beyond Toe	NE		
Sloughing or Erosion of Embankment and Abutment Slopes	MM	Sloughing of upstream slope east of secondary pond and in secondary pond. Minor bench erosion of upstream slope in primary and secondary pond.	Repair erosion on upstream slopes - primary and secondary ponds.
Upstream Face Slope Protection	NA		
Seepage	NE		
Filter and Filter Drains	NA		

EARTH EMBANKMENT
(Continued)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Animal Damage	NE		
Embankment Drainage Ditches	OB	Minor erosion in ditches - south side of pond.	Repair and/or install slope protection if condition deterioates - no photograph.
Vegetative Cover	MM	Small woody vegetation on upstream slope in primary and secondary ponds where mowing has not been completed - typical for embankment.	Remove woody vegetation from upstream slope.
Erosion	NE		
Other			
Other			
Other			

PRINCIPAL SPILLWAY

X Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE		
Structure to Embankment Junction	GC		
Drains	NA		
Seepage Around or Into Structure	NE		
Surface Cracks	NE		
Structural Cracks	NE		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

(Continued)

X Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Alignment of Abutment Walls	NA		
Construction Joints	NE		
Filter and Filter Drains	NA		
Trash Racks	NA		
Bridge and Piers	GC		
Differential Settlement	NE		
Other (Debris)			

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

X Conduit ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE		
Joint Separation	NE		
Seepage Around of Into Conduit	NE		
Surface Cracks	NE		
Structural Cracks	NE		
Trash Racks	NA		
Differential Settlement	NE		
Alignment	GC		
Other (Name)			

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

X Principal Spillway ☐ Dewatering ☐ Other: ______________________

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Gate Sill	GC		
Gate Seals	GC		
Gate and Frame	GC		
Operating Machinery	NA		
Emergency Operating Machinery	NA		
Other (Name)			
Other			

OUTLET WORKS
IF SEPARATE FROM PRINCIPAL SPILLWAY STRUCTURE

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Joint Separation	NA		
Seepage Around or Into Conduit	NA		
Intake Structure	NA		
Outlet Structure	NA		
Outlet Channel	NA		
Riprap	NA		
Other (Name)			
Other			

NA to this dam

ENERGY DISSIPATOR

☐ Principal Spillway ☐ Outlet Works

Type: Outlet into secondary pond

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation			
Structure to Embankment Junction			
Construction Joints			
Surface Cracks			
Structural Cracks			
Differential Alignment			
Expansion and Contraction Joints			

NA to this dam

EMERGENCY SPILLWAY

☐ Earth　　　　Other: Name ______________________

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion			
Weeds, Logs, Other Obstructions			
Side Slope Sloughing			
Vegetation			
Sedimentation			
Riprap			
Settlement of Crest			
Downstream Channel			
Other (Name)			

SUMMARY OF MAINTENANCE DONE AND/OR

REPAIRS MADE SINCE THE LAST INSPECTION

DATE OF PRESENT INSPECTION 29-Oct-2020

DATE OF LAST INSPECTION 3-Oct-2019

1. EARTH EMBANKMENT DAMS
   Mowing completed. Removed gravel from primary pond overflow outlet.

2. CONCRETE MASONRY DAMS
   NA

3. PRINCIPAL SPILLWAY
   None.

4. OUTLET WORKS
   None

5. EMERGENCY SPILLWAY
   NA

East downstream slope

East crest and upstream slope

North downstream slope

North interior and crest

West upstream slope – remove woody vegetation

West downstream slope

South downstream slope

South upstream slope and crest

Sloughing & bench erosion of upstream slope –primary pond – repair

Interior of secondary pond

ATTACHMENT K

POST-CLOSURE PLAN FOR EXISTING CCR SURFACE IMPOUNDMENT
40 C.F.R. § 257.104 rule and 35 I.A.C. 845.780
REV 0 – 10/30/2021

SITE INFORMATION			
Site Name / Address	Newton Power Plant / 6725 North 500th Street, Newton, IL 62448		
Owner Name / Address	Illinois Power Generating Company / 6555 Sierra Drive Irving, Texas 75039		
CCR Unit	Primary Ash Pond	Closure Method and Final Cover Type	Close In-Place Clayey Soil Cover with Vegetation

POST-CLOSURE PLAN DESCRIPTION	
40 C.F.R. § 257.104(c)(1) and 35 I.A.C. 845.780(c)(1) – Length of post-closure care period.	Post-closure care will be conducted for a period of 30 years as required by 40 C.F.R. § 257.104(c)(1) and 35 I.A.C. 845.780(c)(1), except as provided by 40 C.F.R. § 257.104(c)(2) and 35 I.A.C. 845.780(c)(2).
40 C.F.R. § 257.104(c)(2) and 35 I.A.C. 845.780(c)(2) – Circumstances extending the post closure care period.	If at the end of the post-closure care period the CCR unit is operating under assessment monitoring in accordance with §257.95, the post-closure care as described in this plan will continue until returning to detection monitoring in accordance with §257.95. Under 35 I.A.C. 845.780(c)(2), the post-closure care period will be extended until groundwater monitoring data demonstrate that concentrations are below the groundwater protection standards in Section 845.600 and are not increasing for those constituents over background, using the statistical procedures and performance standards in Section 845.640(f) and (g), provided that concentrations have been reduced to the maximum extent feasible and concentrations are protective of human health and the environment.
40 C.F.R. § 257.104(d)(1)(i) and 35 I.A.C. 845.780(d)(1)(A) – A description of the monitoring and maintenance activities required in 40 C.F.R. § 257.104(b) and 35 I.A.C. 845.780(b), and the frequency at which these activities will be performed, to maintain the integrity and effectiveness of the final cover system, maintain the groundwater monitoring system and monitor the groundwater.	Pursuant to § 257.104(b)(1) and 35 I.A.C. 845.780(b)(1), throughout the post-closure care period, periodic visual observations of the final cover system and stormwater management system will be performed at least annually for evidence of settlement, subsidence, erosion, or other damage that may adversely affect the integrity and effectiveness of the final cover system. When practical, visual observations of the final cover will be made concurrent with groundwater monitoring activities. Noted evidence of damage, such as rills, surface cracks and settlement, will be repaired to maintain the integrity and effectiveness of the final cover system. Vegetation will be established and maintained on the final cover system, including storm drainage areas, where appropriate, to provide long-term erosion control. Established vegetation and the slope design of the final cover system will prevent potential erosion and damage that may be caused by run-on and run-off.

	Repair activities may include, but are not limited to, replacing and compacting soil cover, repairing drainage channels that have been eroded, filling in depressions with soil, regrading, and reseeding areas of failed vegetation, as necessary. Pursuant to § 257.104(b)(3) and 35 I.A.C. 845.780(b)(3), the groundwater monitoring system will be maintained, and groundwater will be monitored as required by 40 C.F.R. § 257.90 through 40 C.F.R. § 257.98 and 35 I.A.C. 845.600 through 35 I.A.C. 845.680. Monitoring wells will be inspected during each groundwater sampling event. Monitoring wells and associated instrumentation will be maintained so that they perform to the design specifications throughout the life of the monitoring program. Groundwater monitoring frequency will be at least quarterly, except as provided in 40 C.F.R. § 257.94(d) and 35 I.A.C. 845.650(b)(4).
40 C.F.R. § 257.104(d)(1)(ii) and 35 I.A.C. 845.780(d)(1)(B) – The name, address, telephone number and email address of the person or office to contact about the facility during the post-closure care period.	Illinois Power Generating Company 6555 Sierra Drive Irving, Texas 75039 800.633.4704 ccr@dynegy.com
40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780(d)(1)(C) – A description of the planned uses of the property during the post-closure period.	The CCR unit is located at an operating electric generation facility. Planned uses of the property during the post-closure period are currentlyunknown, except for post-closure care of the CCR unit. Post-closure use of the property will not disturb the integrity of the final cover system or other components of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements of 40 C.F.R. Part § 257, Subpart D and 35 I.A.C. Part 845. Any other disturbance will be conducted following a demonstration that it will not increase the potential threat to human health or the environment as required by 40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780 (d)(1)(C). The demonstration will be certified by a qualified professional engineer and submitted to the Illinois Environmental Protection Agency (IEPA). Per 40 C.F.R. § 257.104(d)(1)(iii) notification shall be provided to the State Director that the demonstration has been placed in the operating record and on the owners or operator's publicly accessible internet site. Following closure of the CCR unit, a notation on the deed to the property, or some other instrument that is normally examined during title search, will be recorded in accordance with 40 C.F.R. § 257.102(i) and 35 I.A.C. 845.760(h). The notation will notify potential purchasers of the property that the land has been used as a CCR unit and its use is restricted under the post- closure care requirements in 40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780(d)(1)(C) or groundwater monitoring requirements per 35 I.A.C. 845.740(b). Within 30 days of recording the deed notation, a notification stating that the notation has been recorded will be submitted to the IEPA and placed in the facility's operating record per 35 I.A.C. 845.760(h)(3). The notification will be placed on the owner or operator's publicly accessible CCR Web site in accordance with 40 C.F.R. § 257.107(i)(9) and 35 I.A.C. 845.810(e) and placed in the facility's operating record as required by 35 I.A.C. 845.800(d)(26) and §257.105(i)(9).

40 C.F.R. § 257.104(d)(3)and 35 I.A.C. 845.780(d)(3) – Amendments to the initial or subsequent written post-closure plan.	Pursuant to 40 C.F.R. § 257.104(d), the initial post closure care plan for the Newton Primary Ash Pond was prepared on October 17, 2016. That plan is being amended pursuant to 40 C.F.R. § 257.104(d)(3)(i). This plan also serves as the initial post-closure care plan, prepared in accordance with 35 I.A.C. 845.780(d). Pursuant to § 257.104(d)(3) and 35 I.A.C. 845.780(d)(3), an operating permit modification application to amend the initial or any subsequent written post-closure care plan developed under 35 I.A.C. 845.780 (d)(1) and § 257.104(d)(1) will be submitted to IEPA. The written post-closure care plan will be amended whenever there is a change in the operation of the CCR surface impoundment that would substantially affect the written post-closure care plan in effect; or unanticipated events necessitate a revision of the written post-closure care plan, after post-closure activities have started. The written post-closure care plan will be amended at least 60 days before a planned change in the operation of the facility or CCR surface impoundment, or within 60 days after an unanticipated event requires the need to revise the existing plan. If the plan is revised after post-closure activities have started, a request to modify the operating permit, including an amended written post-closure care plan, will be submitted to the IEPA within 30 days following the triggering event.
40 C.F.R. § 257.104(d)(4) and 35 I.A.C. 845.780(d)(4) – Qualified professional engineering certification.	Certification by a qualified professional engineer will be appended to this plan and any amendment of this plan.
35 I.A.C. 845.780(e) – Termination of post-closure care	Upon completion of the post-closure period, a request to terminate post-closure care will be submitted to the IEPA. The request will include a certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with the post-closure care plan specified in 35 I.A.C.845.780(d) and the requirements of 35 I.A.C. 845.780.
40 C.F.R. § 257.104(e) and 35 I.A.C. 845.780(f) – Notification of completion of the post-closure care period.	A notification of completion of post-closure care will be prepared and placed in the facility's operating record within 30 days after IEPA approval of the request to terminate post-closure care. The notification will be placed in the facility's operating record in accordance with 35 I.A.C. 845.800(d)(31) and § 257.105(i)(13). The notification will be placed on the owner or operator's publicly accessible CCR Internet site in accordance with the requirements of § 257.107(i)(13) and 35 I.A.C. 845.810(e). The IEPA will be notified when the notification has been placed in the operating record and on the owner or operator's publicly accessible Internet site in accordance with the requirements of § 257.106(i)(13).

Certification Statement 40 C.F.R. § 257.104 (d)(4) and 35 I.A.C. 845.780(d)(4) – Amended/Initial Written Post Closure Plan for a CCR Surface Impoundment

CCR Unit: Dynegy Midwest Generation, LLC; Newton Power Plant; Primary Ash Pond

I, John R. Hesemann, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Unit, that the information contained in the amended/initial written post closure plan, dated October 30, 2021, meets the requirements of 40 C.F.R. § 257.104 and 35 I.A.C.845.780.

John R. Hesemann

Printed Name

10/18/2021

Date

JOHN ROBERT HESEMANN
062-058523
LICENSED PROFESSIONAL ENGINEER OF
ILLINOIS

John R. Hesemann

Exp.: 11/30/2021

ATTACHMENT M

HISTORY OF POTENTIAL EXCEEDANCES

This presentation of the History of Potential Exceedances, and any corrective action taken to remediate groundwater, is provided to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.230(d)(2)(M) for the Newton Power Plant Primary Ash Pond, Illinois Environmental Protection Agency (IEPA) ID No. W0798070001-01.

Note

Groundwater concentrations from 2015 to 2021 presented in the Hydrogeologic Site Characterization Report (HCR) Table 4-1, and evaluated and summarized in the following tables, are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to Groundwater Monitoring Plan [GMP]), which has not been reviewed or approved by IEPA at the time of submittal of the 35 I.A.C. § 845 Operating Permit application.

Alternate sources for potential exceedances as allowed by 35 I.A.C. § 845.650(e) have not yet been evaluated. These will be evaluated and presented in future submittals to IEPA as appropriate.

Table 1 summarizes how the potential exceedances were determined. Table 2 is a summary of all potential exceedances.

Background Concentrations

Background monitoring wells identified in the GMP include APW05 and APW06.

For monitoring wells that have been historically monitored in accordance with Title 40, Code of Federal Regulations, Part 257, Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments), background concentrations calculated from sampling events in 2015-2017 were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations in 2015-2017 greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as Groundwater Protection Standards (GWPSs) for comparing to statistical calculation results for each compliance well to determine potential exceedances. Compliance well statistical calculations consider concentrations from all sampling events in 2015-2021.

For all other monitoring wells, either newly constructed in 2021 or existing wells not monitored under Title 40, Code of Federal Regulations, Part 257, Subpart D, background concentrations calculated from the eight sampling events required by 35 I.A.C. § 845.650(b)(1)(A), to be collected within 180 days from April 21, 2021, were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as GWPSs. Compliance well statistical calculations from that same time period were compared to the GWPSs to determine potential exceedances.

Corrective Action

No corrective actions have been taken to remediate the groundwater.

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW02	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW02	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	Most recent sample	0.001	0.059	0.059	0.01	Background
APW02	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.016	2.0	0.30	2	Standard
APW02	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW02	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.096	2.0	0.26	2	Standard
APW02	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW02	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	98	200	52	200	Standard
APW02	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW02	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW02	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW02	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW02	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.092	0.040	0.030	0.04	Standard
APW02	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW02	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.001	0.10	0.018	0.1	Standard
APW02	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around median	6.6	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW02	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around mean	0.16	6.9	6.9	5	Background
APW02	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW02	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	1500	400	36	400	Standard
APW02	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW02	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	4890	1200	628	1200	Standard
APW03	UD	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW03	UD	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.059	0.059	0.01	Background
APW03	UD	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.062	2.0	0.30	2	Standard
APW03	UD	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

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NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW03	UD	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.36	2.0	0.26	2	Standard
APW03	UD	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW03	UD	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	8.0	200	52	200	Standard
APW03	UD	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW03	UD	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW03	UD	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.25	4.0	0.63	4	Standard
APW03	UD	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW03	UD	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.018	0.040	0.030	0.04	Standard
APW03	UD	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW03	UD	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.00123	0.10	0.018	0.1	Standard
APW03	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around mean	6.6	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW03	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	0.058	6.9	6.9	5	Background
APW03	UD	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW03	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	164	400	36	400	Standard
APW03	UD	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW03	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	623	1200	628	1200	Standard
APW04	UD	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW04	UD	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.001	0.059	0.059	0.01	Background
APW04	UD	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.017	2.0	0.30	2	Standard
APW04	UD	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW04	UD	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.023	2.0	0.26	2	Standard
APW04	UD	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW04	UD	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	28	200	52	200	Standard
APW04	UD	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard

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Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW04	UD	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW04	UD	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW04	UD	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW04	UD	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.014	0.040	0.030	0.04	Standard
APW04	UD	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW04	UD	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.10	0.018	0.1	Standard
APW04	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around median	6.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW04	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	-0.0682	6.9	6.9	5	Background
APW04	UD	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW04	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	887	400	36	400	Standard
APW04	UD	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW04	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	1710	1200	628	1200	Standard
APW05S	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW05S	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.00103	0.059	0.059	0.01	Background
APW05S	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.048	2.0	0.30	2	Standard
APW05S	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW05S	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.039	2.0	0.26	2	Standard
APW05S	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW05S	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around median	180	200	52	200	Standard
APW05S	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW05S	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW05S	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.35	4.0	0.63	4	Standard
APW05S	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW05S	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.033	0.040	0.030	0.04	Standard

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NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW05S	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW05S	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.00101	0.10	0.018	0.1	Standard
APW05S	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.7	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW05S	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around geomean	0.13	6.9	6.9	5	Background
APW05S	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW05S	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	200	400	36	400	Standard
APW05S	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW05S	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	3350	1200	628	1200	Standard
APW07	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW07	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	0.00513	0.027	0.027	0.01	Background
APW07	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.39	2.0	0.26	2	Standard
APW07	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW07	UA	257	Boron, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	0.070	2.0	0.14	2	Standard
APW07	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW07	UA	257	Chloride, total	mg/L	12/15/2015 - 02/10/2021	CI around median	69	200	58	200	Standard
APW07	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.004	0.10	0.004	0.1	Standard
APW07	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW07	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	0.38	4.0	0.70	4	Standard
APW07	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.0075	0.0025	0.0075	Standard
APW07	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.010	0.040	0.023	0.04	Standard
APW07	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW07	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	-0.00141	0.10	0.038	0.1	Standard
APW07	UA	257	pH (field)	SU	12/15/2015 - 02/10/2021	CI around mean	7.1	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW07	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	1.1	5.0	1.5	5	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW07	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW07	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/10/2021	CI around geomean	2.2	400	15	400	Standard
APW07	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW07	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/10/2021	CI around mean	457	1200	1000	1200	Standard
APW08	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW08	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.011	0.027	0.027	0.01	Background
APW08	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	0.34	2.0	0.26	2	Standard
APW08	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW08	UA	257	Boron, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	0.088	2.0	0.14	2	Standard
APW08	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW08	UA	257	Chloride, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	55	200	58	200	Standard
APW08	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.004	0.10	0.004	0.1	Standard
APW08	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.002	0.006	0.002	0.006	Standard
APW08	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	0.17	4.0	0.70	4	Standard
APW08	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around geomean	0.000849	0.0075	0.0025	0.0075	Standard
APW08	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00917	0.040	0.023	0.04	Standard
APW08	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW08	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00528	0.10	0.038	0.1	Standard
APW08	UA	257	pH (field)	SU	12/15/2015 - 02/10/2021	CI around mean	7.2	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW08	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	0.80	5.0	1.5	5	Standard
APW08	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.050	0.006	0.05	Standard
APW08	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	44	400	15	400	Standard
APW08	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW08	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/10/2021	CI around mean	540	1200	1000	1200	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW09	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW09	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00549	0.027	0.027	0.01	Background
APW09	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.20	2.0	0.26	2	Standard
APW09	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW09	UA	257	Boron, total	mg/L	12/15/2015 - 02/11/2021	CI around mean	0.065	2.0	0.14	2	Standard
APW09	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW09	UA	257	Chloride, total	mg/L	12/15/2015 - 02/11/2021	CI around median	84	200	58	200	Standard
APW09	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.004	0.10	0.004	0.1	Standard
APW09	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW09	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/11/2021	CI around mean	0.51	4.0	0.70	4	Standard
APW09	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.0075	0.0025	0.0075	Standard
APW09	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.010	0.040	0.023	0.04	Standard
APW09	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.0002	0.002	0.002	0.002	Standard
APW09	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00713	0.10	0.038	0.1	Standard
APW09	UA	257	pH (field)	SU	12/15/2015 - 02/11/2021	CB around T-S line	7.3	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW09	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	0.72	5.0	1.5	5	Standard
APW09	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW09	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/11/2021	CI around geomean	2.7	400	15	400	Standard
APW09	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW09	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/11/2021	CI around mean	508	1200	1000	1200	Standard
APW10	UA	257	Antimony, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW10	UA	257	Arsenic, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.00476	0.027	0.027	0.01	Background
APW10	UA	257	Barium, total	mg/L	12/16/2015 - 07/29/2021	CB around linear reg	0.016	2.0	0.26	2	Standard
APW10	UA	257	Beryllium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.004	0.0025	0.004	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW10	UA	257	Boron, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.068	2.0	0.14	2	Standard
APW10	UA	257	Cadmium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW10	UA	257	Chloride, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	46	200	58	200	Standard
APW10	UA	257	Chromium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.004	0.10	0.004	0.1	Standard
APW10	UA	257	Cobalt, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW10	UA	257	Fluoride, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.27	4.0	0.70	4	Standard
APW10	UA	257	Lead, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.0075	0.0025	0.0075	Standard
APW10	UA	257	Lithium, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.022	0.040	0.023	0.04	Standard
APW10	UA	257	Mercury, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW10	UA	257	Molybdenum, total	mg/L	12/16/2015 - 07/29/2021	CB around linear reg	0.00488	0.10	0.038	0.1	Standard
APW10	UA	257	pH (field)	SU	12/16/2015 - 07/29/2021	CI around mean	7.0	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW10	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/16/2015 - 07/29/2021	CI around mean	0.54	5.0	1.5	5	Standard
APW10	UA	257	Selenium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW10	UA	257	Sulfate, total	mg/L	12/16/2015 - 07/29/2021	CI around median	410	400	15	400	Standard
APW10	UA	257	Thallium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW10	UA	257	Total Dissolved Solids	mg/L	12/16/2015 - 07/29/2021	CI around mean	939	1200	1000	1200	Standard
APW11	UA	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW11	UA	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	CI around geomean	0.00152	0.059	0.059	0.01	Background
APW11	UA	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CB around linear reg	-0.0314	2.0	0.30	2	Standard
APW11	UA	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW11	UA	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.062	2.0	0.26	2	Standard
APW11	UA	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW11	UA	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	26	200	52	200	Standard
APW11	UA	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW11	UA	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW11	UA	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.25	4.0	0.63	4	Standard
APW11	UA	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW11	UA	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.020	0.040	0.030	0.04	Standard
APW11	UA	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW11	UA	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	CB around linear reg	-0.00109	0.10	0.018	0.1	Standard
APW11	UA	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around mean	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW11	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	0.26	6.9	6.9	5	Background
APW11	UA	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.050	0.001	0.05	Standard
APW11	UA	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around median	140	400	36	400	Standard
APW11	UA	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.002	0.001	0.002	Standard
APW11	UA	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	797	1200	628	1200	Standard
APW12	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW12	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.00153	0.059	0.059	0.01	Background
APW12	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.034	2.0	0.30	2	Standard
APW12	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW12	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.16	2.0	0.26	2	Standard
APW12	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW12	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	21	200	52	200	Standard
APW12	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW12	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.00205	0.006	0.0043	0.006	Standard
APW12	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW12	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW12	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.024	0.040	0.030	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
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NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW12	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW12	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.000744	0.10	0.018	0.1	Standard
APW12	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW12	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around geomean	0.20	6.9	6.9	5	Background
APW12	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW12	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	322	400	36	400	Standard
APW12	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW12	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	1110	1200	628	1200	Standard
APW13	UA	845	Antimony, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW13	UA	845	Arsenic, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.00345	0.059	0.059	0.01	Background
APW13	UA	845	Barium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.050	2.0	0.30	2	Standard
APW13	UA	845	Beryllium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW13	UA	845	Boron, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.10	2.0	0.26	2	Standard
APW13	UA	845	Cadmium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW13	UA	845	Chloride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	45	200	52	200	Standard
APW13	UA	845	Chromium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW13	UA	845	Cobalt, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW13	UA	845	Fluoride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.25	4.0	0.63	4	Standard
APW13	UA	845	Lead, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW13	UA	845	Lithium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.029	0.040	0.030	0.04	Standard
APW13	UA	845	Mercury, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW13	UA	845	Molybdenum, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.00402	0.10	0.018	0.1	Standard
APW13	UA	845	pH (field)	SU	02/22/2021 - 07/15/2021	CI around median	6.4	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW13	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/22/2021 - 07/15/2021	CI around mean	0.17	6.9	6.9	5	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW13	UA	845	Selenium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW13	UA	845	Sulfate, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	208	400	36	400	Standard
APW13	UA	845	Thallium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW13	UA	845	Total Dissolved Solids	mg/L	02/22/2021 - 07/15/2021	CI around mean	787	1200	628	1200	Standard
APW14	UA	845	Antimony, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW14	UA	845	Arsenic, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.00462	0.059	0.059	0.01	Background
APW14	UA	845	Barium, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.046	2.0	0.30	2	Standard
APW14	UA	845	Beryllium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW14	UA	845	Boron, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.092	2.0	0.26	2	Standard
APW14	UA	845	Cadmium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW14	UA	845	Chloride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	42	200	52	200	Standard
APW14	UA	845	Chromium, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW14	UA	845	Cobalt, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW14	UA	845	Fluoride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.26	4.0	0.63	4	Standard
APW14	UA	845	Lead, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW14	UA	845	Lithium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.026	0.040	0.030	0.04	Standard
APW14	UA	845	Mercury, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW14	UA	845	Molybdenum, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.000155	0.10	0.018	0.1	Standard
APW14	UA	845	pH (field)	SU	02/22/2021 - 07/15/2021	CI around median	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW14	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/22/2021 - 07/15/2021	CI around mean	0.38	6.9	6.9	5	Background
APW14	UA	845	Selenium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW14	UA	845	Sulfate, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	315	400	36	400	Standard
APW14	UA	845	Thallium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW14	UA	845	Total Dissolved Solids	mg/L	02/22/2021 - 07/15/2021	CI around mean	869	1200	628	1200	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW15	UA	845	Antimony, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW15	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.016	0.059	0.059	0.01	Background
APW15	UA	845	Barium, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.57	2.0	0.30	2	Standard
APW15	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW15	UA	845	Boron, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.13	2.0	0.26	2	Standard
APW15	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW15	UA	845	Chloride, total	mg/L	02/23/2021 - 07/14/2021	CB around linear reg	120	200	52	200	Standard
APW15	UA	845	Chromium, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW15	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW15	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/14/2021	CB around linear reg	1.2	4.0	0.63	4	Standard
APW15	UA	845	Lead, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW15	UA	845	Lithium, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.020	0.040	0.030	0.04	Standard
APW15	UA	845	Mercury, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW15	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.00926	0.10	0.018	0.1	Standard
APW15	UA	845	pH (field)	SU	02/23/2021 - 07/14/2021	CI around median	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW15	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/14/2021	CI around mean	1.4	6.9	6.9	5	Background
APW15	UA	845	Selenium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW15	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	1.0	400	36	400	Standard
APW15	UA	845	Thallium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW15	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/14/2021	CI around mean	999	1200	628	1200	Standard
APW16	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW16	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.007	0.059	0.059	0.01	Background
APW16	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.51	2.0	0.30	2	Standard
APW16	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

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TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW16	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.12	2.0	0.26	2	Standard
APW16	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW16	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	66	200	52	200	Standard
APW16	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW16	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW16	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.60	4.0	0.63	4	Standard
APW16	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW16	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard
APW16	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW16	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-0.000901	0.10	0.018	0.1	Standard
APW16	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW16	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	0.70	6.9	6.9	5	Background
APW16	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW16	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around median	1.0	400	36	400	Standard
APW16	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW16	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	667	1200	628	1200	Standard
APW17	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW17	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.00404	0.059	0.059	0.01	Background
APW17	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.56	2.0	0.30	2	Standard
APW17	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW17	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.084	2.0	0.26	2	Standard
APW17	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW17	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	14	200	52	200	Standard
APW17	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW17	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW17	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.37	4.0	0.63	4	Standard
APW17	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW17	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard
APW17	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW17	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.00247	0.10	0.018	0.1	Standard
APW17	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW17	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	0.51	6.9	6.9	5	Background
APW17	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW17	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	23	400	36	400	Standard
APW17	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW17	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	624	1200	628	1200	Standard
APW18	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.003	0.006	0.003	0.006	Standard
APW18	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.000977	0.059	0.059	0.01	Background
APW18	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.18	2.0	0.30	2	Standard
APW18	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.004	0.001	0.004	Standard
APW18	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.10	2.0	0.26	2	Standard
APW18	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.005	0.001	0.005	Standard
APW18	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-2.82	200	52	200	Standard
APW18	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW18	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW18	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.93	4.0	0.63	4	Standard
APW18	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.000336	0.0075	0.0074	0.0075	Standard
APW18	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW18	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW18	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-0.00885	0.10	0.018	0.1	Standard
APW18	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.4	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW18	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	1.4	6.9	6.9	5	Background
APW18	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.050	0.001	0.05	Standard
APW18	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	-1.82	400	36	400	Standard
APW18	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.002	0.001	0.002	Standard
APW18	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	483	1200	628	1200	Standard

Notes:
Potential exceedance of GWPS
HSU = hydrostratigraphic unit:
UA = Uppermost Aquifer
UD = Upper Drift
Program = regulatory program data were collected under:
257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
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 linear reg = Confidence band around linear regression
CB around T-S line = Confidence band around Thiel-Sen line
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
Most recent sample = Result for the most recently collected sample used due to insufficient data
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)
Background = background concentration (see cover page for additional information)

TABLE 2. SUMMARY OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW02	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.092	0.040	0.030	0.04	Standard
APW02	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	1500	400	36	400	Standard
APW02	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	4890	1200	628	1200	Standard
APW04	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around median	6.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW04	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	887	400	36	400	Standard
APW04	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	1710	1200	628	1200	Standard
APW05S	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	3350	1200	628	1200	Standard
APW10	UA	257	Sulfate, total	mg/L	12/16/2015 - 07/29/2021	CI around median	410	400	15	400	Standard
APW12	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard

Notes:
HSU = hydrostratigraphic unit:
  UA = Uppermost Aquifer
  UD = Upper Drift
Program = regulatory program data were collected under:
  257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
  845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
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:
  CB around linear reg = Confidence band around linear regression
  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)

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ATTACHMENT N

Certification of Financial Assurance Requirements

On June 17, 2021, Illinois Power Generating Company provided financial assurance in the form of a performance bond to the Illinois Environmental Protection Agency in the amount of $59,772,973 for the Primary Ash Pond at the Newton Power Plant.

I, Matthew A. Goering, Senior Vice President of Illinois Power Generating Company, do hereby certify to the best of my knowledge for the above referenced CCR Unit that the financial assurance instrument satisfies the requirements of 35 I.A.C. Part 845, Subpart I.

Matthew A. Goering
Senior Vice President
Illinois Power Generating Company

ATTACHMENT O

Stantec Consulting Services Inc.
1859 Bowles Avenue Suite 250, Fenton MO 63026-1944

October 12, 2016
File: let_006_175666013_certification
Revision 0

Initial Hazard Potential Classification Assessment
EPA Final CCR Rule
Primary Ash Pond
Newton Power Station
Jasper County, Illinois

1.0 PURPOSE

This report documents Stantec's certification of the initial hazard potential classification assessment for the Newton Power Station Primary Ash Pond.

40 CFR 257.73(a)(2) requires the owner or operator of an existing CCR surface impoundment to conduct an initial hazard potential classification assessment and document the hazard potential classification, and the basis for the classification, of the CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment.

2.0 FINDINGS

A visual analysis was performed to evaluate potential hazards associated with a failure of the Primary Ash Pond perimeter containment dike. Breach failure scenarios were analyzed at the west, north, northeast, southeast and southwest faces of the embankment. Breach locations were selected based on locations of nearby downstream structures and locations that could be potentially occupied by people. Potential for impacts were evaluated by determining probable breach flow paths using available elevation data and imagery of the impoundment along with the surrounding area.

Analyses indicate that a breach of the west and north embankments have potential to impact Landfill 1 and 2 with discharge eventually reaching the Landfill Stormwater Runoff Pond No. 1 and the western branch of Newton Lake. A breach of the northeast embankment will impact the construction pond, railroad running parallel with the embankment, temporary facilities associated with the power station and the eastern branch of Newton Lake. A breach of the southeast embankment would likely result in CCR and water being discharged into the eastern branch of Newton Lake. A breach of the southwest embankment would result in a discharge of CCR and water into the Secondary Pond and the east and west branches of Newton Lake. Based on the visual analysis of the breach scenarios, it does not appear likely that such an event would result in probable loss of human life. However, it is anticipated that a breach failure at critical locations of the containment dike would result in the release of the stored CCR materials into downstream areas and waterways which could cause environmental damage.

40 CFR 257.53 defines a "significant hazard potential CCR surface impoundment" as a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Based on the results of the analysis summarized above, the Primary Ash Pond was assigned a Significant hazard potential classification per 40 CFR 257.53.

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Matthew Hoy, being a Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that;

1. the information contained in this report and the underlying data in the operating record was prepared in accordance with the accepted practice of engineering and is accurate as of the date of my signature below; and

2. the initial hazard potential classification assessment for the Newton Power Station Primary Ash Pond was conducted in accordance with the requirements specified in 40 CFR 257.73.

SIGNATURE ______________________ DATE 10/12/2016

ADDRESS: Stantec Consulting Services Inc.
1859 Bowles Avenue Suite 250
Fenton MO 63026-1944

TELEPHONE: (636) 343-3880

LICENSED PROFESSIONAL ENGINEER
MATTHEW A. HOY
062-063141
STATE OF ILLINOIS

Documentation of Initial Hazard Potential Classification Assessment

Primary Ash Pond
Newton Power Station
Jasper County, Illinois

Prepared for:
Dynegy

October 12, 2016

Stantec Consulting Services Inc.
Design with community in mind
www.stantec.com

Table of Contents

Section **Page No.**

List of Appendixes

Executive Summary

This report documents the hazard potential classification assessment for the Primary Ash Pond at the Newton Power Station as required per the CCR Rule in 40 C.F.R. § 257.73- (a)(2). The applicable hazard potential classifications are defined in 40 C.F.R. § 257.53 as follows:

> (1) High hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
>
> (2) Significant hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
>
> (3) Low hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

Based on these definitions and the analysis herein, the Primary Ash Pond should be classified as a Significant Hazard potential CCR surface impoundment

This report contains supporting documentation for the hazard potential classification assessment. The hazard potential classification for this CCR unit was determined by a visual assessment conducted by Stantec in August, 2016.

1. Introduction

1.1. Background

The CCR Rule was published in the Federal Register on April 17, 2015. The Rule requires that a hazard potential classification assessment be performed for existing CCR surface impoundments that are not incised. A previously completed assessment may be used in lieu of the initial assessment provided the previous hazard assessment was completed no earlier than April 17, 2013. The applicable hazard potential classifications are defined in the CCR Rule 40 C.F.R. § 257.53 as follows:

High Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.

Significant Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Low Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

Dynegy has contracted Stantec Consulting Services Inc. (Stantec) to prepare hazard potential classification assessments for selected impoundments[1].

It was determined that there was no existing available hazard potential classification assessment documentation for the Primary Ash Pond.

1.2. Location

The Newton Power Station is located on the west bank of Newton Lake in South Muddy Township, Jasper County, Illinois. The station is located approximately eight miles southwest of the Town of Newton, Illinois.

The Primary Ash Pond is located south of the power station adjacent to Landfill 1. A site layout and overview map is included as Figure 1 in Appendix A.

2. Source Data

The following information was used to perform the hazard assessment of the Primary Ash Pond:

---

[1] Dynegy Administrative Services Company (Dynegy) contracted Stantec on behalf of the Newton Power Station owner, Illinois Power Generating Company. Thus, Dynegy is referenced in this report.

- Aerial Imagery (USDA National Aerial Imagery Program 2015)
- Topographic Survey Information for the area around the Primary Ash Pond and Landfill 1 (Weaver Consultants Group for Dynegy, December 2015) – 1 foot contour data and planimetrics
- LiDAR Data (Illinois Height Modernization Program ILHMP 2011) – < 9 cm vertical accuracy

3. Potential Failure Scenarios

3.1. Unit Description

The Primary Ash Pond is a diked earthen impoundment extending over an area of approximately 670 acres. The crest of the impoundment is about 15 foot wide at an approximate elevation of 555.0 feet (unless noted, all elevations are referenced to the North American Vertical Datum of 1988 (NAVD88)) with an average adjacent ground elevation outside of the impoundment of about 530.0 feet. The pond has an operating pool about 268.8 acres in size, which currently has a water surface elevation of about 533.5 feet (the interior base of the pond is partially incised). The Primary Ash Pond discharges to the southwest through a concrete control structure to the Secondary Ash Pond.

The Secondary Ash Pond is a diked earthen impoundment covering about 20.9 acres with an average embankment height of about 10 feet. Water from the Primary Ash Pond discharges into the north side of the Secondary Ash Pond, while water from the Secondary Ash Pond discharges into Newton Lake at the south side of the impoundment.

3.2. Failure Scenarios

The Primary Ash Pond earthen dike is elevated above the adjacent grade by about 20 to 25 feet. The impoundment could potentially fail due to a breach of the embankment at any point along its length; therefore, no areas were excluded from evaluation. The embankment was split into sections, and four failure scenarios were evaluated as summarized below.

3.2.1. Scenario 1: West and North Embankment Failure

A failure of this section of the embankment toward the north would discharge into the low area contained to the north and east by the railroad and the west by Landfill 1. A breach in this area would discharge westward towards Landfill 1 along the ditch located at the toe of the Primary Ash Pond embankment. The flow would split at the northwest corner of the Primary Ash Pond and be routed south on either side of Landfill 2. Once the flow passes Landfill 2, it will partially be captured by the Landfill Stormwater Runoff Pond No. 1, with the remaining flow discharging into the western branch of Newton Lake.

A failure of this section of the embankment to the west would be guided by Landfill 1 and 2. Discharge from this breach would also flow into the Landfill Stormwater Runoff Pond No. 1 and the western branch of Newton Lake.

3.2.2. Scenario 2: Northeast Embankment Failure

A failure of this section of the embankment to the northeast would discharge into the area around the Construction Pond and to the eastern branch of Newton Lake. There is a railroad that runs along the base of the embankment that would be significantly impacted by a failure in this direction. However, any structures that might be impacted by a breach in this direction are believed to be temporary facilities associated with the Newton Power Station.

3.2.3. Scenario 3: Southeast Embankment Failure

A failure of this section of the embankment in the southeast direction would result in CCR and water being discharged into the eastern branch of Newton Lake causing significant environmental impacts.

Theoretically, a breach in this direction could cause the pool level in Newton Lake to rise, with the extent of the rise being dependent on the volume of the breach. Based on approximate calculations, the Primary Ash Pond has a pool area of about 270 acres. If the average depth is about 20 feet, about 5,400 acre-feet of water would be lost during a breach. Newton Lake is approximately 2,720 acres in size. A complete breach of the Primary Ash Pond pool that spreads out over the entirety of Newton Lake would result in a rise of about 2 feet.

In addition, if the average depth of stacked waste over the remaining 400 acres of the pond is about 10 feet, that constitutes another potential 4,000 acre-feet of volume. If it is assumed that only about a third of the solids would be lost during a breach event, the combination of solids and water would result in about 6,800 acre-feet of volume for a rise of about 2.5 feet in Newton Lake. The assumption that 1/3 of the solids volume would be lost is based in part on Stantec's experience with other CCR surface impoundment failures and is supported by industry literature. Additionally, for breach purposes solid outflow was conservatively assumed to behave the same as liquids.

There does not appear to be any permanent structures or roadways along Newton Lake that would be adversely impacted by a breach related rise to the extent that lives would be placed at risk. There are two recreation areas with parking lots adjacent to the lake within a 1 mile travel distance of the Primary Ash Pond, but these areas are sufficiently elevated above the lake to pose minimal risk to any people that might be present at the time of a breach.

3.2.4. Scenario 4: Southwest Embankment Failure

A failure of the pond in the southwest direction would result in a discharge of water and CCR into the Secondary Pond and the east and west branches of Newton Lake.

Similar to the southeast embankment failure, it is unlikely this scenario would impact any structures or put any lives at risk downstream. However, there would be an environmental impact to Newton Lake.

4. Hazard Classification

Areas of potential impact were identified with results discussed in Section 3.2 of this report. Based on the results from the analysis of the Primary Ash Pond, it is Stantec's opinion that a breach of the Primary Ash Pond would not result in probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Therefore, the Primary Ash Pond fits the definition for Significant Hazard Potential CCR surface impoundments (as defined in the CCR Rule §257.53) (Reference 1).

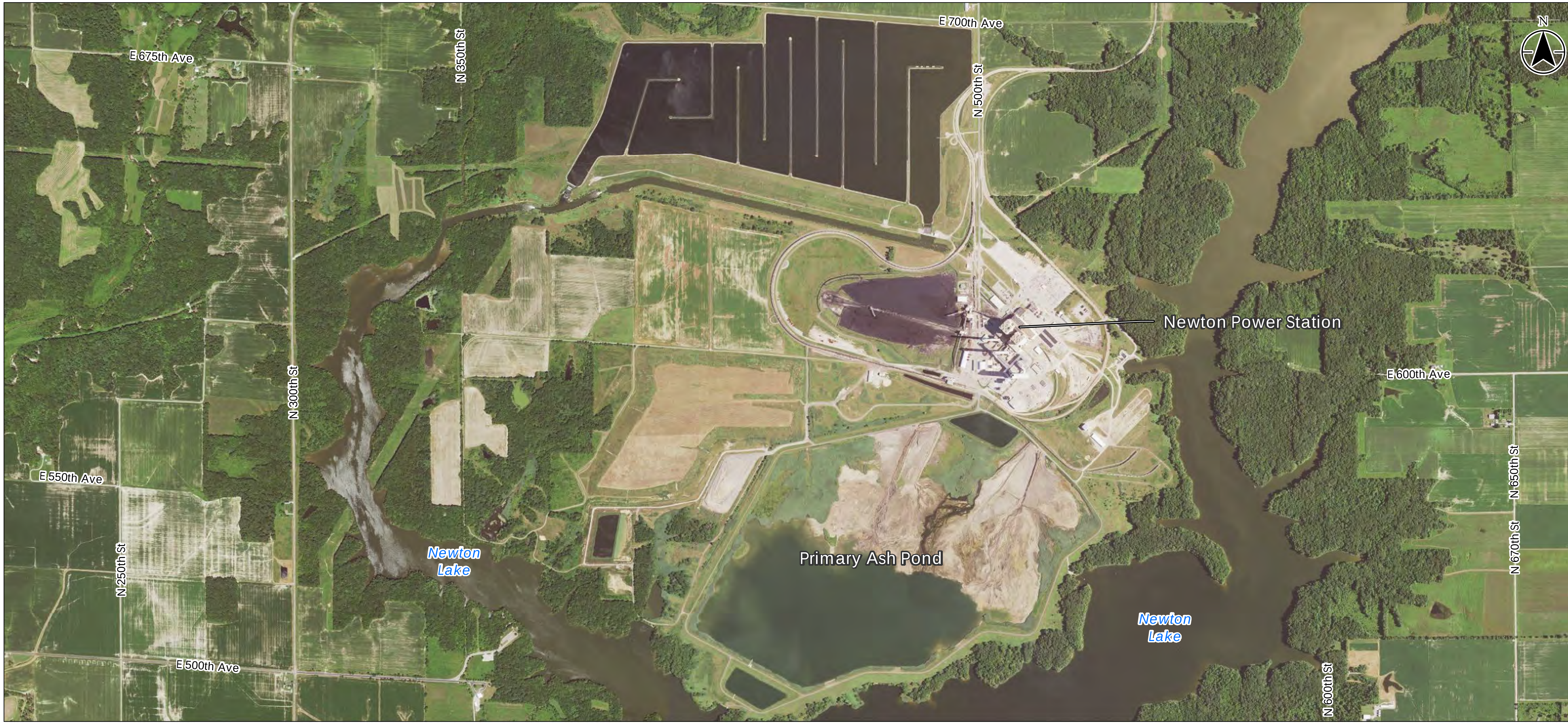
5. References

1. EPA Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR § 257 and § 261 (effective April 17, 2015).

2. Newton Power Station; Coal Ash Impoundment Site Assessment Report (April 2011).

Appendix A

Site Overview Figure



0 2,000 Feet

1:24,000 (At original document size of 11x17)

Stantec DYNEGY

Project Location 175605019
Latitude: 38.936621
Longitude: -88.277038
Jasper County, Illinois
Prepared by WSW on 2016-10-05
Technical Review by NS on 2016-10-05
Independent Review by MH on 2016-10-05

Client/Project
Dynegy
Hazard Potential Classification Assessment
Newton Power Station

Figure No.
1

Title
Site Overview Figure
Primary Ash Pond
Newton Power Station

Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

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ATTACHMENT P

AECOM

Submitted to
Illinois Power Generating Company
6725 North 500th Street
Newton, IL 62448

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

October 2016

CCR Rule Report: Initial Structural Stability Assessment

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the structural stability assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(d). The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

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

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

2 Initial Structural Stability Assessment

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

An initial structural stability assessment has been performed to document that the design, construction, operation and maintenance of the Primary Ash Pond is consistent with recognized and generally accepted good engineering practices and meets the standards in 257.73(d)(1)(i)-(vii). The results of the structural stability assessment are discussed in the following sections. Based on the assessment and its results, the design, construction, operation, and maintenance of the Primary Ash Pond were found to be consistent with recognized and generally accepted good engineering practices.

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

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

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

The foundation consists of stiff to hard soil, which indicates stable foundations. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the foundation. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016). A review of operational and maintenance procedures as well as current and past performance of the dikes has determined appropriate processes are in place for continued operational performance.

Based on the conditions observed by AECOM, the Primary Ash Pond was designed and constructed with stable foundations. Operational and maintenance procedures are in place to address any issues related to the stability of foundations; therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(i).

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

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

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

Based on this evaluation, adequate slope protection was designed and constructed at the Primary Ash Pond. No evidence of significant areas of erosion or wave action were observed. The interior and exterior slopes are protected with vegetation. Where the exterior slopes are adjacent to Newton Lake, they are protected with crushed stone erosion protection. Crushed stone erosion protection is also located on the interior slopes in limited areas. Operational and maintenance procedures are in place to repair the vegetation as needed to protect against surface erosion or wave action. Sudden drawdown of the pool in the Primary Ash Pond is not expected to occur due to operational controls associated with lowering the pool level. Therefore, slope protection to protect against the adverse effects of sudden drawdown is not required as sudden drawdown conditions are not expected to occur. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(ii).

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

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

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

Based on this evaluation, the dike consists of stiff material, with isolated zones of soft, medium stiff, and very stiff material, which is indicative of mechanically compacted dikes. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the dike; therefore, the original design and construction of the Primary Ash Pond included sufficient dike compaction. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016); Operational and maintenance procedures are in place to identify and mitigate deficiencies in order to maintain sufficient density and compaction of the dikes to withstand the range of loading conditions. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iii).

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

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

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

Based on this evaluation, the vegetation on the interior and exterior slopes is adequate as no substantial bare or overgrown areas were observed. Crushed stone erosion protection is present on portions of the exterior slopes adjacent to Newton Lake and is used as an alternative form of slope protection, which is adequate as significant areas of erosion were not observed. Therefore, the original design and construction of the Primary Ash Pond included adequate vegetation of the dikes and surrounding areas. Adequate operational and maintenance procedures are in place to regularly manage vegetation growth, including mowing and seeding any bare areas, as evidenced by the conditions observed by AECOM. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iv).

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

2.5 Spillways (§257.73(d)(1)(v))

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

(A) All spillways must be either:

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

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

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

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

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

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

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

The spillways are comprised of concrete and sliplined corrugated metal pipes, which are non-erodible materials designed to carry sustained flows. The capacity of the spillway was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The analysis found that the spillways can adequately manage flow during peak discharge resulting from the 1,000-year storm event without overtopping of the embankments. The hydrologic and hydraulic analyses are discussed in the *CCR Rule Report: Initial Inflow Design Flood Control System Plan for Primary Ash Pond at Newton Power Station* (October 2016). Operational and maintenance procedures are in place to repair any issues with the spillways and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillways. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(v).

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

CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.

The stability and structural integrity of the slip-lined corrugated metal pipe (CMP) outflow pipes passing through the dike of the Primary Ash Pond were evaluated using design drawings, operational and maintenance procedures, closed-circuit television (CCTV) pipe inspection, and conditions observed in the field by AECOM. No other hydraulic structures are known to pass through the dike of or underlie the base of the Primary Ash Pond.

The CCTV pipe inspection of the slip-lined CMP outflow pipes covered the complete length of both pipes and found the pipes to be free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris that may negatively affect the operation of the hydraulic structure. Operational and maintenance procedures are in place to repair any issues with the spillway and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillway. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi).

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

CCR unit designed, constructed, operated, and maintained with, for CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.

The structural stability of the downstream slopes of the Primary Ash Pond was evaluated by comparing the location of the Primary Ash Pond relative to adjacent water bodies using published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), aerial imagery, conditions observed in the field by AECOM, and sudden drawdown slope stability analyses.

Based on this evaluation, Newton Lake is adjacent to the southern downstream slopes of the Primary Ash Pond. No other rivers, streams, or lakes are adjacent to the downstream slopes of the Primary Ash Pond. Sudden drawdown slope stability analyses were performed at 4 cross sections adjacent to Newton Lake, and considered a drawdown from a normal pool to empty pool condition, thereby evaluating both sudden drawdown and empty and low pool conditions. The resulting factors of safety were found to satisfy the criteria listed in United States Army Corps of Engineers Engineer Manual 1110-2-1902 for drawdown from normal to low pool, as factor of safety criteria for sudden drawdown slope stability is not expressly stated as a requirement of §257.73(d)(1)(vii). Therefore, the Primary Ash Pond meets the requirements listed in §257.73(d)(1)(vii).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

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

VICTOR A MODEER JR
Printed Name

10/13/16
Date

VICTOR ALBERT MODEER JR.
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11/30/17

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ATTACHMENT Q

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Newton, IL 62448

Submitted by
AECOM
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St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Safety Factor Assessment

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

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

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

2 Initial Safety Factor Assessment

40 CFR §257.73(e)(1)
The owner or operator must conduct initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified in (e)(1)(i) through (iv) of this section for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.

(i) The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.
(ii) The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.
(iii) The calculated seismic factor of safety must equal or exceed 1.00.
(iv) For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

A geotechnical investigation program and stability analyses were performed to evaluate the design, performance, and condition of the earthen dikes of the Primary Ash Pond. The exploration consisted of hollow-stem auger borings, cone penetration testing, piezometer installation and laboratory program including strength, hydraulic conductivity, consolidation, and index testing. Data collected from the geotechnical investigation, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents were utilized to perform the safety factor assessment and geotechnical analyses.

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

Ten (10) representative cross sections were analyzed using limit equilibrium slope stability analysis software to evaluate stability of the perimeter dike system and foundations. The cross sections were located to represent critical surface geometry, subsurface stratigraphy, and phreatic conditions across the site. Each cross section was evaluated for each of the loading conditions stipulated in §257.73(e)(1).

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

Results of the Initial Safety Factor Assessments for the critical cross-section for each loading condition (i.e., the lowest calculated factor of safety out of the 10 cross sections analyzed for each loading condition) are listed in Table 1.

Table 1 – Summary of Initial Safety Factor Assessments

Loading Conditions	§257.73(e)(1) Subsection	Minimum Factor of Safety	Calculated Factor of Safety
Maximum Storage Pool Loading	(i)	1.50	1.66
Maximum Surcharge Pool Loading	(ii)	1.40	1.66
Seismic	(iii)	1.00	1.07
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

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

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

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

VICTOR A MODEER JR.

Printed Name

10/13/16

Date

VICTOR ALBERT MODEER JR.
062-043112
REGISTERED
PROFESSIONAL
ENGINEER
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ATTACHMENT R

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Submitted to
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Newton, IL 62448

Submitted by
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St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Inflow Design Flood Control System Plan

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the initial inflow design flood control system plan for the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the requirements specified in 40 Code of Federal Regulations (CFR) §257.82. The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

The Primary Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the initial inflow design flood control system plan for an existing CCR surface impoundment be prepared by October 17, 2016. The plan must document how the inflow design flood control system has been designed and constructed to meet the requirements of 40 CFR §257.82 and be supported by appropriate engineering calculations.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the inflow design flood control system meets the requirements of 40 CFR §257.82. The owner or operator must prepare an inflow design flood control system plan every five years.

2 Initial Inflow Design Flood Control System Plan

40 CFR §257.82
(a) The owner or operator of an existing … CCR surface impoundment … must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.
(1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.
(2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.
(3) The inflow design flood is:
(i) For a high hazard potential CCR surface impoundment, …, the probable maximum flood;
(ii) For a significant hazard potential CCR surface impoundment, …, the 1,000-year flood;
(iii) For a low hazard potential CCR surface impoundment, …, the 100-year flood; or
(iv) For an incised CCR surface impoundment, the 25-year flood.
(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.

Analyses completed for the initial inflow design flood control system plan of the Primary Ash Pond are described in the following subsections. Data and analysis results in the following subsections are based on spillway design information shown on design drawings, construction information, topographic surveys, information about operational and maintenance procedures provided by Illinois Power Generating Company, and field measurements collected by AECOM. The analysis approach and results of the hydrologic and hydraulic analyses are presented in the following subsections.

The Primary Ash Pond has a significant hazard potential based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with §257.73(a)(2).

2.1 Initial Inflow Design Flood Control Systems (§257.82(a))

An initial inflow design flood control system plan, supported by a hydraulic and hydrologic analysis, was developed for the Primary Ash Pond by evaluating the effects of a 24-hour duration design storm for the 1,000-year Inflow Design Flood (IDF) using a hydrologic HydroCAD (Version 10) computer model and a starting water surface elevation of 534.0 feet. The computer model evaluated the Primary Ash Pond's ability to collect and control the 1,000-year IDF under existing operational and maintenance procedures. Rainfall data for the 1,000-year IDF was obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14. The NOAA Atlas 14 rainfall depth is 9.01 inches.

The HydroCAD model results for the Primary Ash Pond indicate that the CCR unit has sufficient storage capacity and spillway structures to adequately manage (1) flow into the CCR unit during and following the peak discharge of the 1,000-year IDF and (2) flow from the CCR unit to collect and control the peak discharge resulting from the 1,000-year IDF. The peak water surcharge elevation is 534.9 feet during the IDF, and the minimum crest elevation of the Primary Ash Pond dike is 552.7 feet. Therefore, overtopping is not expected.

Based on this evaluation, the Primary Ash Pond meets the requirements in §257.82(a).

2.2 Discharge from the CCR Unit (§257.82(b))

40 CFR §257.82(b) provides that the discharge from the CCR unit must be handled in accordance with the surface water requirements under 40 CFR §257.3-3, which states the following:

(a) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.

(b) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.

(c) A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.

(d) Definitions of the terms Discharge of dredged material, Point source, Pollutant, Waters of the United States, and Wetlands can be found in the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., and implementing regulations, specifically 33 CFR part 323 (42 FR 37122, July 19, 1977).

The handling of discharge was evaluated by reviewing design drawings, operational and maintenance procedures, conditions observed in the field by AECOM, and the inflow design flood control system plan developed per §257.82(a).

Based on this evaluation, outflow from the Primary Ash Pond is ultimately routed through a NPDES-permitted discharge into Newton Lake. Hydraulic and hydrologic analyses performed as part of the initial inflow design flood control system plan found that the Primary Ash Pond adequately manages outflow during the 1,000-year IDF, as overtopping of the Primary Ash Pond embankments is not expected.

Therefore, discharge of pollutants in violation of the NPDES permit is not expected as all discharge is routed and controlled through the existing spillway system and NPDES-permitted outfall during both normal and IDF conditions. Based on this evaluation, the Primary Ash Pond meets the requirements in §257.82(b).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial inflow design flood control system plan dated October ____, 2016 meets the requirements of 40 CFR §257.82.

VICTOR A MODEER JR.

Printed Name

10/13/16

Date

VICTOR ALBERT MODEER JR.
062-043112
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

11/30/17

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ATTACHMENT S

PART 845 SAFETY AND HEALTH PLAN

NEWTON POWER PLANT PRIMARY ASH POND

CONTENTS

APPENDICES

ACRONYMS & ABBREVIATIONS

%	Percent
§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
29 C.F.R.	Title 29 of the Code of Federal Regulations
ACGIH	American Conference of Governmental Industrial Hygienists
CCR	Coal Combustion Residual
HAZWOPER	Hazardous Waste Operations and Emergency Response
ID	identification
IDLH	Immediately Dangerous to Life and Health
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
kV	kilovolt
NID	National Inventory of Dams
NIOSH	National Institute for Occupational Safety and Health
No.	number
NPP	Newton Power Plant
OSHA	Occupational Safety and Health Administration
PAP	Primary Ash Pond
Part 845	35 I.A.C. Part 845: Residuals in Surface Impoundments
PEL	Permissible Exposure Level
PFAS	Per- and polyfluoroalkyl substances
PFD	Personal Flotation Device
PNOR	particulates not otherwise recognized
POC	Point of Contact
PPE	personal protective equipment
ppm	parts per million
SDS	Safety Data Sheet
Site	NPP PAP
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	time-weighted averages
USCG	United States Coast Guard

REVISION SUMMARY

Revision Date	**Description of Changes** (Section title or number – description)	**Responsible Party** (individual name or title, company / agency name, document reference and date)

PREFACE

Illinois Power Generating Company (IPGC) has prepared this Safety and Health Plan in accordance with requirements set forth in Title 35 of the Illinois Administrative Code (35 I.A.C.) Part 845: Residuals in Surface Impoundments (Part 845), Section (§) 845.530. IPGC assessed health and safety hazards of its coal combustion residual (CCR) surface impoundments to develop and update this Safety and Health Plan.

This document describes the minimum anticipated protective measures necessary for worker health and safety at the Newton Power Plant (NPP) Primary Ash Pond (PAP; Vistra identification [ID] number [No.] 501, Illinois Environmental Protection Agency [IEPA] ID No. W0798070001-01, National Inventory of Dams [NID] No. IL50719), herein referred to as the Site. Employees of IPGC, contract workers, and third-party contractors must read and comply with the contents of this document. The contents of this document are not intended to cover all situations that may arise nor to waive any provisions specified in Federal, State, and local regulations or site owner / contractor health and safety requirements.

Third-party contractors are accountable for the health and safety of their employees. Third-party contractors are required to prepare a Safety and Health Plan that meets the minimum requirements herein. However, no requirements or provisions within this plan shall be construed as an assumption of IPGC of their legal responsibilities as an employer.

This Safety and Health Plan will be reviewed and updated annually, at a minimum. The Safety and Health Plan will also be updated if facility operations change, or a new hazard is identified.

1. INTRODUCTION

This Safety and Health Plan has been developed to outline the requirements to be met by employees of IPGC, contract workers, and third-party contractors while performing any activity to construct, operate, or close the PAP. This Safety and Health Plan has been developed to meet the requirements of 35 I.A.C. § 845.530 and describes the responsibilities, training requirements, protective equipment, and safety procedures necessary to minimize the risk of injury, fires, explosion, chemical spills, material damage incidents, and near misses related to CCR activities. This Safety and Health Plan incorporates by reference the Occupational Safety and Health Administration (OSHA) regulations contained in Title 29 of the Code of Federal Regulations (29 C.F.R.) § 1910 and 29 C.F.R. § 1926.

The requirements and guidelines in this Safety and Health Plan are based on a review of available information and data, and an evaluation of identified on-site hazards. This Safety and Health Plan will be reviewed with persons assigned to work at the PAP and will be available on-site.

1.1 Site Description/History

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately 7 miles southwest of the town of Newton. The PAP is located in Section 26 and the western half of Section 25, Township 6 North, Range 8 East. The PAP is located south of the power plant and situated in a predominantly agricultural area and is surrounded by Newton Lake on the west, south, and east. Beyond the lake is additional agricultural land. The Phase 1 Landfill is located northwest and west of the PAP, and the Phase 2 Landfill is located to the west (Appendix A).

1.2 Facility Personnel

The following table outlines key IPGC personnel with respect to facility operations and health and safety. The Plant Control Room is the first point of contact for plant communication, including emergencies.

Name	Position	Phone Number
Kevin Schafer	Point-of-Contact (POC) / Safety and Environmental Manager	618-783-0394
Security		618-783-0302
Control Room		618-783-0302
James Marshall	Plant Manager	618-783-0351
Plant Shift Supervisor (24/7)		618-783-0344
Terry Hanratty	Chemist and Lab Supervisor	618-783-0388
Matt Ballance	Engineering Manager	618-343-7739 (office) 618-792-7274 (mobile)
Jason Campbell	Dam Safety Manager	271-753-8904 (Springfield) 217-622-3491 (mobile)
Stu Cravens	Senior Technical Expert	217-390-1503 (mobile)
Vic Modeer	Engineering Manager	618-541-0878

1.3 Responsibilities

The following persons have responsibilities associated with communicating and implementing the Safety and Health Plan for the PAP.

1.3.1 IPGC Point of Contact

The IPGC Point of Contact (POC) is a management-level person who is requiring employees, contract workers, or third-party contractors to enter the PAP. The IPGC POC is responsible to communicate Safety and Health Plan information and requirements to employees, contract workers, and third-party contractors, and oversee work performed in the PAP to the extent necessary to confirm implementation of Safety and Health Plan requirements.

1.3.2 IPGC Employees

IPGC employees are directly hired by IPGC. They are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.3 Contract Workers

Contract workers are those hired by IPGC through an agency firm. Similar to IPGC employees, contract workers are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.4 Third-Party Contractor Employees

Third-party contractor employees work for firms under contract to IPGC. Third-party contractors include prime contractors and all of their lower tier subcontractors. Similar to IPGC employees, third-party contractors are required to implement Safety and Health Plan requirements as applicable to their work and exercise their "stop work authority" if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.5 Third-Party Contractor Safety Competent Person

Third-party contractors will be required to designate a Safety Competent Person. The Safety Competent Person must be in a management position (*e.g.,* superintendent, foreman, etc.) with OSHA 30-hour construction safety certification who may perform other duties, unless IPGC requires a dedicated Safety Competent Person. A Safety Competent Person must be on site at all times when the subcontractor has employees performing work for IPGC and must possess a sound working knowledge of pertinent OSHA regulations, this Safety and Health Plan, and other applicable safety requirements related to the scope of work. Third-party contractors must also designate a backup Safety Competent Person that possesses the same authority and training. The competent person will ensure timely correction of safety deficiencies identified by IPGC. The Safety Competent Person is responsible to ensure Safety and Health Plan requirements have been communicated to lower-tier subcontractors and enforce Safety and Health Plan requirements.

2. SITE ACCESS & CONTROL

This section outlines requirements for ensuring that only authorized personnel and visitors are permitted at the Site.

2.1 Facility Security

Elements of site control include restricting access to the Site to persons until they have met the training requirements outlined in this Safety and Health Plan and have been authorized to do so by NPP POC or their representative.

All personnel must check in with Security upon arriving to the Site and check out upon departure.

Upon arrival to the Site, all IPGC employees, contract workers, and third-party contractors must check in/out at Security. A COVID-19 screening must also be completed per Section 3.8.

2.2 Third-Party Contractor Management

Prior to working at the PAP, all third-party prime contractors must maintain an active registration with ISNetworld and maintain a grade of A or B. Lower tier subcontractors are currently not required to be registered in ISNetworld, but this requirement may change at the discretion of IPGC.

All third-party contactor supervisors must meet with their specified Contract Coordinator/Plant Contact prior to beginning work.

2.3 Third-Party Contractor Safety and Health Plan

Prior to being authorized to conduct work at PAP, third-party contractors must develop and submit a Safety and Health Plan. The third-party contractor's Safety and Health Plan must be specific to the scope of work that they will be performing at the PAP. The third-party contractor's Safety and Health Plan must meet or exceed all the requirements in this Safety and Health Plan, other IPGC requirements, and applicable regulations. All lower tier subcontractors of third-party contractors must meet the requirements in this Safety and Health Plan as well as the requirements outlined in the Safety and Health Plan of the third-party with whom they are contracted.

2.4 Authorized Personnel

At a minimum, authorized personnel who will be granted unescorted access to the project include IPGC employees, contract workers, and third-party contractors that meet the following:

- Reviewed this Safety and Health Plan and other applicable safety planning documentation
- Have completed all the training, medical surveillance, and drug screen and background investigation requirements as outlined in Section 3 of this Safety and Health Plan.
- Have completed the NPP Site Orientation Training

2.5 Visitors

Visitors must be escorted by Authorized Personnel through the PAP if they have not reviewed this Safety and Health Plan or completed the training requirements outlined in Section 3 of this Safety and Health Plan. Visitors may not undertake any activity to construct, operate, or close a CCR surface impoundment.

2.6 Communication

Communication between workers and emergency services must be maintained at all times. Cellular service is not consistently available and cannot be relied upon to summon emergency services. In lieu of using mobile phones, the following will be implemented:

- Hand held radios will be used to communicate to a central location where a landline or reliable cellular service is available.

- Hand held radios will be used to communicate to a central location where a landline or reliable cellular service is available.

3. TRAINING & MEDICAL REQUIREMENTS

Project personnel must be properly trained for the type of work being performed and in accordance with 35 I.A.C. § 845.530, 29 C.F.R. § 1926 and 29 C.F.R. § 1910, and IPGC policies. Additionally, personnel working in areas regulated by the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) must have current medical surveillance. All employees, contractors, and third-party contractors must complete the following prior to beginning any activity to construct, operate, or close the PAP.

3.1 HAZWOPER Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors be trained in accordance with 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65. The following training will be completed as required by job function:

- **OSHA 40-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have extensive contact with contaminated materials and/or may be required to wear a respirator.
- **OSHA 24-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have minimal contact with contaminated materials and will NOT be required to wear a respirator.
- **OSHA 8-hour Supervisor Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for Site Supervisors, Foremen, Superintendents, and others who will be directing and managing site activities.
- **OSHA 8-hour Refresher** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, completed within 12 months of initial 40-hour or 24-hour training and annually thereafter.

The following matrix outlines HAZWOPER training requirements based on typical job functions at the PAP. It is not intended to be all inclusive, new job functions must be evaluated per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65.

Training	Job Function
OSHA 40-hour	Ash handlers
OSHA 24-hour	Personnel not required to handle CCR materials
OSHA 8-hour Supervisor Training	Third-Party Contractor Safety Competent Persons
OSHA 8-hour refresher	All personnel

3.2 OSHA Construction Outreach Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors complete an OSHA 10-hour or 30-hour construction safety training. These trainings will be completed as follows:

- All employees, contract workers, and third-party contract employees: OSHA 10-hour or 30-hour construction outreach training.
- Supervisors, superintendents, foreman and safety professionals: OSHA 30-hour construction outreach training.

3.3 PAP Safety and Health Plan Review

Pursuant to 35 I.A.C. § 845.530(d)(e), before beginning any activity at the PAP, and annually thereafter, all IPGC employees, contract workers, and third-party contractors must review the content of this HASP. After reviewing this Safety and Health Plan all personnel will understand the following:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- Communications or alarm systems outlined in Section 6
- Response to fires and explosions outlined in Section 6
- Response to a spill or release of CCR
- Information about chemical hazards and hazardous materials outlined in Section 5
- The use of engineering controls, administrative controls, and personal protective equipment (PPE) outlined in Section 4

All personnel will acknowledge this HASP by signing the *Safety and Health Plan Acknowledgment Form (Appendix B).*

3.4 Emergency and Monitoring Equipment Training

All IPGC employees, contract workers, and third-party contractors must be aware of how to respond to alarms and other emergencies as outlined in Section 6 of this plan. Individuals may only use facility emergency and monitoring equipment if they have been trained in their use and authorized to do so by the designated POC. Additionally, a written release may need to be completed as required by Vistra Corporate Procedure FFA-POL-0006.

Individual IPGC employees and contract workers may be responsible for using, inspecting, repairing and replacing facility emergency monitoring equipment. These individuals will be trained in accordance with procedures identified by IPGC. These individuals will review and adhere to the manufacturer's instructions, where applicable.

Third-party contractors are responsible for inspecting, repairing, and replacing any owned emergency (*i.e.*, fire extinguishers) and monitoring equipment (*i.e.*, air monitoring equipment). Third-party contractors will maintain procedures for using, inspecting, repairing, and replacing owned emergency and monitoring equipment that is consistent with the manufacturer's requirements. Third-party contractor employees who are responsible for this equipment will be trained in procedures for using, inspecting, and repairing owned equipment by their employer.

3.5 Hazard Communication

All employees, contract workers, and third-party contractors must be trained in chemical hazards (if any) associated with their work in accordance with 29 C.F.R. § 1910.1200. Work tasks performed on the PAP may include exposure to compounds identified in the Hazard Communication section of this Safety and Health Plan and is included as part of the Safety and Health Plan Review outlined in Section 3.3.

3.6 Medical Surveillance

All employees, contract workers, and third-party contractors engaged in operations specified in 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65 and meet one of the criteria outlined in 29 C.F.R. § 1910.120(f)(2) and 29 C.F.R. § 1926.65(f)(2) must participate in a medical surveillance program that is administered by their employer. The criteria for participating in a medical surveillance program are:

- All employees who are or may be exposed to hazardous substances at or above the established permissible exposure limit, without regard to the use of respirators, for 30 days or more a year;
- All employees who wear a respirator for 30 days or more a year; or
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

The medical surveillance program must result in documentation that an individual is cleared to work on sites covered by 29 C.F.R. § 1910.120 and 20 C.F.R. § 1926.65 and is medically fit to wear a respirator when applicable.

3.7 Drug Screen and Background Investigations

IPGC requires that contract worker agencies and third-party contractors are responsible for ensuring that all personnel have completed and passed a drug and alcohol test and background investigation prior to on-site work as described in Appendix C.

3.8 COVID-19 Site Entry Guidelines

All personnel entering Vistra work sites shall review and adhere to the site entry guidelines provided in Appendix D.

3.9 Document Management

IPGC will maintain employee and contract employee training and medical surveillance records. Medical surveillance records are located in the Employee Development Center within the nurse's office. Training records are located in the safety office. Third-party contractors are responsible for maintaining training and medical surveillance documentation for their employees. Third-party contractors will produce documentation upon IPGC request.

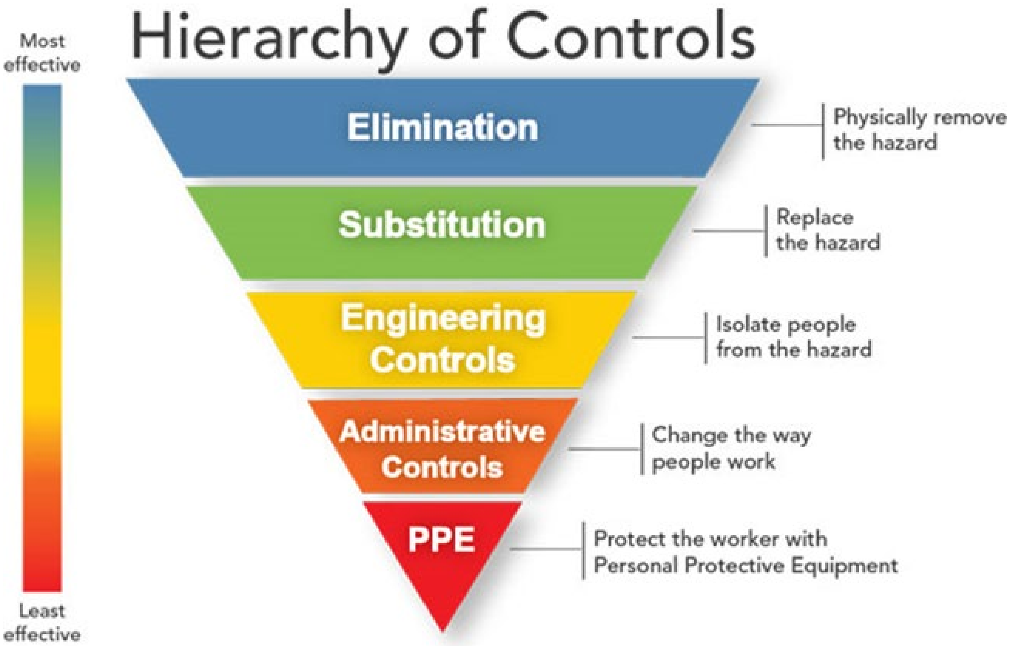
3.10 Industrial Hygiene Sampling Records

Upon receipt of exposure sampling results IPGC and third-party contractors must distribute exposure sampling results to employees within 15 business days unless otherwise required by applicable regulation. All personnel exposure sampling results and records must be maintained by the employee's company for at least 30 years following termination of employment.

4. HAZARD & CONTROLS

The following section outlines general controls for the hazards and controls. Third-party contractors are still responsible for developing a Safety and Health Plan that incorporates requirements of this Safety and Health Plan, other safety requirements for the NPP, as well as the third-party contractor's safety policies and procedures. Safety and Health Plans developed by third-party contractors must be specific to the site and the anticipated work means and methods. Safety and Health Plans that consist of only standard operating procedures or are not otherwise specific to the work performed at the PAP will not be accepted by IPGC.

IPGC requires that a hierarchy of controls be considered when performing work at the PAP. Implement controls that favor elimination, substitution, and engineering over the use of administrative controls and PPE when feasible. See the figure below for additional guidance (courtesy of the National Institute for Occupational Safety and Health [NIOSH]).



4.1 Ash/Unstable Surfaces

Prior to working in or on an ash pond, third-party contractors must notify the facility POC. Work in or on an ash pond may not begin until the facility POC has approved the work. Upon completion of the work, third-party contractors must notify the POC that they have left the ash pond.

Additionally, Security must be notified prior to entering and upon exiting an ash pond.

When working on ash ponds or unstable surfaces the following requirements must be implemented where applicable and feasible. The following table summarizes safety controls for work performed in ash ponds and on unstable surfaces and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure	Use crane mats or other cribbing to support heavy equipment on ash ponds	Traverse compacted paths that have previously been used by heavy equipment	Use a restraint (tethering) system to prevent falls or slips into unstable ash pond surfaces or surface water that represents a drowning hazard

Elimination	Substitution	Engineering	Administrative	PPE
			If an unstable condition exists, complete a Next Level Up Pre-Job Brief prior to accessing the ash pond.	
			Approach the ash pond from the most stable direction	
			Inspect travel paths for recent terrain shifts, particularly following heavy rains or rapid dewatering	
			Working alone on ash ponds is prohibited without pre-approval from the POC.	
			When a drowning hazard exists, implement requirements for working on/near water as outlined in Section 4.4.	
			Implement an emergency response plan with trained responders for falls into (or engulfment by) ash	

4.2 Ash Inhalation/Airborne Exposure

Ash that becomes airborne due to site activities or environmental conditions may result in an exposure to its components as outlined in Section 5.1. IPGC and third-party contractors are responsible for ensuring their respective employees' and contract workers' exposures are below occupational exposure limits. Upon request, third-party contractors must demonstrate to IPGC that exposure control methods are adequate. The following table summarizes airborne exposure controls and is aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Substitute manual work methods for those that can be completed from the cab of a vehicle	Continually wet work areas to reduce the amount of ash that becomes airborne Equip vehicles and heavy equipment cabs with filters. Clean and change filters as required	Conduct air monitoring or exposure sampling to confirm that airborne exposure is below regulatory limits	If exposure levels are above the PEL, equip employees with respirators appropriate to the level of exposure

4.3 Stuck Vehicles/Equipment

If a vehicle or piece of equipment becomes stuck, a third-party towing or wrecking company who is trained in vehicle extraction must be retained and the IPGC will be notified. Third-party contractors may extract their own vehicle if they have an approved extraction plan and a competent person is on site to implement the extraction. The extraction plan shall be included as part of the third-party contractor’s reviewed and approved Safety and Health Plan. The above notifications are still required.

The hazards presented by stuck vehicles/equipment must not be underestimated. While the weight of the stuck equipment can be calculated, it’s impossible to precisely calculate the other forces that are pulling against the towing vehicle which requires special training and experience to properly size towing equipment and select towing techniques. This is especially true for “complex” or high-hazard extractions involving equipment stuck at axle depth (or beyond) or sloped surfaces or any area where extraction activities could trigger shifts in the ground surface. No chains shall be used to remove stuck vehicles/equipment.

The following table summarizes safety controls related to stuck vehicles and equipment and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure Substitute tracked equipment for wheeled equipment	Use crane mats or other cribbing to support heavy equipment on ash ponds Lighten the load – Remove materials from stuck vehicles or equipment prior to extraction if possible	Only persons trained in vehicle extraction are permitted to remove stuck vehicles/equipment A professional towing/wrecking service is required Prepare for spills (damage to fuel or hydraulic systems)	All persons involved in removing stuck equipment must wear PPE that includes hard hat, safety boots, safety glasses, high visibility vests, and cut resistant gloves

4.4 Working Near/Over Water

All employees, contract workers, and third-party contractors must wear a United States Coast Guard (USCG) approved personal floatation device (PFD), when within 6 feet of water, over water, and/or wading in water where the danger of drowning exists. The PFD must be properly secured to the wearer, free of all defects including rips, tears, stress, and fading, and be kept clean and free of excessive dirt and oil.

If the possibility of falling into water has been eliminated through the use of guardrails, fall restraint, or other method, the use of a PFD is no longer required.

When performing work on water from a vessel, at least one lifesaving rescue vessel (*e.g.,* a skiff) shall be immediately available at locations where employees are working over, in, on, or adjacent to water where the danger of drowning exists. However, if the water is so shallow that rescuers could simply walk/run into the water body without endangering themselves and/or others or the work was being conducted very close to shore (*e.g.,* the length of the skiff from shore would be greater than the working distance from shore and/or the skiff would foul on the bottom), a skiff would not be required.

The following table summarizes the requirements for working over/near water where a drowning hazard exists and are aligned to the hierarchy of controls:

Elimination	**Substitution**	**Engineering**	**Administrative**	**PPE**
Change the work task or work methods so that work near a drowning hazard is no longer required		Install guardrails that separate work areas from the drowning hazard	All work to be performed by at least two people where each is equipped with proper safety gear and capable of summoning emergency rescue	All personnel are required to wear suitable PFDs
		Utilize equipment (crowd-control barricades, safety fence, etc.) that will keep personnel at least 6 feet from a drowning hazard	When working on water use of a rescue skiff as outlined above	
			Use of a ring buoy with 90 feet of braided polycarbonate (or equivalent) line	
			Ring buoys must be positioned within 100 feet of work (maximum of 200 feet spacing)	

4.5 Heavy Equipment

All heavy equipment operators must be competent and authorized to operate each piece of heavy equipment. Forklift and telehandler (*e.g.,* Lull, JLG) operators must have a license or certificate that indicates they have passed a written test and "road" test for the equipment they will be operating within the last 3 years. Third-party contractors will provide proof of qualification upon request of IPGC.

Persons working around heavy equipment must implement the “25 Foot Rule.” The 25 Foot Rule requires that persons get the operator’s attention and permission prior to approaching closer than 25 feet to heavy equipment. Persons must walk quickly through blind spots. Loitering in heavy equipment blind spots (especially to the rear) must be avoided.

Temporary fuel storage tanks will be labelled as to their content and be protected from collision by Site vehicles using solid barricades including balusters, chain link fence, or equivalent. Spill kit (55-gallon sorbent capacity contained in an overpack) and one 20-pound Type ABC fire extinguisher will be located within 45 feet of fueling areas. Tanks will be rated for above ground use and will be double walled or have secondary containment in case of a leak. Tanks and dispensing hose will be bonded and grounded. On-site filling of fuel storage tanks will be completed with trucks that have automatic over-flow shutoffs. These trucks will be properly bonded to the storage tank and meet all of the other storage tank requirements. Temporary secondary containment must be provided in the refueling area that includes the storage tank and dispensing hoses.

Elimination	Substitution	Engineering	Administrative	PPE
		Heavy equipment (and vehicles) must be equipped with backup alarms, horns, roll-over protection (when feasible)	Operators must be competent and authorized	Operators must use seatbelts when equipped
		Vehicles and heavy equipment operated at night must have headlights, tail lamps, and reflectors	Forklift operators must have a current license or certificate (within 3 years)	High visibility vests are required when working around heavy equipment
			All vehicles and equipment must be turned off when not in use	
			Operators must inspect equipment daily prior to use	
			Persons working near heavy equipment must follow the "25 Foot Rule" and avoid lingering in blind spots as outlined above	
			Always obey site speed limits – 15 mph unless otherwise posted	

4.6 Overhead Powerlines

All overhead powerlines must be assumed to be energized until confirmed otherwise. The minimum clearance distance for equipment working near energized power lines must be in accordance with the table found in 29 C.F.R. § 1926.1408(h).

The following table summarizes safety controls for work near energized power lines:

Elimination	Substitution	Engineering	Administrative	PPE
Plan to work away from powerlines	Use heavy equipment with shorter booms/attachments to avoid coming close to power lines	Contact the utility owner to deenergize the line	Install signs to warn personnel of overhead powerlines	

Elimination	Substitution	Engineering	Administrative	PPE
		Contact the utility owner to install insulated sleeves over energized lines	Install a non-conductive distance marker to delineate minimum clearance	
			Use a dedicated spotter to ensure equipment does not enter minimum clearance distances	

4.7 Severe Weather

Severe weather conditions include but are not limited to high winds, electrical storms, heavy rain, and tornados can cause hazardous conditions at CCR surface impoundments. The primary control for severe weather is monitoring weather reports prior to beginning work and as work occurs throughout the day. In remote work areas with inconsistent cellular service, a weather radio should be used.

Monitor lightning using a commercially available mobile application if cellular service is available. When lightning is observed within 10 miles of the CCR surface impoundment, or a storm is imminent, take shelter in the nearest solid structure or fully enclosed vehicle. If possible, secure all tools, materials, and equipment prior to the storm arriving. Work may resume 30 minutes after the last lightning strike is observed within 10 miles. The severe weather shelter is located at the Service Building. The shelter location will be reviewed during the Site Orientation Training.

Do not conduct work on a CCR surface impoundment when there is a risk for tornados in the area. If on a CCR surface impoundment and a tornado forms, seek the nearest substantial shelter. The closest tornado shelter to the PAP is the Service Building (shown on Appendix A). If no shelter is available, attempt to evacuate to a shelter using a vehicle. If a tornado forms and you are not in a shelter, take one of the following actions:

- Stay in a vehicle with the seat belt on, keep your head below the windows and cover it with your hands
- If there is an area which is noticeably lower than the work area, lie in that area and cover your head with your hands.

The following table summarizes safety controls related to severe weather:

Elimination	Substitution	Engineering	Administrative	PPE
Plan outdoor tasks on days with low potential for severe weather.			Prior to beginning outdoor work monitor the day's weather.	
			Periodically monitor weather throughout the day. Use a weather app which issues alerts for severe weather and lightning, assuming cell service is available	

Elimination	Substitution	Engineering	Administrative	PPE
			Utilize a weather radio if cellular service is inconsistent	
			Stop all outdoor work and seek shelter when lightning is observed	

4.8 Heat Stress

Heat stress can be a significant hazard, especially for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Employees, contract workers, and third-party contractors will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and in the prevention of heat stress incidents.

Workers will be encouraged to immediately report any heat-related problems that they experience or observe in fellow workers. Any worker exhibiting signs of heat stress and exhaustion should be made to rest in a cool location and drink plenty of water. Emergency help by a medical professional is required immediately for anyone exhibiting symptoms of heat stroke, such as red, dry skin, confusion, delirium, or unconsciousness. Heat stroke is a life-threatening condition that must be treated immediately by competent medical authority.

4.8.1 Heat Stress Prevention

To prevent heat stress, IPGC employees, contract workers, and third-party contractors will implement heat stress prevention measures as outlined in OSHA's Heat Index (below). A summary of these precautions is described below.

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

Know the Symptoms: Some symptoms associated with heat stress are: Employees should be aware of these symptoms with themselves and with their co-workers:

- Elevated heart rate, lack of concentration, difficulty focusing on a task, fatigue
- Irritability and/or sickness

- Cramps, rash, headache
- Loss of desire to drink water
- Fainting
- Skin clammy, moist, and pale (severe heat exhaustion)
- Skin extremely dry and red (heat stroke)

Acclimatize: When high heat stress conditions arise, employees should be exposed to the heat for short work periods followed by longer periods of work. Acclimatization usually takes five (5) days and should be provided for all new employees and employees returning from an absence of two (2) weeks or more. Contact Corporate Health and Safety for proper procedures.

Hydration & Pace of Work: Make sure all employees intake plenty of water throughout the work day (sometimes as much as a quart per worker per hour) and let employees know where the drinking water is located. Adjust your work pace and expectations on how much work can be done during periods of high heat stress. Workers cannot do as much during periods of high heat stress compared with similar periods of low heat stress. After acclimatization, workers may be able to resume a more "normal" work pace as long as fluid intake is adequate.

Work/Rest Periods: If possible, heavy work should be scheduled during the cooler parts of the day (*i.e.,* early morning) and rest periods should be taken in cool areas for longer periods.

Personal Protective Equipment (PPE): Employees using PPE (*i.e.*, Tyvek® suits or other equipment which may retain heat) can be more susceptible to heat stress due to the fact that heat/sweat often cannot escape the suits and/or the equipment. Persons wearing PPE that contributes to heat stress require more hydration, longer rest periods, or a reduced pace of work. Also, more careful monitoring of each person's health status is required by co-workers and management.

The following table summarizes safety controls for heat related illnesses:

Elimination	Substitution	Engineering	Administrative	PPE
Perform outdoor, strenuous, tasks at cooler times of day/year	Use mechanized equipment in place of manual labor	Install fans or air conditioning units in the work area	Train all personnel to know the signs of heat stress/stroke and how to prevent it	Implement the use of cooling vests or other similar PPE
		Install a canopy to provide shade to work areas	Allow workers to acclimatize to the work environment	
		Provide cool, shaded break areas	Adjust work pace to allow for the effects of heat	
			Implement work/rest periods	

4.9 Cold Stress

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds (wind chill), dampness, and cold water. One, or any combination of these factors, can cause cold-related hazards. Cold stress, including frostbite and hypothermia, can result in severe health effects. Employees, contract employees, and third-party contractors will be instructed in the identification of a cold stress victim, the first-aid treatment procedures for the victim and in the prevention of heat stress incidents.

A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures. Major risk factors for cold-related stresses include:

- Wearing inadequate or wet clothing thus increasing the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine, and medication thus inhibiting the body's response to the cold and/or impairing judgment.
- Having a cold or certain disease, such as diabetes, heart, vascular and thyroid problems, and thereby increasing susceptibility to the winter elements.
- Lower body-fat composition or other physiological differences. Statistics show that men experience far greater death rates due to cold exposure than women, potentially attributable to participation in risk-taking activities, lower body-fat composition and/or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, thus speeding up the effects of cold weather.

The following table provides the resulting equivalent chill temperature to exposed skin because of increasing wind speeds at decreasing actual temperatures. Personnel shall be aware of predicted weather conditions before beginning site work and stay apprised of changes.

TABLE 2. Cooling Power or Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

Equivalent chilll temperature requiring dry clothing to maintain core body tempearture above 36°C (96.8°F) per cold stress TLV

The following table summarizes safety controls for preventing cold stress:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or warmer parts of the year		Install heaters in enclosed work areas	Train all personnel on the symptoms of cold stress and how to prevent it	All personnel must wear multiple layers of clothing
		Provide a warm break area	Implement work/rest schedule	Utilize hand/foot warmers when required

An additional hazard in cold weather conditions is the increased risk for slips from the accumulation of ice and snow in general work areas, ruts where water is accumulated, and heavy equipment. The following table outlines controls that may be used for preventing slips:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or in areas free of accumulated areas		Clear snow in work areas		Use traction control devices (*i.e.,* YakTrax) on work boots to provide additional traction.
		Apply salt/sand to icy areas		
		Use equipment to access work areas		

4.10 Biological Hazards

The following are biological hazards that may be present at the PAP.

4.10.1 Ticks (Lyme Disease) & Mites

Although Lyme disease has been detected throughout the continental United States, it is prevalent primarily in certain areas in New England, the Mid-Atlantic and the northern Midwest states. Although Lyme disease is the most common tickborne illness, other tickborne illnesses include southern tick-associated rash illness, Rocky Mountain spotted fever, ehrlichiosis, and tularemia. More information on Lyme disease and other tickborne illnesses can be found from the CDC.

Prevention

- Standard field gear (work boots, socks, and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions shall be taken when working in areas that might be infested with ticks:
    - Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists, tape cuffs if necessary
    - Wear light colored clothing so ticks can be easily spotted
    - Per- and polyfluoroalkyl substances (PFAS)-free tick repellents (DEET and Permethrin) must be used when walking in all overgrown areas. DEET (≥25 percent [%]) must be applied to skin while permethrin must be applied to clothes and allowed to dry. Spray outer clothing, particularly your pant legs and socks, BUT NOT YOUR SKIN, with an insect repellent that contains permethrin. For heavily infested tick areas, wear spun polypropylene coveralls that have been sprayed with permethrin.
    - Inspect clothing frequently
    - Inspect head and body thoroughly when you return from the field, particularly on your lower legs and areas covered with hair
    - When walking in wooded areas, wear a hard hat, and avoid contact with bushes, tall grass, or brush as much as possible

Removal

- Remove any ticks by tugging with tweezers or special tick removal tools
- Do not squeeze or crush the tick
- DO NOT use matches, a lit cigarette, nail polish, or any other type of chemical to "coax" the tick out

Treatment

- Disinfect the area with alcohol or a similar antiseptic after removal

- Notify the Safety Competent Person of the embedded tick
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash.
- No further treatment is necessary for ticks embedded <48 hours.
- If other signs or symptoms of Lyme are observed (fever/chills, aches, and pains), then notify the Safety Competent Person and seek medical attention

The following table summarizes safety controls to reduce the hazards associated with ticks and mites.

Elimination	**Substitution**	**Engineering**	**Administrative**	**PPE**
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on tick and mite prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light-colored long sleeved shirt tucked into pants. Tuck pant legs into socks
			Perform frequent tick checks in the field and a thorough tick check after completing work activities	Apply Permethrin to clothes and DEET (20% or more) to exposed skin
			Call licensed pesticide contractors to remove infestations of bees, wasps, fire ants, etc.	

4.10.2 Insect Bites/Stings

Stinging/biting insects at the PAP include spiders, wasps, and bees. Contact with these insects may result in project personnel experiencing adverse health effects that range from being mildly uncomfortable to being life-threatening. Therefore, insects present a serious hazard to project personnel, and extreme caution must be exercised whenever Site and weather conditions increase the risk of encountering stinging insects. Some of the factors related to stinging insects that increase the degree of risk associated with accidental contact are as follows:

- The nests for these insects are frequently found in remote wooded or grassy areas or equipment staging areas where equipment has not been moved recently.
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock. Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.
- The hypersensitivity needed to cause anaphylactic shock, can in some people accumulate over time and exposure, therefore even if someone has been stung previously and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again
- Spider bites generally only cause localized reactions such as swelling, pain, and redness. However, bites from a Black Widow or Brown Recluse, or if you are allergic to spiders, can cause symptoms that are more serious.

- ***If a worker knows that they are hypersensitive to bee, wasp, or hornet stings, or other insects, they must inform the Safety Competent Person prior to site work. Persons who have been prescribed epi-pens by their physician must have an epi-pen on the Site.***
- Inspect any clothing or PPE that has been left for a period of time prior to putting it on. Shake out the clothing and inspect the inside of safety shoes/boots prior to putting them on
- Nests in active work areas must be eradicated. Small nests may be handled by Site personnel using consumer-type insecticide. A pest control contractor should be hired to handle large or difficult to reach nests.

The following table outlines safety controls to reduce the risk of hazards associated with stinging/biting insects.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on stinging/biting insect prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light-colored long sleeved shirt tucked into pants. Tuck pant legs into socks
		Eradicate nests in the work area as outlined above.	Instruct personnel to inspect/shake out clothing and work boots that have been left for a period of time.	Apply Permethrin to clothes and DEET (20% or more) to exposed skin – NOTE this will not repel bees/wasps
			Instruct employees who are hypersensitive to insect bites/stings to carry their epi-pen while on site	

4.10.3 Venomous Snakes

There are four species of venomous snakes in Illinois, they are:

- Copperhead
- Cottonmouth Water Moccasin
- Timber rattlesnake
- Eastern Massasauga

Generally, these snakes are found in the southern one-third of the state, with the Cottonmouth Water Moccasin found mostly in the southernmost portions of Illinois. Snakes are generally found in tall grass, wood piles, or other covered areas. Snakes are generally not aggressive towards humans, but if they are encountered avoid the snake and do not provoke it. If bitten by a snake that may be venomous seek medical treatment.

The following table outlines safety controls to reduce the hazard associated with venomous snakes.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove debris piles, overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of venomous snakes. Areas of vegetation overgrowth and/or debris piles should be considered “high risk” areas	If working in area with snakes cannot be avoided, wear snake chaps
			Instruct personnel to not disturb snakes if they identify one in their work area	
			Use caution when moving staged tools or materials into which snakes may have moved	

4.10.4 Poisonous Plants and Plant Hazards

Poison ivy and poison oak may be present at the Site. Poison ivy thrives in all types of light and usually grows in the form of a trailing vine; however, it can also grow as a bush and can attain heights of 10 feet or more. Poison ivy has pointed leaves that grow in clusters of three. Poison oak resembles poison ivy except that the poison oak leaves are more rounded rather than jagged like poison ivy, and the underside of poison oak leaves are covered with hair.

The skin reaction associated with contacting these plants is caused by the body's allergic reaction to toxins contained in oils produced by the plant. Becoming contaminated with the oils does not require contact with just the leaves. Contamination can be achieved through contact with other parts of the plant such as the branches, stems or berries, or contact with contaminated items such as tools and clothing. The allergic reaction associated with exposure to these plants will generally cause the following signs and symptoms:

Symptoms

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact and in many cases, persons experience almost immediate irritation.
- Reddening, swelling, itching, and burning at the site of contact.
- Pain, if the reaction is severe.
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin.

Prevention

- The best treatment appears to be removal of the irritating oil before it has had time to cause inflammation by wiping exposed skin with rubbing alcohol followed by washing with soap and water.
- A visual Site inspection and identification of the plants should be completed prior to starting work so that all individuals are aware of the potential exposure. Avoid contact with any poisonous plants on the Site, and keep a steady watch to identify, report, and mark poisonous plants found on the Site.
- Avoid contact with, and wash daily, contaminated tools, equipment, and clothing.
- Barrier creams (Ivy Block®) and orally administered desensitization may prove effective and should be tried to find the best preventive solution.

- Keeping the skin covered as much as possible (*i.e.*, long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure. PFAS-free spun polypropylene coveralls or Tyvek® may be worn to prevent contact of skin and clothes with poison ivy.

The following table outlines safety controls to mitigate the hazards associated with poisonous plants.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of poisonous plants	Wear pants and long sleeves when working in overgrown areas
			Instruct personnel to avoid areas where poisonous plants have been identified	Consider the use of a coverall when working in areas where these plants are present, especially for hypersensitive employees.
			Provide isopropyl alcohol along with soap and water to remove oils from skin, tools, and equipment.	

4.11 Working Alone

As outlined in Section 4.1, working alone while on the PAP must be pre-approved by the POC. Working alone is prohibited for tasks deemed to be high risk by IPGC including, but not limited to, handling highly hazardous chemicals (sulfuric acid), work over/near water, excavation and trenching, hot work (grinding, welding and torch cutting), and elevated work that requires personal fall arrest. Third-party contractors are responsible for identifying potential high-risk tasks in their Safety and Health Plan and requiring that a buddy system be implemented while high risk work is performed. The buddy must be located in a safe area but may perform other tasks that do not prevent observing the person performing high risk work. Working alone may occur on and around other parts of the PAP when there is no drowning hazard or risk of severe injury due to high-risk work.

Elimination	Substitution	Engineering	Administrative	PPE
	Modify work methods by substituting lower hazard methods for high hazard methods	Varies depending on the hazard, but for example, could include installing guardrails (temporary or permanent) which mitigates a fall hazard reducing the risk to levels where working alone may be permitted	Prohibit working alone on ash ponds and for other high hazard tasks without prior approval from the POC	

Elimination	Substitution	Engineering	Administrative	PPE
			Implement a buddy system whenever feasible (required for high hazard work)	
			Implement a worker check-in, emergency alerting, and monitoring system	

5. HAZARD COMMUNICATION

As required by 35 I.A.C. § 845.530, the OSHA HAZWOPER standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) and OSHA Hazard Communication Standard, site personnel, subcontractors, and visitors must be informed of chemical hazards associated with their work area. The information in this section is based on:

- Recommendations in the most recent "NIOSH Pocket Guide to Chemical Hazards" by the Department of Health and Human Services, Centers for Disease Control and Prevention, and the NIOSH Pocket Guide.
- Requirements set forth in the OSHA regulations from as defined in Chapter 17 of 29 C.F.R. § 1910.1200(c) for all hazards not otherwise classified.

5.1 Coal Combustion Residuals

Primary exposure to CCR is through inhalation and skin contact. CCR is typically a fine, black, grey, or tan particulate. CCR is comprised of several components. The following table outlines the components of the CCR. The exact percentage of each component will vary based on the type of ash and location at the surface impoundment.

<table>
<tr><th>Chemical</th><th>Percentage</th><th>PEL</th><th>IDLH</th><th>ACGIH TLV</th><th>Symptoms of Exposure & Health Effects</th></tr>
<tr><td>Crystalline Silica</td><td>20-60% (total)</td><td>0.05 mg/m³ (respirable)</td><td>25 mg/m³ (respirable)</td><td>0.025 mg/m³ (respirable)</td><td>Cough, dyspnoea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]</td></tr>
<tr><td>Iron oxide</td><td>1-10%</td><td>5 mg/m³</td><td>2500 mg/m³</td><td>5 mg/m³</td><td>Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)</td></tr>
<tr><td>Calcium oxide</td><td>10-30%</td><td>5 mg/m³</td><td>25 mg/m³</td><td>2 mg/m³</td><td>irritation eyes, skin, upper respiratory tract; ulcer, perforation nasal septum; pneumonitis; dermatitis</td></tr>
<tr><td>Titanium dioxide</td><td><3%</td><td>15 mg/m³</td><td>ND</td><td>10 mg/m³</td><td>Lung fibrosis; [potential occupational carcinogen]</td></tr>
<tr><td>Aluminosilicates</td><td>10-60%</td><td rowspan="3">15 mg/m³ (PNOR)</td><td rowspan="3">ND</td><td rowspan="3">10 mg/m³ (PNOR)</td><td rowspan="3">irritation eyes, skin, throat, upper respiratory system</td></tr>
<tr><td>Magnesium oxide</td><td>2-10%</td></tr>
<tr><td>Magnesium dioxide</td><td><2%</td></tr>
<tr><td>Phosphorous pentoxide</td><td>≤2%</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Sodium oxide</td><td>1-10%</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Potassium oxide</td><td>≤1%</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Bromide salt</td><td><0.1%</td><td></td><td></td><td></td><td></td></tr>
</table>

Footnotes:

All values are 8-hour time-weighted averages (TWAs) unless otherwise indicated.

- PEL: Permissible Exposure Limit, the concentration an employee may be exposed to for an 8-hour work day for a 40-hour work week for which nearly all employees may be repeatedly exposed without adverse health effects.
- IDLH: IMMEDIATELY Dangerous to Life and Health, contaminant concentration which present the possibility for severe health consequences if exposed to the IDLH concentration without the appropriate personal protective equipment (PPE).
- ACGIH TLV: American Conference of Governmental Industrial Hygienists Threshold Limit Value
- mg/m^3 = milligrams per cubic meter of air
- PNOR: Particulates Not Otherwise Regulated
- ND: Not Determined

5.2 Sulfuric Acid

Sulfuric acid is used in the PAP to control pH. Sulfuric acid is a very hazardous corrosive capable of causing immediate chemical burns to eyes and skin as well as damage to the upper respiratory tract and lungs if aerosols are inhaled. Sulfuric acid storage tanks and piping are labelled.

Immediately flush skin and eyes for 15 minutes following contact with sulfuric acid. Personnel working within the vicinity of sulfuric acid must provide a suitable, temporary or permanent, emergency shower and eyewash.

5.3 Safety Data Sheets

Pursuant to 35 I.A.C. § 845.530(b)(3), IPGC will provide Safety Data Sheets (SDSs) to all employees, contract workers, and third-party contractors for the CCR located at the Site. Third-party contractors will provide SDSs to the POC. SDSs are provided in Appendix E.

5.4 Signage

The absence of any of the following signage does not mean that a potential hazard does not exist. Signage will be posted by IPGC, but employees, contract workers, and third-party contractors must remain vigilant for changing site conditions.

To aid in hazard communication and pursuant to 35 I.A.C. § 845.530(f), IPGC will post the following signs at the PAP:

- Signs identifying the hazards of CCR, including dust inhalation when handling CCR.
- Signs identifying unstable CCR areas that make the operation of heavy equipment hazardous.
- Signs identifying the necessary safety measures and necessary precautions, including the proper use of PPE.

The following signs may also be posted at the CCR units to aid in hazard communication:

- Sulfuric acid hazard communication signs or labels on all tanks, drums, or other storage containers. "Sulfuric Acid" labels on piping.
- Overhead electrical lines that may be struck by heavy equipment of vehicles will have signs warning drivers of their presence.

6. EMERGENCY RESPONSE PLAN

This emergency response section details actions to be taken in the event of site emergencies. This section is consistent with the NPP PAP Emergency Action Plan. All personnel on site must be familiar with emergency signals and the content of this section.

6.1 Emergency Phone Numbers & Notifications

Emergency Number	
Site Address	**Emergency Phone Number**
6725 N 500th St Newton, IL	618-783-0344
Control Room/Security	618-783-0302

Medical Treatment	
Local Hospital	**Phone Number**
HSHS St. Anthony's Memorial Hospital 503 N Maple St Effingham, IL 62401	217-342-2121

Incident Notifications		
Title	**Name**	**Contact Number**
Kent Schafer	POC / Safety and Environmental Manager	618-783-0394

6.2 Evacuation Signal

The site-specific evacuation signal will be communicated during the NPP Site Orientation.

Upon hearing an evacuation signal, all personnel will leave the work area and proceed to the muster point.

6.3 Muster Point

The muster point for the PAP is located at the main gate. The muster point is shown in Appendix A. An alternative muster point may be identified based on the location of the work or the type of incident.

6.4 Calls for Emergency Support

In the case of an emergency, site personnel will **618-783-0344**. The Control Room/Security will coordinate the arrival of on-site emergency personnel. The individual calling for emergency support will briefly explain the nature of the emergency and site conditions as follows:

- Indicate his/her name
- Location of emergency
- Description of emergency conditions that may require special rescue equipment, such as confined spaces, excavations, and elevated work platforms
- Potential chemical hazards and recommended PPE

6.5 Fire & Explosion Response Plan

Trained site personnel may respond to incipient stage fires using a 20-pound Type ABC dry chemical fire extinguisher or hose. An incipient stage fire is a fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus. Personnel shall only attempt to extinguish the fire if it is safe to do so.

A fire that CANNOT be readily extinguished with a fire extinguisher will require evacuation of the work area personnel to Muster Point areas per this Safety and Health Plan. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan will also be followed.

All fires or explosions must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.6 Injury Response Plan

Treatment for minor injuries will be provided on site using available first aid supplies and personnel trained in first aid. All third-party contractors must have at least one individual on site who is trained in first aid, CPR, and AED use. Third-party contractors must provide their own first aid kits and AED. For minor injuries that are not life-threatening but require further medical attention, employees should be treated by occupational physicians at occupational clinics whenever possible. Treatment of minor injuries by emergency room or personal physicians should be avoided. When injured workers are released back to work with restrictions, all subcontractors are expected to accommodate those restrictions.

Emergency medical incidents include puncture wounds to the head, chest, and abdomen, serious head and spinal cord injuries, and loss of consciousness must be treated at the hospital emergency room listed in Section 6.1 of this Safety and Health Plan.

All injuries must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.7 Spill Response Plan

In general, IPGC employees, contract workers, and third-party contractors are trained and equipped to handle small spills associated with their work. Third-party contractors must include an approved spill response plan in their Safety and Health Plan. Site personnel will generally respond to spills as follows:

- Stop the leak immediately if it can be done without directly contacting the leaking material.
- Remove or stop all ignition sources (hot work, generators, etc.) that are within 25 feet of any part of the spill.
- On-site personnel should immediately secure the area to prevent unauthorized entry into the spill area.
- Although not likely given the anticipated types of spills, site personnel must immediately initiate evacuation if a spill may cause an explosion, death, or serious injury.
- Site personnel may only respond to incipient stage fires regardless if such fires are associated with a spill.
- PPE for spills to open areas generally requires Modified Level D PPE (poly-coat Tyvek®, nitrile gloves, and boot covers or boot decontamination). Over-boots or boot covers may also be used if persons cleaning the spill would have to walk on spilled materials. Latex gloves are not acceptable and will degrade with exposure to petroleum products.

6.8 CCR Spill or Release Response Plan

Response to minor or incidental spills of CCR will be managed as outlined in the General Spill Response Plan. An incidental release is a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up. An incidental spill may be safely cleaned up by employees who are familiar with CCR. Response to major releases of CCR will be in accordance with the NPP PAP Emergency Action Plan, which can be found on the Luminant CCR website at https://www.luminant.com/ccr/.

6.9 Ash Pond Rescue

Ash ponds may be unstable and represent an engulfment hazard if persons and equipment traverse the surface, berms, or other unstable areas. Special training is required on behalf of emergency responders to retrieve persons and equipment who become trapped in unstable ash. **Untrained persons must not enter unstable areas** in an attempt to conduct rescue because of the significant potential that they will also become victims. Call the NPP emergency number and state that an "ash pond rescue" is required. The NPP emergency contact will notify the designated service to perform the ash pond rescue. On-site personnel should remain on stand-by to support the ash pond rescue team as necessary.

6.10 Incident Reporting

All incidents must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan. An Incident Report must be completed for all injuries, illnesses, spills, fire, explosion, or property damage. The absence of an injury does not preclude the need to complete an Incident Report as such incidents will be classified as "near miss" or "other." It will include, but is not limited to, the nature of the problem, time, location, and corrective actions taken to prevent recurrence.

APPENDIX A
SITE MAP

PART 845 REGULATED UNIT (SUBJECT UNIT)

OTHER UNIT

PROPERTY BOUNDARY

0 500 1,000 Feet

SITE MAP

PART 845 SAFETY AND HEALTH PLAN
NEWTON POWER PLANT
NEWTON, ILLINOIS

APPENDIX A

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

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PROJECT: 169000XXXX | DATED: 9/22/2021 | DESIGNER: STOLZSD

APPENDIX B
SAFETY AND HEALTH PLAN ACKNOWLEDGMENT FORM

SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT FORM

I HEREBY CERTIFY THAT I HAVE READ AND UNDERSTOOD ALL HEALTH AND SAFETY PROCEDURES AS STATED HEREIN:

Name and Affiliation (printed)	**Signature**	**Date**

APPENDIX C
DRUG SCREEN POLICIES AND SUPPLEMENTAL TERMS

Drug and Background Investigations

Contractor is solely responsible for ensuring that all members of Contractor Project Team have completed and passed all drug and alcohol tests and background investigations required under this Attachment and under Contractor's own programs before assigning such personnel to perform Work. Contractor is also solely responsible for ensuring that such testing and investigations are performed in accordance with all applicable laws.

1. Required Investigations. Except as otherwise required by applicable law, Required Investigations shall consist of all of the following:

   1.1 a 7-panel drug screening;

   1.2 a background investigation that includes a criminal records check in all counties where the applicable person has resided for at least the last seven (7) years;

   1.3 a third-party verification of previous employment and the highest education level completed by the applicable person;

   1.4 a check of the National Sex Offender Registry and Terrorist Watch List (Denied Parties); and

   1.5 a check of Motor Vehicles Record (if work to be performed by the applicable person requires driving as part of the defined duties).

2. Notices to Tested Persons Regarding Background Checks. All background checks will be conducted in compliance with applicable provisions of the Fair Credit Reporting Act.
3. Forms and Testing Organization for Drug Tests. Except for those positions subject to Department of Transportation ("DOT") drug and alcohol testing regulations, all drug testing shall be performed using the Universal Toxicology four part "Non-DOT" Chain of Custody and Request Form with white and blue top page, and shall be conducted by an independent third-party organization.

4. Pass/Fail Standards – Background Checks. A person shall be deemed to have failed the applicable background check if:

   4.1 information is reported through the background check process indicating that such person has failed to disclose or misrepresented information requested at any time about such a person's criminal background history; or

   4.2 such person has ever committed any felony constituting a violent crime, crime against a person, sexual offense or fraud; or

   4.3 such person has committed any other felony, or has been incarcerated for a felony, within ten (10) years prior to the date of such background check (i.e., for these felonies there must be a ten (10) year lapse in time from the later of the commission and the end of any period of incarceration); or

   4.4 such person has committed any misdemeanor that:

      4.4.1 involves violence that is sexually related; or

4.4.2 consists of a DUI that is the second (or more) DUI in the last two (2) years prior to the date of the background check; or

4.4.3 consists of a theft-related offense; provided that there can be no more than one theft by check and it must have been for an amount less that $100; or

4.4.4 consists of any drug-related misdemeanor committed at any time within forty-eight (48) months prior to the date of the background check.

4.4 For purposes of both felonies and misdemeanors, a person is deemed to have committed the applicable offense if he/she is convicted or enters a plea of guilty or nolo contendere for such offense (to include, without limitation, sentences of probation and deferred adjudication).

5. Pass/Fail Standards – Drug Tests. A person shall be deemed to have failed the applicable drug test if any of the following maximum cut-off levels are exceeded, unless there is a legitimate medical explanation for the presence of a tested substance at or above the applicable cut-off level:

5.1 Amphetamines 500ng/mL

5.2 Barbiturates 150ng/mL

5.3 Benzodiazepines 150ng/mL

5.4 Cocaine 150ng/mL

5.5 Marijuana 150ng/mL

5.6 Opiates 2000ng/mL

5.7 Phencyclidine 25ng/mL

For any positions subject to DOT drug and alcohol testing requirements, testing shall be conducted according to the applicable DOT panel and cutoff levels.

6. Other Requirements.

6.1 Background checks and drug tests will be paid for by Contractor without reimbursement by Company.

6.2 Contractor will keep background checks and drug test records while the applicable persons are working pursuant to this Agreement and for three (3) years thereafter.

6.3 Upon request, Contractor will provide a certification to Company that no person required hereunder to pass a background check or drug test has failed such investigation or test. Contractor will not provide the specific results of the background check or drug test of any individual to Company.

6.4 If any person required under this Agreement to pass a background check or drug test fails such check or test, Contractor will not report the specific results of such check or test to Company and will not allow such individual to perform any Work for Company. Although such person may not be assigned to perform any Work for Company, nothing in this Attachment requires Contractor to take any other action with respect to such person's employment with Contractor.

Supplemental Terms for Onsite Services

1. SAFETY

1.1 Contractor agrees that any safety-related assistance or initiatives undertaken by Company will not relieve Contractor while on Company Property from responsibility for the implementation of, and compliance with, safe working practices, as developed from their own experience, or as imposed by law or regulation, and will not in any way, affect the responsibilities resting with Contractor under the provisions of any agreement to which these policies are attached and to meet all safety requirements as specified by the Occupational Safety & Health Administration (OSHA), the Mine Safety Health Administration (MSHA), including the "Mining Contractor Safety Reference Handbook" located at http://www.vistraenergy.com/wp-content/uploads/2016/12/Contractors-Safety-Handbook_Final-MC-08262016.pdf, the Department of Transportation (DOT) and any other applicable state or federal safety and health laws or regulations.

1.2 In the event that a material safety data sheet, warning label, or other documentation concerning the use of hazardous chemicals at any property owned or controlled by Company or any of its affiliates (collectively, "Company Properties"), applies to any materials or equipment provided by Contractor as an aspect of the Work, such documentation will be provided by Contractor to Company prior to the commencement of any such Work.

1.3 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

2. SECURITY

2.1 It will be the affirmative duty of Contractor to ensure that Contractor Group assists in carrying out all security measures, to include reporting all information or knowledge of matters adversely affecting security to Company's designated security personnel.

2.2 Company reserves the right to exclude any of Contractor's employees from any Company Property by denial of access, suspension or revocation of access authorization, preemptory expulsion, or by any other means, without notice or cause. Former Company employees, and any of Contractor's employees who previously have been excluded from any Company Property, may be brought onto Company property or facilities only if prior approval from Company is obtained. If Contractor terminates a member of Contractor Group performing Work on Company's premises, Contractor shall inform Company immediately, but in no event, no later than twenty-four (24) hours after such employee is terminated in order for Company to remove access to Company Property for such employee.

2.3 Company measures may also include investigations, whether by Company or law enforcement officials. Contractor agrees to cooperate in such investigations and understands that Company reserves the right to require anyone in Contractor Group to authorize appropriate agencies to release his or her criminal records to Contractor as a condition of either initial or continued permission for access to any Company Property. Investigations may include searches of Contractor Group. Such searches may include searches of facilities assigned to Contractor Group, search of all Company Property areas and property at such Company Property areas, searches of including, but not limited to, offices, lockers, desks, lunch boxes, packages and motor vehicles (regardless of ownership). Without limiting the foregoing, Contractor acknowledges and agrees that all members of Contractor Group, to the extent that Company reasonably determines that such members require security badge access prior to entering onto any Company Property, shall be required to comply with Company's standard security badge requirements, including without limitation a background check to be performed by Company.

3. ISNETWORLD

3.1 Contractor agrees to maintain at Contractor's expense a subscription with ISNetworld (www.ISNetworld.com), Company's safety compliance program or any replacement program therefor, as directed by Company, for the Term of the Agreement. Contractor shall also furnish ISNetworld with any information requested by ISNetworld relating to ISNetworld's evaluation of the Contractor's safety program and practices. As a minimum, requested documents will be related to safety, health, and insurance (i.e., regulatory required training, certifications, safety plans, safe and secure workplace practices, insurance certificates, etc.), OSHA and MSHA injury rates and Experience Modification Rate (EMR).

3.2 Contractor has and during the performance of this Agreement shall continue to report full, complete and accurate information to ISNetworld concerning Contractor's employees.

4. MATERIALS, EQUIPMENT AND LABOR. Contractor will be solely responsible for the proper storage, transportation and disposal of any product or waste, other than sandblasting waste, used or generated in connection with the Work in accordance with all applicable Environmental Laws. Contractor will dispose of all waste materials, other than sandblasting waste, at an off-site disposal facility approved for such waste materials pursuant to applicable Environmental Laws and will complete and sign all waste manifests as the generator of such waste. Company will be responsible for the storage, transportation and disposal of any sandblasting waste generated during the performance of the Work.

5. CONDITIONS AFFECTING WORK

5.1 Contractor will investigate and acquaint itself with the conditions affecting the Work, including but not limited to those related to the transportation, disposal, handling and storage of materials and waste; availability of labor, water, electric power and roads; the uncertainties of weather, river stages or similar physical conditions at the site; the conformation and condition of the ground; and the character of equipment and facilities needed preliminary to and during prosecution of the Work. Contractor has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered. Contractor's failure to acquaint itself with any conditions affecting the Work or any available related information will not relieve it from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

5.2 Contractor assumes full responsibility for investigating conditions and determining the existence and magnitude of any hazards to the physical well-being of property of Contractor, the employees, agents, and servants of Contractor, or any other person or entity who is or may become involved in the performance of Work, and any and all other persons in the vicinity of the Work. Contractor will advise all of the above-specified persons or entities of any hazards relating to Work, and will ensure that those persons or entities are advised of and fully understand the nature of the hazards and safety precautions that can be taken to eliminate or minimize dangers relating to the hazards.

5.3 Contractor will provide information to Company regarding hazardous chemicals and/or consumable products that contain constituents listed in 40 CFR 372.65 used at any Company Property. Contractor will report the amount of such material carried on and off the site, the amount actually used and the manner of use. Contractor will provide the maximum quantity of the material stored on site at any one time and if a waste material was collected, where it was disposed of (location name and address). Contractor will provide information on the amount of material used for the previous calendar year by the first of February.

5.4 Contractor will use its best efforts to ensure that the Work is performed so as to minimize any adverse impact upon natural resources and the environment and will use best industry practices in this regard at all times.

5.5 Contractor acknowledges and agrees that all members of Contractor Group performing Work at any Company Generation or Mining Property are required to view Company's "Contractor/Visitor Safety Orientation" video (in the case of Company Generation property), when applicable, and to read and adhere to Company's "Contractor/Visitor Safety Booklet" (in the case of Company Mining property) prior to performing any Work at any Company Generation or Mining Property.

5.6 Contractor will immediately notify Company as soon as Contractor has reason to believe that Contactor, or any employee or other person performing the Work, is not or may not be performing the Work in compliance with applicable Environmental Laws. Contractor will provide Company with written notice to Company of such actual or potential non-compliance within three (3) days following the discovery thereof. Contractor will take immediate steps to ensure compliance with all applicable Environmental Laws and will, if directed by Company, cease all Work until authorized by Company to resume the Work.

5.7 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

6. WORK SITE PERMITS AND LICENSES

6.1 Subject to the following two paragraphs, Contractor will obtain, prior to the commencement of the Work, and provide to Company upon request, all permits, licenses and governmental authorizations, at its sole expense, required for the performance of the Work. Contractor will be solely responsible for maintaining compliance with such permits, licenses and governmental authorizations.

6.2 In the event that a storm water discharge permit is required for the performance of the Work, (i) Contractor will be responsible for filing a Notice of Intent with respect to the Work, in addition to any Notice of Intent that Company may be required to file, and (ii) Contractor will coordinate with

Company in the preparation and execution of a Storm Water Pollution Prevention Plan for the Work Site.

6.3 In the event that the performance of the Work involves the handling or abatement of asbestos-containing materials, Contractor will coordinate with Company in the preparation and filing of all required notification forms.

7. ACCESS. Should Contractor desire access to the Work Site over any land not controlled by Company, it will, at its sole expense, obtain all proper permits or written permission necessary for that access.

8. COMPANY FACILITIES. Contractor will not use Company's sanitary facilities, changehouses, shops, parks, storage buildings, tools, equipment or other facilities unless so directed by Company. Contractor will not discharge, without Company's prior written authorization, any product or waste used or generated in connection with the Work through any (i) Company-permitted outfall, (ii) Company-owned or operated pollution control equipment, or (iii) storm or sanitary sewer located at or in the vicinity of the Work Site. Any request for authorization to discharge will include, at a minimum, either a copy of the Material Safety Data Sheet for the product or a written description of the waste, including a list of the constituents of the waste and the relative concentrations thereof.

9. ENVIRONMENTAL

9.1 In the event that Contractor discovers during the performance of the Work any substance at the Work Site that is not the subject of the Work or has not otherwise been identified by Company for Contractor, which substance Contractor has reason to believe is or may be a Hazardous Substance that (i) has been or may be released or spilled into the soil, surface water, or groundwater or in a building or structure, or (ii) consists of asbestos-containing materials, lead-based paint, batteries, thermostats, lighting equipment, or equipment containing polychlorinated biphenyls, Contractor will immediately stop Work and notify Company of the discovery. Contractor will not resume the Work until receiving authorization from Company to do so.

9.2 The term "Hazardous Substance" means any product, waste, emission or substance defined, listed or designated as a hazardous or toxic substance, hazardous waste, hazardous material or pollutant by or pursuant to any Environmental Law and includes, but is not limited to, any petroleum-based product, substance or waste, including any additives associated therewith, pesticides, fertilizers, solvents, polychlorinated biphenyls, mercury, lead, lead-based paint, asbestos-containing material or explosives.

9.3 Contractor will immediately notify Company in the event of a spill or release of any material which Contractor knows or has reason to believe is a Hazardous Substance, whether onto the ground, into any body of water, a storm or sanitary sewer, or the air, or anywhere on property owned or controlled by Company, including within any building or structure. Contractor will be solely responsible, as may be required by applicable Environmental Laws, for, in consultation with Company, (i) notifying the appropriate governmental agencies of such spill or release caused or permitted by the acts or omissions of Contractor and (ii) for the cleanup and remediation of such spill or release.

10. PROTECTION OF HIGHWAYS AND RAILROADS. Contractor will make suitable arrangements with governmental authorities and railroads for the construction of all structures, whether underneath or over roads, railroads or rights-of-way to protect the public from accident or delay. Contractor will repair, at its

own expense, to the satisfaction of the governmental authorities or other owners, all roads, railroads and bridges that may be damaged by, or given undue wear due to the Work.

11. CLEANING UP

11.1 Contractor will at all times keep the Work Site free of waste materials or rubbish caused by the Work. After completing the Work, Contractor will remove all its waste materials, rubbish, tools, supplies, equipment and surplus materials from and about the Work Site.

11.2 If Contractor fails to keep the Work Site clean or to clean up after completing the Work, Company may do so and charge all costs of cleaning up to Contractor. Those costs may be deducted from the final payment to Contractor.

12. COLLATERAL WORK. Company and other contractors may be working at the Work Site. Company reserves the right to coordinate the performance of Contractor's Work with the work of others. Contractor will cooperate with and will not delay, impede or otherwise impair the work of others. Company does not guarantee Contractor continuous uninterrupted access to the Work Site, but will provide such access as good construction practices will allow, considering the other activities in the area.

13. ALCOHOLIC BEVERAGES, DRUGS AND WEAPONS. Contractor will inform all members of Contractor Group who may be involved in the performance of any Work of the following Company rules relating to alcoholic beverages, drugs and weapons, with which all personnel are expected to comply:

13.1 Bringing, attempting to bring, possessing, using or being under the influence of intoxicants, drugs, or narcotics while on any Company Property, including but not limited to parking areas, is prohibited. Possessing alcoholic beverages in sealed containers is permitted, however, in designated parking areas.

13.2 Prescription or over-the-counter medications that could affect the performance of safety-sensitive work are allowed on Company Property only if they have been previously cleared by Contractor. Contractor must confirm that the medication and dosage do not impair an individual's ability to perform safety-sensitive work before clearing the individual to perform such work while under the influence of the medication.

13.3 Bringing, attempting to bring, possessing or using firearms, whether classified as legal or illegal, while on any Company Property, including but not limited to buildings, parking areas, recreation facilities, equipment and vehicles, is prohibited, unless otherwise required by applicable law. Use or possession of firearms for specific situations is permitted if approved by function or higher level management of Company.

13.4 Off-the-job involvement with intoxicants, illegal drugs, or illegal narcotics that adversely affects Company's business, to include impairing the individual's ability to perform his job or the public trust in the safe operation of Company, is prohibited.

13.5 Any conduct on any Company Property which is in violation of any state or federal law or regulation is considered a violation of these rules and a breach of any agreement to which these policies are attached.

13.6 In order to enforce these rules, all individuals with access to any Company Property as well as the vehicles, offices, lockers and any personal belongings of such individuals on any Company Property are subject to search by Company and its agents, to include security representatives appointed or employed by Company. Individuals may be required to take a blood, urinalysis or Breathalyzer test, or submit to other recognized investigatory tests or procedures as are deemed appropriate or necessary by Company in the investigation of a violation of these rules.

14. TITLE AND RIGHT. Nothing in the Agreement will vest Contractor with any right of property in materials used after they have been attached to or incorporated into the Work, nor materials for which Contractor has received full or partial payment. All those materials, upon being so attached, incorporated or paid for, will become the property of Company. Any gravel, sand, stone, minerals, timber or other materials excavated, uncovered, developed or obtained in the Work, or on any land belonging to Company may be used, in the performance of the Work, provided such materials meet the requirements of this Agreement. Any objects or natural materials or animals excavated or exposed that may have historical significance or constitute a threatened or endangered species must be brought to the attention of Company.

15. PROTECTION AGAINST LIENS AND ENCUMBRANCES

15.1 Contractor will not at any time permit any lien, attachment or other encumbrance ("Encumbrance") by any person or persons whosoever or by reason of any claim or demand against Contractor to be placed or remain on the property of Company, including, but not limited to, the Work Site upon which Work is being performed or equipment and materials that are being furnished. To prevent an Encumbrance from being placed on the property of Company, Contractor will furnish during the progress of any Work, as requested from time to time, verified statements showing Contractor's total outstanding indebtedness in connection with the Work.

15.2 If Contractor allows any indebtedness to accrue to subcontractors or others and fails to pay or discharge that indebtedness within five (5) days after demand, then Company may withhold any money due Contractor until that indebtedness is paid or pay the indebtedness and apply that amount against the money due Contractor.

15.3 If Contractor allows any Encumbrances, whether valid or invalid to be placed on the property of Company, any and all claims or demands for payment to Contractor will be denied by Company until the Encumbrance is removed. If the Encumbrance is not removed immediately, Company may pay that claim or demand and deduct the amount paid, together with all related expenses, including attorneys' fees, from any further payment due Contractor, or at Company's election, Contractor will, upon demand, reimburse Company for the amount paid and all related expenses. Any payment made in good faith by Company will be binding on Contractor.

16. TERMINATION FOR DEFAULT

16.1 If a petition in bankruptcy should be filed by Contractor, or if Contractor should make a general assignment for the benefit of creditors, or if a receiver should be appointed due to the insolvency of Contractor, or if Contractor should refuse or fail to supply enough properly skilled workmen or proper equipment, materials or services or should fail to make prompt payment to subcontractors, or to pay promptly for materials or labor, or disregard laws, ordinances or the instruction of Company's Contract Coordinator, or if Contractor should refuse or fail to abide by the SOW Construction Schedule or otherwise violate any provisions of the Agreement or SOW, then Company, upon a determination by Company's Contract Coordinator that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy available to it after giving Contractor seven (7) days' written notice, terminate the Agreement or the SOW and take possession of the Work Site. In the event of such a termination, Company may use all or part of Contractor's equipment and materials and may finish the Work by whatever method Company may deem expedient. In such event, Contractor will not be entitled to receive any further payment hereunder until the Work is finished. If the unpaid balance of the SOW fees will exceed the expense of finishing the Work, including compensation of Company's Contract Coordinator, other Company personnel, third party engineering companies, or other contractors for additional services, such excess will be paid to Contractor. If the expense of finishing the Work will exceed such unpaid balance, Contractor will pay the difference to Company within fifteen (15) days of receiving an invoice for same. The expenses incurred by Company herein, and the damage incurred through Contractor's default, will be determined by Company's Contract Coordinator, in its sole discretion, and such determination will be binding as between the parties.

16.2 In the event of a termination under the provisions of this Section 3, Contractor will transfer and assign to Company, in accordance with Company's instructions, all Work, all construction records, reports, permits, data and information, other materials (including all Company-supplied materials), supplies, Work in progress and other goods for which Contractor is entitled to receive reimbursement hereunder, and any and all plans, drawings, sketches, specifications, and information in connection with the Work, and will take such action as may be necessary to secure Company, at Company's sole election, the rights of Contractor under any or all orders and subcontracts made in connection with the Work.

16.3 In the event that Company so directs or authorizes, Contractor will sell at a price approved by Company, or retain at a mutually agreeable price, any such materials, supplies, Work in progress, or other goods as referred to in the preceding paragraph. In any event, Company will receive any and all records, plans, drawings, data, permits, specifications, sketches, reports, or other information relating to the Work. The proceeds of any such sale or the agreed price will be paid or credited to Company in such manner as Company may direct so as to reduce the amount payable by Company under this Section 3.

APPENDIX D
COVID-19 SITE ENTRY GUIDELINES

COVID-19 Vistra Site Entry Guidelines – *Effective: June 17, 2021*
These guidelines are applicable to ALL PERSONNEL entering Vistra work sites.

To enter a Vistra work site, each person must answer the following three questions with a "no" answer *and* pass the required temperature testing *unless* they display their Vistra vaccination sticker on their employee badge or hardhat:

Site Entry Questions:

1. In the past 10 days, have you tested positive for COVID-19 or are you currently waiting on test results?

2. In the past 10 days, have you been within six feet of someone, where masks were not worn, who:
   a. has tested positive for COVID-19,
   b. is known to be waiting on test results for COVID-19, or
   c. is under a quarantine order?

3. In the past 10 days, have you or someone who has been within six feet of you where masks were not worn had:
   a. flu-like symptoms,
   b. a deep, dry cough,
   c. recent shortness of breath or difficulty breathing,
   d. new loss of taste or smell, and/or
   e. fever of 100 degrees or above?

Temperature Testing:

You must register a temperature between 96- and 100-degrees Fahrenheit as described in the temperature procedures. (see next page for testing procedures)

- If your temperature is below 96 degrees, retest with a different device.
- If your temperature is 100-degrees Fahrenheit or above, retest on another device preferably an ear thermometer, if your temperature still registers 100-degrees Fahrenheit or above you may not enter the site.

Clearance to enter the site:

- If you have answered **"no"** to all three questions ***and*** passed the temperature test, you may enter the site.
- ***If you have an approved Vistra vaccination sticker, you are cleared to enter the site without the temperature test or answering COVID screening questions.***
- If you passed the temperature test ***and*** answered "Yes" to any of the questions, but have been cleared through VistraTravelerSafety (HR clearance) to enter the Vistra work site for that instance of exposure, testing, or symptoms, you may enter the site.

Anyone *not* cleared to enter the work site must immediately leave the work site and notify their supervisor who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.

Any symptomatic employee, unvaccinated employee exposed to COVID-19 or any employee tested for COVID-19 as described above must be cleared through VistraTravelerSafety prior to returning to work.

Required Temperature Testing Procedures:

All persons entering the site without a Vistra vaccination sticker, who have cleared all questions above, will also submit to temperature testing or self-administer a temperature test as required by the facility management. If a self-administered test is required, then a member of the management team or their designee will witness the testing; however, where that is not practicable, each person must attest that they are only entering the site premises because they have passed the screening questions and temperature test required for entry. Also:

a. Hats may cause false high temperatures and should not be worn for five minutes immediately preceding a forehead temperature test.
b. Each person is responsible for ensuring all self-testing materials and areas touched during testing are sanitized.
c. All personnel should maintain a **distance of at least six feet** from other people during this process or wear required masks.

Temperature Testing Requirements:

1. **All persons entering the site without a Vistra vaccination sticker must register a temperature between 96- and 100-degrees Fahrenheit. Any such person who has a temperature not within that range or who triggers an alarm on a thermal camera** must **retest with a different device**, preferably an **ear thermometer**, if available. If the second test registers a temperature of 100 degrees or above:
   a. That person **may not enter** the Vistra work site and must notify their supervisor, who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.
   b. If there is significant inconsistency between the two tests, repeat another temperature test and use the two closest readings.
2. **Anyone who registers a temperature between 96- and 100-degrees Fahrenheit** may proceed to their work site.
   - **If temperature is below 96 degrees, wait a few minutes and retest with a different device.**

Control rooms and communal areas:

All persons entering the site without a Vistra vaccination sticker should maintain at least six-feet distance from other people as much as possible and should wear face coverings when six-feet distance is not feasible. No one should gather in communal areas (including the temperature-testing area) without a Vistra vaccination sticker. Only operators are allowed in control rooms without plant manager approval.

Vistra Vaccination Sticker protocols:

All persons with a valid Vistra vaccination sticker do not have to socially distance or wear masks while at the site. They will also not be required to quarantine as a part of COVID-19 exposures unless exhibiting COVID-19 symptoms. To be eligible for these protocols, each person must have their approved Vistra vaccination sticker easily visible at all times while at work. If someone who has applied for a Vistra vaccination sticker believes they have specific health conditions that may affect the ability to have a full immune response to the vaccination, please consult your health provider prior to working without a mask.

Any symptomatic employee, unvaccinated employee exposed to COVID-19 or any employee tested for COVID-19 as described above must be cleared through VistraTravelerSafety prior to returning to work.

APPENDIX E
SAFETY DATA SHEETS

DYNEGY

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Bottom Ash
Synonyms:	Ash; Ashes; Ash residues; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Coal Fly Ash; Pozzolan; Waste solids.
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause respiratory irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*20 - 40%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*Repeat Dose STOT, Category 1* *Carcinogen. Category 1A*
Aluminosilicates[2]	*Various, see Footnote 2*	*10 - 60%*	*Single Exposure STOT, Category 3*
Calcium oxide (CaO)	*1305-78-8*	*10 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Manganese dioxide (MnO_2)	*1313-13-9*	*<2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1 - 10%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant Category 2* *Eye Irritant Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	*See Footnote 3*	*Toxic to Reproduction Category 2*

[1]*The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen 1A has been assigned.*

[2]*Aluminosilicates (CAS# 1327-36-2) may be in the form of mullite (CAS# 1302-93-8); aluminosilicate glass; pozzolans (CAS# 71243-67-9); or calcium aluminosilicates such as tricalcium aluminate (C3A), or calcium sulfoaluminate (C4A3S). The form is dependent on the source of the coal and or the process used to create the CCP. Pulverized coal combustion would be more likely to create high levels of pozzolans. Aluminosilicates may have inclusions of calcium, titanium, iron, potassium, phosphorus, magnesium and other metal oxides.*

[3]*Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction Category 2 has been assigned.*

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable	0.05	0.05	0.025	0.05
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): 8 - 11	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point and boiling range (°C): Not applicable	**Partition coefficient: n-octane/water:** Not determined
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; no corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined)
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L
Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13
Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica
  - Titanium dioxide

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO_2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency
- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)							
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****	

** Chronic Health Effects*
******** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

This SDS has been prepared in accordance with the Hazard Communication Rule 29 CFR 1910.1200. Information herein is based on data considered to be accurate as of date prepared. No warranty or representation, express or implied, is made as to the accuracy or completeness of this data and safety information. No responsibility can be assumed for any damage or injury resulting from abnormal use, failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

DYNEGY

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Class C Fly Ash
Synonyms:	Coal Fly Ash, Pozzolan
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause respiratory irritation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The* *classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*30 - 60%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Aluminosilicates	*71243-67-9* *1327-36-2*	*30 - 60%*	*Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Calcium oxide (CaO)	*1305-78-8*	*20 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1-8%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	*See Footnote 2*	*Toxic to Reproduction, Category 2*

Footnote 1: The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen, Category 1A has been assigned.

Footnote 2: Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction, Category 2 has been assigned.

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable Crystalline Silica	0.05	0.05	0.025	0.05
Titanium dioxide	Total	15	2.4 (fine) 0.3 (ultrafine)	10	10
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): Not Determined	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point/boiling range (°C): NA	**Partition coefficient: n-octane/water:** NA
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; No corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash C (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined).
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L

Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13

Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65.

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Manganese oxide-as manganese compounds	1313-13-9; Various	No	No	Yes	Yes
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency

- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)								
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****		

** Chronic Health Effects*
****** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

This SDS has been prepared in accordance with the Hazard Communication Rule 29 CFR 1910.1200. Information herein is based on data considered to be accurate as of date prepared. No warranty or representation, express or implied, is made as to the accuracy or completeness of this data and safety information. No responsibility can be assumed for any damage or injury resulting from abnormal use, failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

ATTACHMENT T

Luminant

Phil Morris
Illinois Power Generating Company
Luminant
1500 Eastport Plaza Drive
Collinsville, IL 62234

May 19, 2021

Mr. Darin LeCrone, P.E.
Manager, Industrial Unit
Bureau of Water, Division of Water Pollution Control, Permits Section
Illinois Environmental Protection Agency
1021 North Grand Avenue, East
Springfield, IL 62794-9276

Re: CCR Surface Impoundment Category Designation and Justification for Illinois Power Generating Company

Dear Mr. LeCrone:

Pursuant to 35 I.A.C. 845.700(c), Illinois Power Generating Company submits the information necessary to categorize the CCR surface impoundments located at the Newton Power Plant and the now retired Coffeen Power Plant. The following parameters were used in assessing and justifying each assigned category.

- Category 1 – *Impacts to existing potable water supply well or impacts to groundwater quality within the setback of an existing potable water supply well.*
  - This review includes an assessment of potable water wells within 2,500 feet of CCR surface impoundments to determine whether any potential impacts are occurring within the setback zone of any community water supply well established under the Illinois Groundwater Protection Act.
  - This information was developed during the Part 845 rulemaking and is summarized in Attachment 1, Table 2: Impacts to Potable Water Supply.
- Category 2 – *Imminent threat to human health or the environment or have been designated by IEPA under (g)(5)*
  - The surface impoundments at Newton and Coffeen Power Plants do not pose an imminent threat to human health or the environment. There are no known conditions at or around the facility where someone or something may be exposed to contaminant concentrations reasonably expected to cause harm
- Category 3 – *Located in areas of environmental justice ("EJ") concern*
  - EJ areas were evaluated using the EJ mapping link from IEPA's webpage located at https://www2.illinois.gov/epa/topics/environmental-justice. Per the IEPA mapping tool, the EJ Status thresholds were determined as twice the state averages for Minority and Low Income consistent with 35 IAC 845.700(g)(6).
  - An EJ map denoting the facilities with impoundments is located in Attachment 2.

- Category 4-7
  - Category 4 - Inactive CCR surface impoundments that have an exceedance of the groundwater protection standards in Section 845.600
  - Category 5 - Existing CCR surface impoundments that have exceedances of the groundwater protection standards in Section 845.600
  - Category 6 - Inactive CCR surface impoundments that are in compliance with the groundwater protection standards in Section 845.600.
  - Category 7 – Existing CCR surface impoundments that are in compliance with the groundwater protection standards in Section 845.600

Based on the information above, category designations have been assigned. The category designations for each CCR impoundment are shown in Attachment 1, Table 1: Category Designations.

If you have any questions regarding this submittal, please contact Phil Morris at 618-343-7794 or phil.morris@vistracorp.com.

Sincerely,

Phil Morris
Senior Environmental Director

Attachments

Attachment 1

Table 1: Category Designation

Facility	Pond Description	Classifications	Potable Water Supply Impacts (Category 1)	Human Health or Environment Threat (Category 2)	Located within Environmental Justice Areas[1] (Category 3)	Standards Exceedances[2] (Categories 4,5,6,7)	Impoundment Category 845.700(g)
Coffeen	Ash Pond 1	Inactive	No	No	No	Yes	5
	GMF Pond	Inactive	No	No	No	Yes	5
	GMF Recycle Pond	Inactive	No	No	No	Yes	5
Newton	Primary Ash Pond	Existing	No	No	No	Yes	5

[1] See Attachment 2 Environmental Justice Area Map

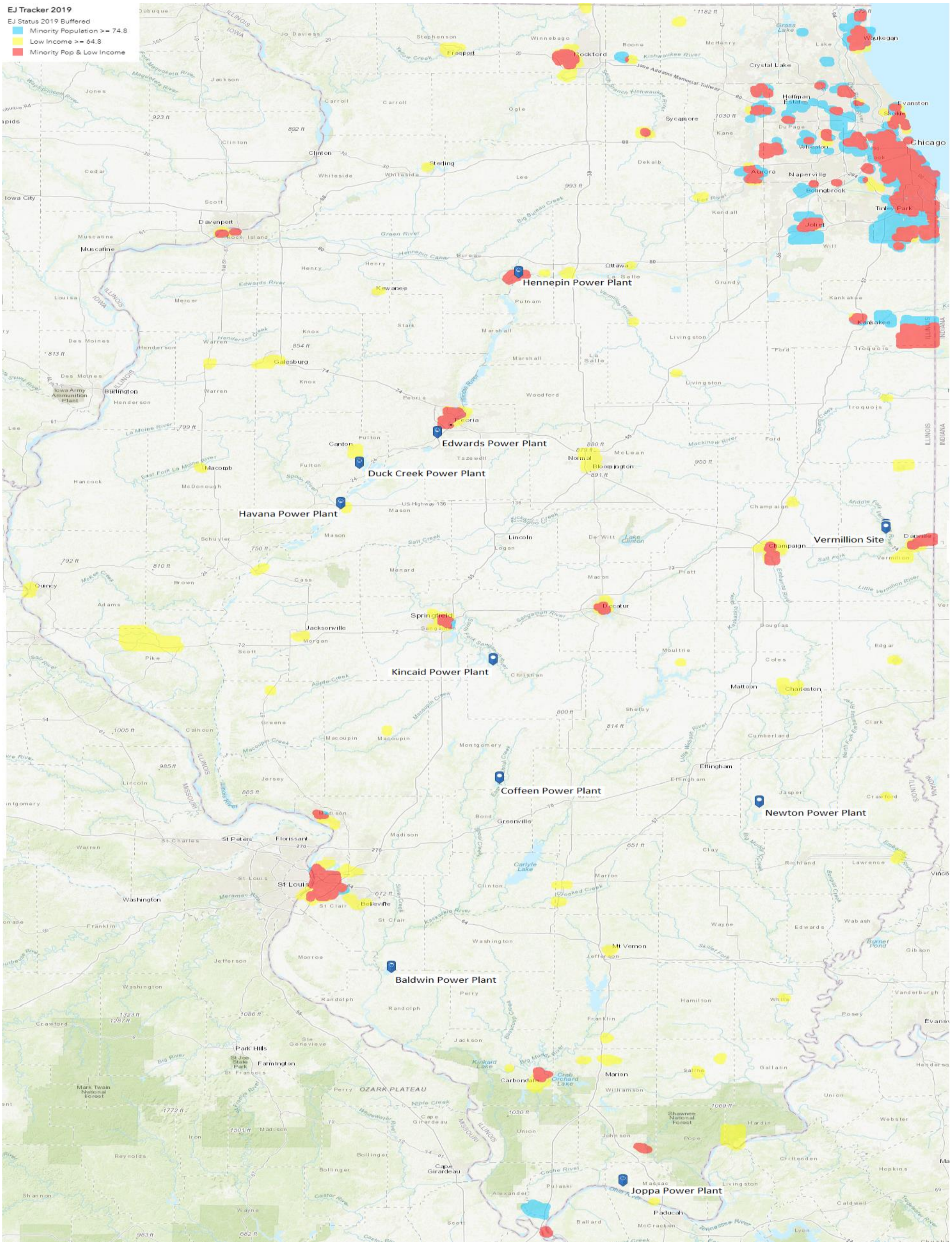
[2] Ground water analyses for purposes of categories 4-7, assumptions have been made based on current groundwater data. However, since sampling and analysis is ongoing and subject to IEPA review and approval, IPGC reserves the right to update its category designations for Categories 4-7.

Table 2: Impacts to Potable Water Supply[1]

Site Name	Private and Semi-Private Wells	Non-Community Water Supply (CWS) Wells	Non-CWS Surface Water Intakes	Community Water Supply Wells	CWS Surface Water Intakes
Coffeen	**Present, but not at risk** Thirty-four (34) water wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant, they are abandoned, or they do not appear to be used for potable purposes. None of the off-site wells are located in a downgradient direction.	**Present, but not at risk** Three (3) non-CWS wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant and/or their inactive status.	Absent	Absent	Absent
Newton	**Present, but not at risk** Twenty-four (24) water wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant, they are abandoned, and/or they are unlikely to be present based on the mapped location. None of the offsite wells are located in a downgradient direction.	Absent	Absent	Absent	Absent

[1] Ramboll, WELL/WATER SUPPLY SURVEY AND EVALUATION COAL-FIRED POWER PLANTS IN ILLINOIS (September 24, 2020), filed with the Illinois Pollution Control Board in R2020-019.

Attachment 2: EJ Mapping Denoting Facilities with Impoundments



ATTACHMENT U

Geosyntec consultants

1 McBride and Son Center Drive, Suite 202
Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 11, 2021

Illinois Power Generating Company
6725 North 500th Street
Newton, Illinois, 62448

Subject: USEPA CCR Rule and IEPA Part 845 Rule Applicability Cross-Reference
2021 USEPA CCR Rule Periodic Certification Report
Primary Ash Pond, Newton Power Plant, Newton, Illinois

At the request of Illinois Power Generating Company (IPGC), Geosyntec Consultants (Geosyntec) has prepared this letter to document how the attached 2021 United States Environmental Protection Agency (USEPA) CCR Rule Periodic Certification Report (Report) was prepared in accordance with both the Federal USEPA CCR Rule[1] and the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 Rule[2]. Specific sections of the report and the applicable sections of the USEPA CCR Rule and Illinois Part 845 Rule are cross-referenced in **Table 1**. A certification from a Qualified Professional Engineer for each of the CCR Rule sections listed in **Table 1** is provided in Section 10 of the attached Report. This certification statement is also applicable to each section of the Part 845 Rule listed in **Table 1.**

Table 1 – USEPA CCR Rule and Illinois Part 845 Rule Cross-Reference

Report Section	USEPA CCR Rule		Illinois Part 845 Rule	
3	§257.73 (a)(2)	Hazard Potential Classification	845.440	Hazard Potential Classification Assessment[3]
4	§257.73 (c)(1)	History of Construction	845.220(a)	Design and Construction Plans (Construction History)
5	§257.73 (d)(1)	Structural Stability Assessment	845.450 (a) and (c)	Structural Stability Assessment
6	§257.73 (e)(1)	Safety Factor Assessment	845.460 (a-b)	Safety Factor Assessment
7	§257.82 (a)(1-3)	Adequacy of Inflow Design Control System Plan	845.510(a), (c)(1), (c)(3)	Hydrologic and Hydraulic Capacity Requirements / Inflow Design Flood Control System Plan
	§257.82 (b)	Discharge from CCR Unit	845.510(b)	Discharge from CCR Surface Impoundment

[1] United Stated Environmental Protection Agency, 2015. *40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule.*
[2] State of Illinois, Joint Committee on Administrative Rule, Administrative Code (2021). *Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Subchapter j: Coal Combustion Waste Surface Impoundment, Part 845 Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments.*
[3] "Significant" and "High" hazard, per the CCR Rule[1], are equivalent to Class II and Class I hazard potential, respectively, per Part 845[2].

CLOSING

This letter has been prepared to demonstrate that the content and Qualified Professional Engineer Certification of the 2021 Periodic USEPA CCR Rule Certification Report fulfills the corresponding requirements of Part 845 of Illinois Administrative Code listed in **Table 1**.

Sincerely,

Panos Andonyadis, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

2021 USEPA CCR RULE PERIODIC CERTIFICATION REPORT §257.73(a)(2), (c), (d[1]), (e) and §257.82 PRIMARY ASH POND Newton Power Plant Newton, Illinois

Submitted to

Illinois Power Generating Company

6725 North 500th Street
Newton, Illinois 62448

Submitted by

Geosyntec consultants

engineers | scientists | innovators

1 McBride and Son Center Drive, Suite 202
Chesterfield, Missouri 63005

October 11, 2021

[1] Except for §257.73(d)(1)(vi).

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF DRAWINGS

LIST OF ATTACHMENTS

EXECUTIVE SUMMARY

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule [1] certification report (Periodic Certification Report) for the Primary Ash Pond (PAP) [2] at the Newton Power Plant (NPP), also known as Newton Power Station, has been prepared in accordance with Rule 40, Code of Federal Regulations (CFR) §257, herein referred to as the "CCR Rule" [1]. The CCR Rule requires that initial certifications for existing CCR surface impoundment, completed in 2016 and subsequently posted on Illinois Power Generating Company (IPGC) CCR Website ([2], [3], [4], [5], [6]) be updated on a five-year basis.

The initial certification reports developed in 2016 and 2017 ([2], [3], [4], [5], [6]) were independently reviewed by Geosyntec. Additionally, field observations, interviews with power plant staff, updated engineering analyses, and evaluations were performed to compare conditions in 2021 at the PAP relative to the 2016 and 2017 initial certifications. These tasks identified that updates are not required for the Initial Hazard Potential Classification. However, due to changes at the site and technical review comments, updates were required and were performed for the:

- History of Construction Report,
- Initial Structural Stability Assessment,
- Initial Safety Factor Assessment, and
- Initial Inflow Design Flood Control System Plan.

Geosyntec's evaluations of the initial certification reports and updated analyses identified that the PAP meets all requirements for hazard potential classification, history of construction reporting, structural stability, safety factor assessment, and hydrologic and hydraulic control, with the exception of the structural integrity of hydraulic structures (§257.73(d)(1)(vi)), which was certified by others. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[2] The PAP is also referred to as ID Number W0798070001-01, Primary Ash Pond by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 401 by EEI; and IL50719 within the National Inventory of Dams (NID) maintained by the Illinois Department of Natural Resources (IDNR). Within this document it is referred to as the PAP.

Table 1 – Periodic Certification Summary

	CCR Rule Reference	Requirement Summary	2016 Initial Certification: Requirement Met?	2016 Initial Certification: Comments	2021 Periodic Certification: Requirement Met?	2021 Periodic Certification: Comments
Hazard Potential Classification						
3	§257.73(a)(2)	Document hazard potential classification	Yes	Impoundment was determined to have Significant hazard potential classification [2].	Yes	Updates were not determined to be necessary. Geosyntec recommends retaining the Significant hazard potential classification.
History of Construction						
4	§257.73(c)(1)	Compile a history of construction	Yes	History of Construction report was prepared for the PAP [3].	Yes	A letter listing updates to the History of Construction report is provided in **Attachment C**.
Structural Stability Assessment						
5	§257.73(d)(1)(i)	Stable foundations and abutments	Yes	Foundations were found to be stable. Abutments are not present [7].	Yes	Foundations and abutments were found to be stable after performing updated slope stability analyses.
	§257.73(d)(1)(ii)	Adequate slope protection	Yes	Slope protection is adequate [7].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(iii)	Sufficiency of embankment compaction	Yes	Embankment compaction is sufficient for expected ranges in loading conditions [7].	Yes	Dike compaction was found to be sufficient after performing updated slope stability analyses.
	§257.73(d)(1)(iv)	Presence and condition of slope vegetation	Yes	Vegetation is present on interior and exterior slopes and is maintained. [7].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(v)(A) and (B)	Adequacy of spillway design and management	Yes	Spillways are adequately designed and constructed and adequately manage flow during 1,000-year flood [7].	Yes	Spillways were found to be adequately designed and constructed and are expected to adequately manage flow during the 1,000-year flood, after performing updated hydrologic and hydraulic analyses.
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	Yes	Hydraulic structures passing through the embankment were inspected and found to maintain structural integrity [7].	Periodic certification of §257.73(d)(1)(vi) was independently completed by Luminant in 2020 [8].	
	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body.	Yes	Downstream slopes adjacent to Newton Lake and the Secondary Pond are expected to remain stable during inundation [7].	Yes	Downstream slopes were found to be stable after performing updated sudden drawdown slope stability analyses.
Safety Factor Assessment						
6	§257.73(e)(1)(i)	Maximum storage pool safety factor must be at least 1.50	Yes	Safety factors were calculated to be 1.66 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.66 and higher.
	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	Safety factors were calculated to be 1.66 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.66 and higher.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.07 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.07 and higher.
	§257.73(e)(1)(iv)	For embankment construction of soils that have susceptible to liquefaction, safety factor must be at least 1.20	Not Applicable	Embankment soils were not susceptible to liquefaction [5].	Not Applicable	No changes were identified that may affect this requirement.
Inflow Design Flood Control System Plan						
8	§257.82(a)(1), (2), (3)	Adequacy of inflow design control system plan.	Yes	Flood control system adequately managed inflow and peak discharge during the 1,000-year, 24-hour, Inflow Design Flood [7].	Yes	The flood control system was found to adequately manage inflow and peak discharge during the 1,000-year, 24-hour, Inflow Design Flood, after performing updated hydrologic and hydraulic analyses.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharge from the CCR Unit is routed through a NPDES-permitted outfall during both normal and 1,000-year, 24-hour Inflow Design Flood conditions [6].	Yes	Discharge from the CCR Unit is routed through a NPDES-permitted outfall during both normal and 1,000-year, 24-hour Inflow Design Flood conditions, after performing updated hydrologic and hydraulic analyses.

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Illinois Power Generating Company (IPGC) to document the periodic certification of the Primary Ash Pond (PAP) at the Newton Power Plant (NPP), also known as the Newton Power Station, located at 6725 N 500th Street, Newton, Illinois, 62448. The location of NPP is provided in **Figure 1**, and a site plan showing the location of the PAP and landfill, among other closed and open CCR units and non-CCR surface impoundments, is provided in **Figure 2**.

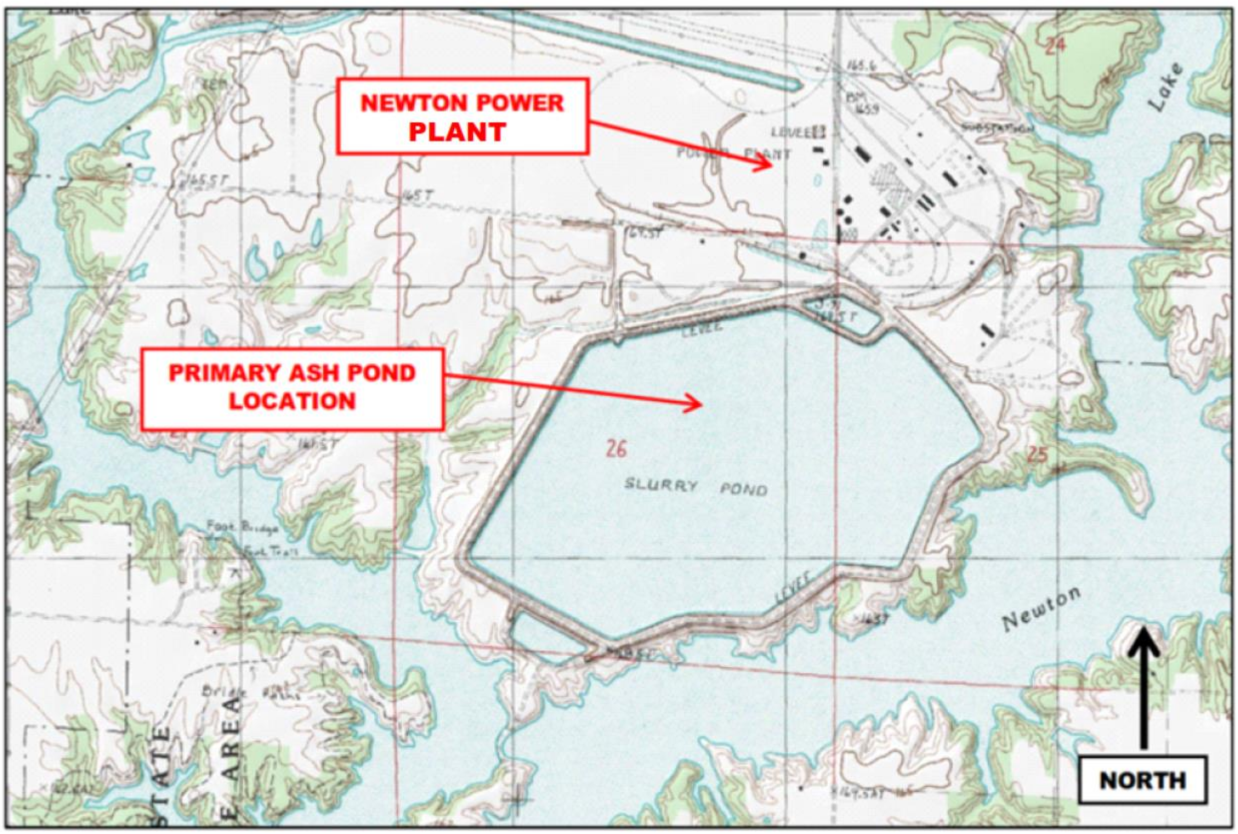


Figure 1 – Site Location Map (from AECOM, 2016)

Figure 2 – Site Plan

1.1 PAP Description

The PAP is utilized for managing CCR materials generated by NPP. The PAP has a Significant hazard potential, based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with §257.73(a)(2) [2].

The PAP receives fly ash, bottom ash, and other miscellaneous non-CCR process waters produced by NPP. Bottom ash is sluiced from the north perimeter of the PAP on either side of the Secondary Settlement Pond, which is a non-CCR basin included within the footprint of the Primary Ash Pond. The outfall structure in the PAP discharges through the perimeter embankment into the Secondary Pond, which is a non-CCR basin that ultimately discharges into Newton Lake via a National Pollutant Discharge Elimination System (NPDES)-permitted outfall.

Two adjacent spillway structures are present at the PAP: the principal spillway structure and the secondary spillway structure. Only the principal structure is used to control outflow during both normal operational and flood conditions. The spillway structures are both identical square concrete riser structures, with inflow controlled by a series of stoplogs. Inflow into the structures is transmitted to the Secondary Pond through 30-inch diameter corrugated metal pipes that have been slip lined and now have an inside diameter of 28 inches. The principal spillway structure is located at a lower elevation than the secondary spillway structure, with a top of weir box elevation of 537 feet and a pipe invert elevation of 512.5 feet (presumed to be NGVD29 datum based on the date of the design drawings). The secondary spillway structure is located directly upslope from the primary structure and has a top of weir box elevation of 555 feet, which is the design crest elevation of the earthen embankment, and a pipe invert elevation of 533 feet. The 28-inch diameter slip lined outlet pipes from both structures converge within the earthen embankment into a single 28-inch slip lined outlet pipe that discharges into the Secondary Pond. The purpose of the secondary spillway structure is to be a supplemental spillway for the Primary Ash Pond under conditions where the pool level is significantly increased above the current normal pool to allow for additional storage volume [7].

The surface area of the impoundment is approximately 400 acres, and the embankment is a continuous structure (a ring embankment), which has a total perimeter length of approximately 3.2 miles and a maximum height above the exterior grade of 72 feet where the downstream toe of the embankment is underneath the normal pool level of the downstream Newton Lake. Typical embankment heights range from 14 to 42 feet. The embankment was constructed as a homogenous earthen structure with well-compacted clayey fill. Portions of the south embankment directly adjacent to Newton Lake include crushed stone near the waterline for erosion protection. The upstream and downstream slope orientations are typically 3H:1V (horizontal to vertical) but range from about 2.5H:1V to 3.4H:1V. Embankment crest widths range from approximately 12 to 50 feet, and the crest is covered with a gravel access road [7].

The pool elevation of the pond is controlled by the configuration of the outflow structure and plant process inflows. At the time of the periodic survey, was approximately[3] 535.5 feet. Crest elevations range from approximately 553 to 555 feet, and the minimum crest elevation is 552.7 feet [7].

Initial certifications for the PAP for Hazard Potential Classification (§257.73(a)(2)), History of Construction (§257.73(c)), Structural Stability Assessment (§257.73(d)), Safety Factor Assessment (§257.73(e)(1)), and Inflow Design Flood Control System Plan (§257.82) were completed by Stantec and AECOM in 2016 and 2017 and subsequently posted to IPGC's CCR Website ([2], [3], [4], [5], [6]).

[3] All elevations are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

1.2 Report Objectives

These following objectives are associated with this report:

- Compare site conditions from 2015/2016 to site conditions in 2020/2021, and evaluate if updates are required to the:
    - §257.73(a)(2) Hazard Potential Classification [2];
    - §257.73(c) History of Construction [3];
    - §257.73(d) Structural Stability Assessment [4];
    - §257.73(e) Safety Factor Assessment [5], and/or
    - §257.82 Inflow Design Flood Control System Plan [6].
- Independently review the Hazard Potential Classification ([2], [9]), Structural Stability Assessment ([4], [7]), Safety Factor Assessment ([5], [7]), and Inflow Design Flood Control System Plan ([6], [7]) reports to determine if updates may be required based on technical considerations.
    - The History of Construction report [3] was not independently reviewed for technical considerations, as this report contained historical information primarily developed prior to promulgation of the CCR Rule [1] for the CCR units at NPP, and did not include calculations or other information used to certify performance and/or integrity of the impoundments under §257.73(a)(2)-(3), §257.73(c)-(e), or §257.82.
- If updates are required, they will be performed and documented within this report.
- Confirm that the PAP meets all of the requirements associated with §257.73(a)(2), (c), (d), (e), and §257.82, or, if the PAP does not meet all requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISON OF 2015/16 AND 2020/21 SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the PAP between the start of the initial CCR certification program in 2015 and subsequent collection of periodic certification site data in 2020 and 2021.

2.2 Review of Annual Inspection Reports

Annual onsite inspections for the PAP were performed between 2016 and 2020 ([10], [11], [12], [13], [14] and, [15]) and were certified by a licensed professional engineer in accordance with §257.83(b). Each inspection report stated the following information, relative to the previous inspection:

- A statement that no changes in geometry of the impounding structure were observed since the previous inspection.
- Information on maximum recorded instrumentation readings and water levels.
- Approximate volumes of impounded water and CCR at the time of inspection.
- A statement that no appearances of actual or potential structural weakness or other disruptive conditions were observed.
- A statement that no other changes which may have affected the stability or operation of the impounding structure were observed.

In summary, the reports did not indicate any significant changes to the PAP between 2015 and 2020.

2.3 Review of Instrumentation Data

Twelve piezometers are present at the PAP and were monitored monthly between August 5, 2015 and April 29, 2021 [16]. Geosyntec reviewed the piezometer data to evaluate if significant fluctuations, partially increases in phreatic levels, may have occurred between development of the initial structural stability and factor of safety certifications [7], [4], [5]) and April 29, 2021. Available piezometer readings are plotted in **Attachment A**.

In summary, the peak measured groundwater levels for several piezometers were up to 10 ft higher than the phreatic conditions considered during the initial certification. These changes could impact the results of the factor of safety analyses required for the structural stability and factor of safety certifications ([7], [4], [5]). Specifically, up to four cross sections were identified with significant changes in phreatic conditions.

2.4 Comparison of 2015 to 2020 Surveys

Surveys conducted at the site by Weaver Consultants (Weaver) in 2015 [17] and IngenAE, LLC (IngenAE) in 2020 [18] were compared within AutoCAD Civil3D 2021 software. This comparison quantified changes in the volume of CCR placed within the PAP and considered volumetric changes above and below the starting water surface elevation (SWSE) used for the 2016 §257.82 inflow design flood control plan hydraulic analysis [7]. Potential changes to embankment geometry were also evaluated. This comparison is presented in side-by-side views of each survey in **Drawing 1**, and a plan view isopach map denoting changes in ground surface elevation in **Drawing 2**. A summary of the water elevations and changes in CCR volumes is provided in **Table 2**.

Table 2 – 2015 and 2020 Survey Comparison

Initial Surveyed Pool Elevation (ft)	534.0
Periodic Surveyed Pool Elevation (ft)	535.5
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	534.0
Total Change in CCR Volume (CY)	98,711 (fill)
Change in CCR Volume Above SWSE (CY)	185,376 (fill)
Change in CCR Volume Below SWSE (CY)	-86,913 (cut)

The comparison indicated that approximately 98,711 CY of CCR was placed in the PAP between the initial and periodic survey, thereby leading to a potential for the peak water surface elevation (PWSE) to increase during the inflow design 1,000-year flood event. Also, the measured water surface elevation for the periodic survey is higher than the water levels estimated for both normal and a 1,000-yr flood events event in the initial certifications (**Section 7**).

No significant changes to embankment geometry appeared to have occurred between the initial and periodic surveys, as shown on the isopach. However, along the northern embankments there appears to be material stockpiled upstream of the embankments which would have increased the loading on the embankments. It is further noted that there are two areas along the southern embankment that appear to be cut and apparently excavated since the initial survey. Such excavation is not known to have occurred and it is likely this apparent cut is a byproduct of survey discrepancy between the initial and periodic bathymetric surveys.

2.5 Comparison of 2015 to 2020 Aerial Photography

Aerial photographs of the PAP collected by Weaver in 2015 [17] and IngenAE in 2020 [18] were compared to visually evaluate if potential site changes (i.e., changes to the embankment, outlet structures, limits of CCR, other appurtenances) may have occurred. A comparison of these aerial photographs is provided in **Drawing 3**, and the following changes were identified:

- A few mounds of new earth built up along the northern embankments; and
- No clear change in the ash delta or shoreline was observed; and
- It appears the water level of the impounded pond may have been higher in 2015.

2.6 Comparison of Initial and Periodic Site Visits

An initial site visit to the PAP was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [19]. A site visit was conducted by Geosyntec on May 21, 2021, with Panos Andonyadis, P.E., conducting the site visit. The site visit was intended to evaluate potential changes at the site since 2015 (i.e., modification to the embankment, outlet structures or other appurtenances, limits of CCR, maintenance programs, repairs), in addition to performing visual observations of the PAP to evaluate if the structural stability requirements (§257.73(d)) were still met. The site visit included walking the perimeter of the PAP, visually observing conditions, recording filed notes, and collecting photographs. The site visit is documented in a photographic log provided in **Attachment B**. A summary of significant findings from the periodic site visit is provided below:

- The perimeter embankments appear to be structurally stable as no signs of structural or foundation instability were observed
- No new development was observed in the vicinity of the PAP, although the observation was limited to the portions of the vicinity visible form the crest of the PAP dike.
- No significant changes were observed since the previous certification.

2.7 Interview with Power Plant Staff

An interview with Ken Schafer of the NPP was conducted by Panos Andonyadis of Geosyntec on May 21, 2021. Mr. Schafer was employed at NPP between 2015 and 2021, The interview included a discussion of potential changes that that may have occurred at the PAP since development of the initial certifications ([2], [3], [4], [5], [6], [7]) in 2015 and 2016. between 2015 and 2020. A summary of the interview is provided below.

- Were any construction projects completed for the PAP between 2015 and 2021, and, if so, are design drawings and/or details available?

- No repairs were performed since the initial certification.

- Were there any changes to the purpose of the PAP between 2015 and 2021?
    - No, the impoundment continues to receive sluiced ash, sluiced bottom ash, and plant waste water.
- Were there any changes to the to the instrumentation program and/or physical instruments for the PAP between 2015 and 2021?
    - No.
- Are area-capacity curves for the PAP available?
    - No area-capacity curves have been developed.
- Were there any changes to spillways and/or diversion features for the PAP completed between 2015 and 2021?
    - No changes to the spillway were made.
- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the PAP between 2015 and 2021?
    - No changes were made.
- Were there any instances of embankment and/or structural instability for the PAP between 2015 and 2021?
    - A repair of a slough was performed on the upstream side of the southernmost embankment. The damage appears to have been caused by wave related erosion and is limited to the area of a previous repair.

SECTION 3

HAZARD POTENTIAL CLASSIFICATION - §257.73(a)(2)

3.1 Overview of 2016 Initial Hazard Potential Classification

The Initial Hazard Potential Classification (Initial HPC) was prepared by Stantec Consulting Services, Inc. (Stantec) in 2016 ([2], [9]), following the requirements of §257.73(a)(2). The Initial HPC included the following information:

- Performing a visual analysis to evaluate potential hazards associated with a failure of the PAP perimeter embankment, along all sides of the PAP.
- Evaluation of potential breach flow paths were evaluated using elevation data and aerial imagery to evaluate potential impacts to downstream structures, infrastructure, frequently occupied facilities/areas, and waterways [2].
- While a breach map is not included in the Initial HPC, it is included within the §257.73(a)(3) Initial Emergency Action Plan prepared by Stantec [20].

The visual analysis indicated that none of the breach scenarios appeared to impact occupied structures, although a breach of the east embankment could impact an infrequently-used gravel site access road and a breach of the north, northeast or east embankment could impact a nearby railroad. The Initial HPC concluded that none of breach scenarios considered would be likely to result in a probable loss of human life, although the breach could cause CCR to be released into the Newton Lake, thereby causing environmental damage. The Initial HPC therefore recommended a "Significant" hazard potential classification for the PAP [2].

3.2 Review of Initial HPC

Geosyntec performed a review of the Initial HPC ([2], [9]) in terms of technical approach, input parameters, assessment of the results, and applicable requirements of the CCR Rule [1]. No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

3.3 Summary of Site Changes Affecting the Initial HPC

Geosyntec did not identify any changes at the site that may affect the HPC. No new structures, infrastructure, frequently occupied facilities/areas, or waterways were present in the probable breach area indicated in the Initial EmAP [20], although Geosyntec's evaluation of new structures was limited to visual observations completed from the dike crest during the site visit and a review of available aerial imagery provided by IngenAE in 2020 [18]. Additionally, no significant changes to the topography in the probable breach were identified.

3.4 Periodic HPC

Geosyntec recommends retaining the "Significant" hazard potential classification for the PAP, per §257.73(A)(2), based on the lack of site changes potentially affecting the Initial HPC occurring since the initial HPC was developed, as described in **Section 3.2**. Updates to the Initial HPC reports ([2], [9]) are not recommended at this time.

SECTION 4

HISTORY OF CONSTRUCTION REPORT - §257.73(c)

4.1 Overview of Initial HoC

The Initial History of Construction report (Initial HoC) was prepared by AECOM in 2016 [3], following the requirements of §257.73(c), and included information on the PAP. The Initial HoC included the following information for each CCR surface impoundment:

- The name and address of the owner/operator,
- Location maps,
- Statements of purpose,
- The names and size of the surrounding watershed,
- A description of the foundation and abutment materials,
- A description of the embankment materials,
- Approximate dates and stages of construction,
- A list of available design and engineering drawings,
- A summary of instrumentation,
- A statement that area-capacity curves are not available,
- Information on spillway structures,
- A statement that the constructions specifications are not available,
- Inspection and surveillance plans,
- Information on operational and maintenance procedures, and
- A statement of observed historical structural instability that occurred at the PAP.

4.2 Summary of Site Affecting the Initial HoC

Several significant changes were identified at the site that occurred after development of the initial HoC report [3] and are described below:

- A state identification number (ID) of W0798070001-01 was assigned to the PAP by the Illinois Environmental Protection Agency (IEPA).

- Revised area-capacity curves and spillway design calculations for the PAP were prepared as part of the updated periodic Inflow Design Flood Control System Plan, as described in **Section 7.3**.

A letter documenting changes to the HoC report is provided in **Attachment C**.

SECTION 5

STRUCTURAL STABILITY ASSESSMENT - §257.73(d)

5.1 Overview of Initial SSA

The Initial Structural Stability Assessment (Initial SSA) was prepared by AECOM in 2016 ([4], [7]) following the requirements of §257.73(d)(1), and included the following evaluations:

- Stability of embankment foundations, embankment abutments, slope protection, embankment compaction, and slope vegetation,
- Spillway stability including capacity, structural stability and integrity;
- Stability and structural integrity of hydraulic structures; and
- Downstream slope stability under sudden drawdown conditions for a downstream water body.

The Initial SSA concluded that the PAP met all structural stability requirements for §257.73(d)(1)(i)-(vii).

A periodic certification of the structural stability and structural integrity of hydraulic outfall structures (§257.73(d)(1)(vi)) was performed by Luminant in 2020 [8]. This certification independently determined that the criteria was met due to the condition of the spillway pipes and the soil types within the embankment. Therefore, the review and certification of §257.73(d)(1)(vi) was not included within the scope of this report.

The Initial SSA referenced the results of the Initial Structural Factor Assessment (Initial SFA) ([5], [7]), to demonstrate stability of the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) portions of the SSA criteria. This included stating that slope stability analyses for slip surfaces passing through the foundation met or exceeded the criteria listed in §257.73(e)(1), for the stability of foundations and abutments. For the sufficiency of dike compaction, this included stating that slope stability analyses for slip surfaces passing through the dike also met or exceeded the §257.73(e)(1) criteria.

Additionally, the Initial SSA included a sudden drawdown slope stability analysis to evaluate the effect of a drawdown event in the adjacent Newton Lake from the 100-year flood pool to an empty-pool condition, as required by §257.73(3)(1)(vii) for CCR units where the downstream slopes are inundated by an adjacent water body. The minimum acceptable factor of safety for this loading condition was assumed to be 1.3 based on US Army Corps of Engineers guidance [21].

5.2 Review of Initial SSA

Geosyntec performed a review of the Initial SSA ([4], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing photographs collected in 2015 and used to demonstrate compliance with §257.73(d)(1)(i)-(vii).
- Reviewing geotechnical calculations used to demonstrate the stability of foundations, per §257.73(d)(1)(i), sufficiency of embankment compaction, per §257.73(d)(1)(iii), and downstream slope inundation/stability, per §257.73(d)(1)(vii), in terms of supporting geotechnical investigation and testing data, input parameters, analysis methodology, selection of critical cross-sections, and loading conditions.
- Reviewing completeness and technical approach of closed-circuit television (CCTV) inspections used to evaluate the stability of hydraulic structures, per §257.73(d)(1)(vi).

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

5.3 Summary of Site Changes Affecting the Initial SSA

Several changes at the site that occurred after development of the Initial SSA were identified. These changes required updates to the Initial SSA and are described below:

- The Initial SSA utilized the results of the Initial Inflow Design Flood Control System Plan (IDF) to demonstrate compliance with the adequacy of spillway design and management (§257.73(d)(1)(v)(A)-(B)). The Initial IDF was subsequently updated to develop a Periodic IDF, based on site changes, as discussed in **Section 7**.
- The Initial SSA utilized the slope stability analysis results of the Initial Safety Factor Assessment (SFA) as part of the compliance demonstration for the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) as discussed in **Section 5.1**. The Initial SSA also utilized sudden drawdown slope stability analyses performed using the same cross-sections and input data as the Initial SFA to demonstrate compliance with downstream slope inundation/stability (§257.73(d)(1)(vii). The Initial SFA slope stability analyses, including the sudden drawdown analyses, were subsequently updated to develop a Periodic SFA, based on site changes, as discussed in **Section 6.4**.

5.4 Periodic SSA

The Periodic SFA (**Section 6.4**) indicates that foundations and abutments are stable and dike compaction is sufficient for expected ranges in loading conditions, as slope stability factors of safety were found to meet or exceed the requirements of §257.73(e)(1), including for static maximums storage pool conditions and post-earthquake (i.e., liquefaction) loading conditions considering seismically-induced strength loss in the foundation soils. Therefore, the requirements of §257.73(d)(1)(i) and §257.73(d)(1)(iii) are met for the Periodic SSA.

The Periodic IDF (**Section 7.4**) indicates that spillways are adequately designed and constructed to adequately manage flow during the PMF flood, as the spillways can adequately manage flow during peak discharge from the PMP storm event without overtopping of the embankments. Therefore, the requirements of §257.73(d)(1)(v)(A)-(B) are met for the Periodic SSA.

Certification of §257.73(d)(1)(vi) was independently performed by Luminant [8] and is not included within the scope of this report.

SECTION 6

SAFETY FACTOR ASSESSMENT - §257.73(e)(1)

6.1 Overview of Initial SFA

The Initial Safety Factor Assessment (Initial SFA) was prepared by AECOM in 2016 [7], following the requirements of §257.73(e)(1). The Initial SFA included the following information:

- A geotechnical investigation program with in-situ and laboratory testing;
- An assessment of the potential for liquefaction in the embankment and foundation soils;
- The development of ten slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W software; and
- The analysis of all cross-sections for maximum storage pool, maximum surcharge pool, and seismic loading conditions.

The Initial SFA concluded that the PAP met all safety factor requirements, per §257.73(e), as all calculated safety factors were equal to or higher than the minimum required values.

6.2 Review of Initial SFA

Geosyntec performed a review of the Initial SFA ([5], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing geotechnical calculations used to demonstrate the acceptable safety factors, per §257.73(e)(1), in terms of:
  - Completeness and adequacy of supporting geotechnical investigation and testing data;
  - Completeness and approach of liquefaction triggering assessments;
  - Input parameters, analysis methodology, selection of critical cross-sections, and loading conditions utilized for slope stability analyses; and
  - Phreatic conditions based on piezometric data, as discussed in **Section 2.3**.

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

6.3 Summary of Site Changes Affecting the Initial SFA

Several changes at the site that occurred after development of the Initial SFA were identified. These changes required updates to the Initial SFA and are described below:

- The groundwater levels measured since 2015 (**Section 2.3**) appear to be up to 10 ft higher than the phreatic surface modeled for the perimeter embankments during the Initial SFA ([5], [7]). Therefore, the phreatic surface needed to be updated to reflect the critical levels observed since 2015.

- The Periodic IDF (**Section 7.4)** found that the normal pool elevation within the PAP increased from 534.0 to 537.0 ft, resulting in 3.0 ft more water loading on the embankment dikes than was considered in the Initial SFA for the maximum storage pool, seismic loading conditions (§257.73(e)(1)(i) and (iii)), and sudden drawdown loading condition (§257.73(d)(1)(ii)). Peak water surface elevations during the IDF also increased from 534.9 to 538.2 ft, resulting in 3.3 ft more water loading on the embankment dikes than was considered in the Initial SFA for the maximum surcharge pool loading conditions (§257.73(e)(1)(i)).

6.4 Periodic SFA

Geosyntec revised existing slope stability analyses associated with the Initial SFA ([5], [7]) for the ten cross- sections of PAP to account for the increase in normal and peak pool loadings, and phreatic level changes as described in **Section 2.3** and **Section 7.4**. This included revising the slope stability analyses evaluating sudden drawdown conditions in the cross-sections adjacent to the downstream water body that were utilized as part of the Initial SSA (**Section 6.2**). The following approach and input data were used to revise the analyses:

- Water levels in the PAP for the maximum storage pool, seismic slope stability analysis, and sudden drawdown loading conditions were increased to El. 537.0 ft, based on the Periodic IDF (**Section 7.4)**.

- Water levels in the PAP for the maximum surcharge pool slope stability analysis loading conditions were increased to El. 538.2 ft, based on the Periodic IDF (**Section 7.4)**.

- According to updated groundwater level monitoring plot (**Section 2.3**), the phreatic level in the location of related piezometers increased for all the loading conditions from El. 534 to El. 538 ft in cross-section "E", from El. 537 to El. 539 ft in cross-section "F", from El. 535 to El. 544 ft in cross-section "G", and from El. 535 to El. 541 ft in cross-section "K".

- All other analysis input data and settings from the Initial SFA ([5], [7]), were utilized, including, but not limited to, subsurface stratigraphy and soil strengths, phreatic conditions, ground surface geometry, software package and version, slip surface search routines and methods, and input data for the seismic analyses.

Factors of safety from the Periodic SFA are summarized in **Table 3** and confirm that the PAP meets the requirements of §257.73(e)(1). Slope stability analysis output associated with the Initial SFA is provided in **Attachment D**.

Table 3 – Factors of Safety from Periodic SFA

	Structural Stability Assessment (§257.73(d)) and Safety Factor Assessment (§257.73(e))				**Structural Stability Assessment (§257.73(d))**
Cross-Section	**Maximum Storage Pool §257.73(e)(1)(i) Minimum Required = 1.50**	**Maximum Surcharge Pool[1] §257.73(e)(1)(ii) Minimum Required = 1.40**	**Seismic §257.73(e)(1)(iii) Minimum Required = 1.00**	**Dike Liquefaction §257.73(e)(1)(iv) Minimum Required = 1.20**	**Sudden Drawdown §257.73(d)(1)(ii) Minimum Required = 1.30**
A	1.82	1.82	1.26	N/A	N/A
B	1.81	1.81	1.07*	N/A	1.59*
C	1.67	1.67	1.11	N/A	1.67
D	1.76	1.76	1.23	N/A	1.76
E	2.18	2.18	1.91	N/A	N/A
F	1.93	1.93	1.45	N/A	N/A
G	1.98	1.98	1.46	N/A	N/A
H	1.81	1.81	1.36	N/A	N/A
I	1.66*	1.66*	1.43	N/A	1.61
K	1.73	1.74	1.17	N/A	1.73

Notes:
*Indicates critical cross-section (i.e., lowest calculated factor of safety out of the ten cross-sections analyzed)
N/A – Loading condition is not applicable.

SECTION 7

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN - §257.82

7.1 Overview of 2016 Inflow Design Flood Control System Plan

The Initial Inflow Design Flood Control System Plan (Initial IDF) was prepared by AECOM in 2016 [7], following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the 1,000-year design flood event because of the hazard potential classification of "Significant", which corresponded to 9.01 inches of rainfall over a 24-hour period.
- The Initial IDF utilized a HydroCAD Version 10 model to evaluate spillway flows and pool level increases during the design flood, with a starting water surface elevation of 534.0 ft.

The Initial IDF concluded that the PAP met the requirements of §257.82, as the peak water surface estimated by the HydroCAD model was elevation 534.9 ft, relative to a minimum PAP embankment crest elevation of 552.7 ft. Therefore, overtopping was not expected. The Initial IDF also evaluated the potential for discharge from the CCR unit and determined that discharge from the PAP during normal and inflow design flood conditions was expected to be routed through the existing spillway and NPDES-permitted outfall.

7.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([6], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing the return interval used vs. the hazard potential classification.
- Reviewing the rainfall depth and distribution for appropriateness.
- Performing a high-level review of the inputs to the hydrological modeling.
- Reviewing the hydrologic model parameters for spillway parameters, starting pool elevation, and storage vs. the reference data.
- Reviewing the overall Initial IDF vs. the applicable requirements of the CCR Rule

Several review comments were identified during review of the Initial IDF. The comments are described below:

- The Initial IDF utilized the National Resource Conservation Service (NRCS) Type II rainfall distribution type [22]. Geosyntec recommend utilizing the Huff 3rd Quartile distribution for areas less than 10 square miles [23] for the reasons listed below.
    - Huff 3rd Quartile distribution was determined to be a more appropriate representation of a 1,000-year, 24-hour storm event per the Illinois State Water Survey (ISWS) Circular 173 [24] which developed standardized rainfall distributions from compiled rainfall data at sites throughout Illinois.
    - Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR) [25] recommends use of the Huff Quartile distributions in Circular 173 when using frequency events to determine the spillway design flood inflow hydrograph, "*The suggested method to distribute this rainfall is described in the ISWS publication, Circular 173, "Time Distributions of Heavy Rainstorms in Illinois"*.
- The process inflows (ash sluice and wastewater) included within the hydrologic and hydraulic analysis file were daily averages which are less than the maximum pump rate (i.e., worst-case scenario).

7.3 Summary of Site Changes Affecting the Initial IDF

Two changes at the site that occurred after development of the Initial IDF were identified. These changes required updates to the Initial IDF and are described below:

- Approximately 98,700 CY of CRR were placed above the SWSE utilized for the Initial IDF certification, thereby altering the stage-storage curve for the PAP relative to the Initial IDF.
- The operative water level of the impoundment is higher, thereby altering the SWSE for the PAP relative to the Initial IDF.

7.4 Periodic IDF

Geosyntec revised the HydroCAD model associated with the Initial IDF to account for the revised rainfall distribution type, cessation of process flows, and additional CCR placement, as described in **Sections 7.2** and **7.3**. The following approach and input data were used for the revised analyses and are referenced in **Attachment E** as appropriate:

- Stage-storage (i.e., area-capacity) curves for the PAP were updated based on the 2020 site survey [18].

  - A revised stage-volume curves for the PAP and Secondary Pond were prepared based on measuring the storage volume of the ponds at every one-foot increment of depth from an elevation at the bottom of the ponds (495 ft PAP; 505 ft Secondary Pond) to the perimeter dike embankment's approximate minimum crest elevation (552 ft PAP; 532 ft Secondary Pond). This analysis identified an overall increase of 129,070 CY (80 ac-ft) of storage volume at the PAP and an overall decrease of 14,520 CY (9 ac-ft) of storage volume at the Secondary Pond from 2016 to 2021.

- The SWSE within the PAP was updated from 534.0 ft to 537.0 ft as this is the invert of the pond outlet structure. The 2020 site survey showed a water surface elevation (WSE) of 535.5 ft; however, the greater elevation of the outlet invert and the surveyed WSE was used as the SWSE to provide conservatism in the model.

- The SWSE within the Secondary Pond was updated from 520.0 ft to 519.9 ft to reflect the 2020 site survey. The primary outlet invert elevation from the Secondary Pond is 505 ft; however, the greater elevation of the outlet invert and the surveyed WSE was used as the SWSE to provide conservatism in the model.

- Updated the inflows from the Ash Sluice from 3.88 cfs for 14 hours per day to 13.37 cfs for 14 hours per day for the duration of the modeled simulation. This more accurately reflects the full load operation of the pumps described in the Initial Full Certification Report (two pumps at 3,000 gpm each, operating 14 hours/day under full load).

- Wastewater inflows were updated from 11.64 cfs for 24 hours per day to 23.39 cfs for 12 hours per day for the duration of the modeled simulation. This more accurately reflects the full load operation of the pumps described in the Initial Full Certification Report (five pumps at 2,100 gpm each, operating 60 pump hours/day).

- The time of concentration (ToC) was updated for drainage areas to the PAP and Secondary Pond from 16.7 minutes (PAP) and 5 minutes (Secondary Pond) to 6 minutes to reflect direct run-on inflow in accordance with TR-20 [22].

- The primary outlet structure from the PAP was updated to reflect the description in the Initial Full Certification Report with no noted changes to the outlet structures.

  - The outlet invert elevation was updated from 512.0 ft to 512.18 ft to reflect the described invert elevation of 512.5 ft using the NGVD29 datum. This was converted to the NAVD88 datum to be consistent with the vertical datum used for the IDF HydroCAD model.

  - Added a weir box riser structure by routing a 28-inch diameter horizontal orifice to the existing outlet culvert. The invert of the riser was set to 537.0 ft. The dimensions of the riser structure were not available; therefore, the riser structure was sized in the model to be consistent with the downstream culvert; this was assumed to be a conservatively restrictive outlet.

- The routing method for the model was updated to more accurately account for routing between the ponds and Lake Newton. The Reach Routing Method was updated from “Storage Indication+ Translation” to “Dynamic Storage Indication”. The Pond Routing Method was updated from “Storage – Indication” to “Dynamic Storage Indication”.

- The tailwater conditions of the PAP and Secondary Pond were changed from fixed elevations to “Automated” to more accurately account for routing between the ponds.

- Lake Newton was changed to be represented by a link instead of a pond, which allowed a fixed water surface of 504.33 ft (based on 2020 survey of outlet invert elevation).

- The outlet invert elevation of the culvert outlet from the Secondary Pond was updated to 504.33 ft to reflect the 2020 site survey.

- All other input data and settings from the Initial IDF HydroCAD model were utilized, including, but not limited to software package and version, runoff method, rainfall depth, analysis time span and analysis time step.

The results of the Updated IDF are summarized in **Table 4** and confirm that the PAP meets the requirements of §257.82(a)-(b), as the peak water surface elevation does not exceed the minimum perimeter dike crest elevations. Additionally, all discharge from the PAP is routed through the existing spillway system to the NPDES-permitted outfall, during both normal and IDF conditions. Updated area-capacity curves and HydroCAD model output is provided in **Attachment E**.

Table 4- Water Levels from Periodic IDF

	Primary Ash Pond		
Analysis	**Starting Water Surface Elevation (ft)**	**Peak Water Surface Elevation (ft)**	**Minimum Dike Crest Elevation (ft)**
Initial IDF	534.0	534.9	552.0
Updated Periodic IDF	537.0	538.2	552.0
Initial to Periodic Change[1]	+3.0	+3.3	

Notes:
[1]Postive change indicates increase in the WSE relative to the Initial IDF, negative change indicates decrease in the WSE, relative to the Initial IDF.

SECTION 8

CONCLUSIONS

The PAP at NPP was evaluated relative to the USEPA CCR Rule periodic assessment requirements for:

- Hazard potential classification (§257.73(a)(2)),
- History of Construction reporting (§257.73(d)),
- Structural stability assessment (§257.73(d)), with the exception of §257.73(d)(1)(vi) that was independently certified by Luminant [8];
- Safety factor assessment (§257.73(e)), and
- Inflow design flood control system planning (§257.82).

Based on the evaluations presented herein, the referenced requirements are satisfied.

SECTION 9

CERTIFICATION STATEMENT

CCR Unit: Illinois Power Generating Company, Newton Power Plant, Primary Ash Pond

I, Panos Andonyadis, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this 2021 USEPA CCR Rule Periodic Certification Report, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the periodic assessment of the hazard potential classification, history of construction report, structural stability, safety factors, and inflow design flood control system planning, dated October 2021, were conducted in accordance with the requirements of 40 CFR §257.73(a)(2), (c), (d), (e), and §257.82, with the exception of §257.73(d)(1)(vi)) that was independently certified by others.

Panos Andonyadis

OCTOBER 11, 2021

Date

PANOS ANDONYADIS
062-066885
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS
10/11/2021
Exp 11/30/2021

SECTION 10

REFERENCES

[1] United States Environmental Protection Agency, 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 2015.

[2] Stantec Consulting Services Inc., "Initial Hazard Potetnial Classificaiton Assessment, EPA Final CCR Rule, Primary Ash Pond, Newton Power Station, Jasper County, Illinois," Fenton, MO, October 12, 2016.

[3] AECOM, "History of Construction, USEPA Final CCR Rule, Newton Power Station, Newton, Illinois," October 2016.

[4] AECOM, "CCR Rule Report: Initial Structural Stability Assessment For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[5] AECOM, "CCR Rule Report: Initial Safety Factor Assessment For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[6] AECOM, "CCR Rule Report: Initial Inflow Design Flood Control System Plan For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[7] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for Primary Ash Pond at Newton Power Station," St. Louis, MO, October 2016.

[8] V. Modeer, "Primary Ash Pond Structural Stability Assessment, Illinois Power Resrouces Generationg, LLC, Newton Power Station," Luminant, October 1, 2020.

[9] Stantec Consulting Services, Inc., "Documentation of Initial Hazard Potential Classificaiton Assessment, Primary Ash Pond, Newton Power Station, Jasper County, Illinois," October 12, 2016.

[10] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, January 18, 2016.

[11] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, January 18, 2017.

[12] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, February 7, 2018.

[13] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR 257.83(b), Newton Power Station, Primary Ash Pond*, January 10, 2019.

[14] Knutelski, James, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Newton Power Station, Primary Ash Pond*, January 10, 2020.

[15] James Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Newton Power Station, Primary Ash Pond*, January 06, 2021.

[16] Geocyntec Consultants Inc., "Newton Piezo Measurements_20160121," Geocyntec Consultants Inc., Chesterfield, MO, 2021.

[17] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 - Newton Topography," Collinsville, IL, December 2015.

[18] IngenAE, "Luminant, Dynegy Midwest Generation, LLC, Newton Power Station, December 2020 Topography," Earth City, Missouri, March 12, 2021.

[19] AECOM, "Draft CCR Unit Initial Site Visit Summary, Dynegy CCR Compliance Program," June 24, 2015.

[20] Stantec Consulting Services Inc, "Illinois Power Generating Company, Newton Power Station, City of Newton, Jasper County, IL, Emergency Action Plan, Primary Ash Pond (NID # IL50719)," Fenton, MO, April 13, 2017.

[21] U.S. Army Corps of Engineers, "Slope Stability, EM 1110-2-1902," October 31, 2003.

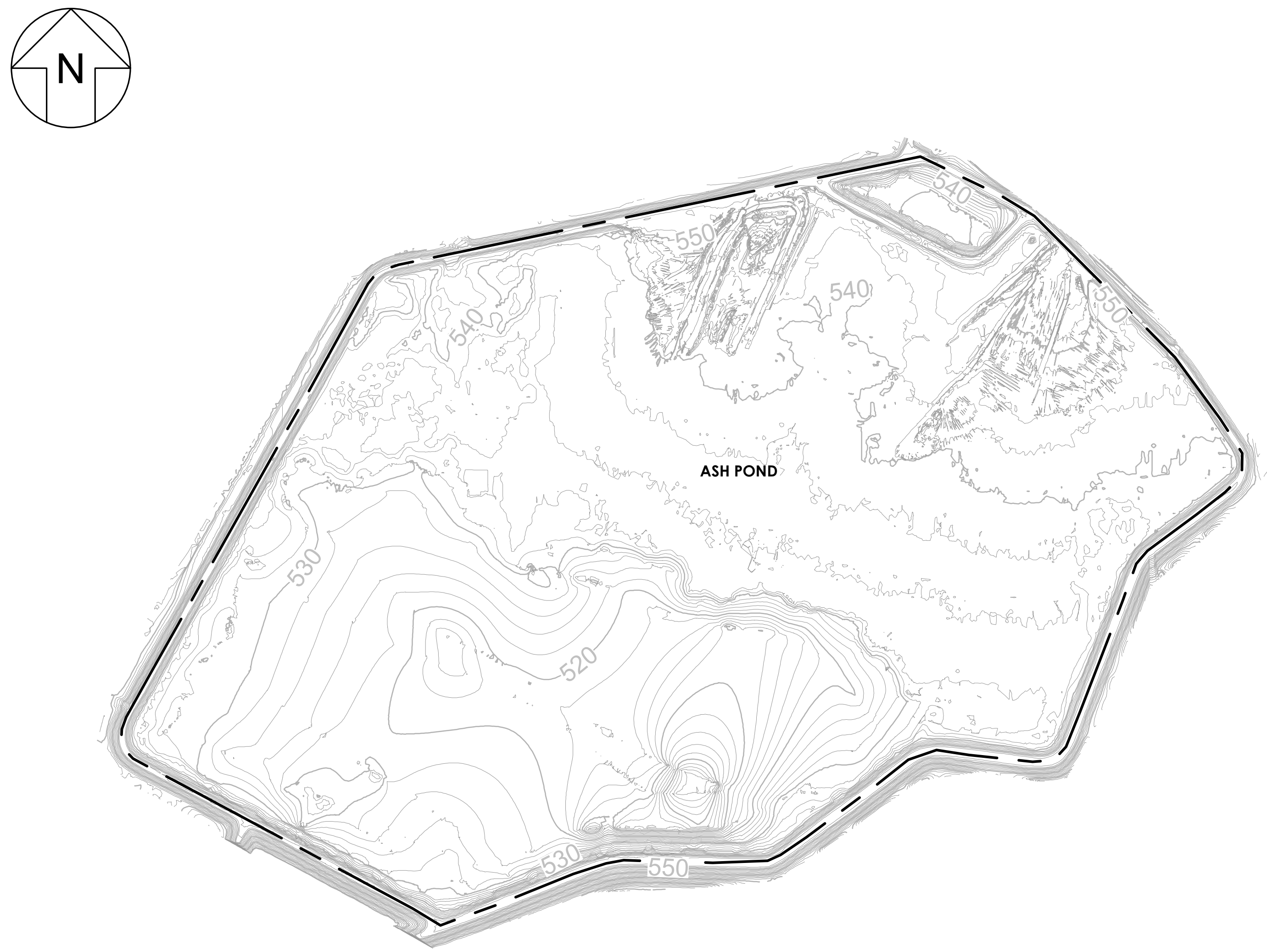
[22] Natural Resources Conservation Service, Conservation Engineering Division, "Urban Hydrology for Small Watersheds (TR-55)," United States Department of Agriculture, June 1985.

[23] F. A. Huff and J. R. Angel, "Frequency Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois," State Water Survey Division, Department of Energy and Natural Resoruces, State of Illinois, Champaign, Illinois, 1989.

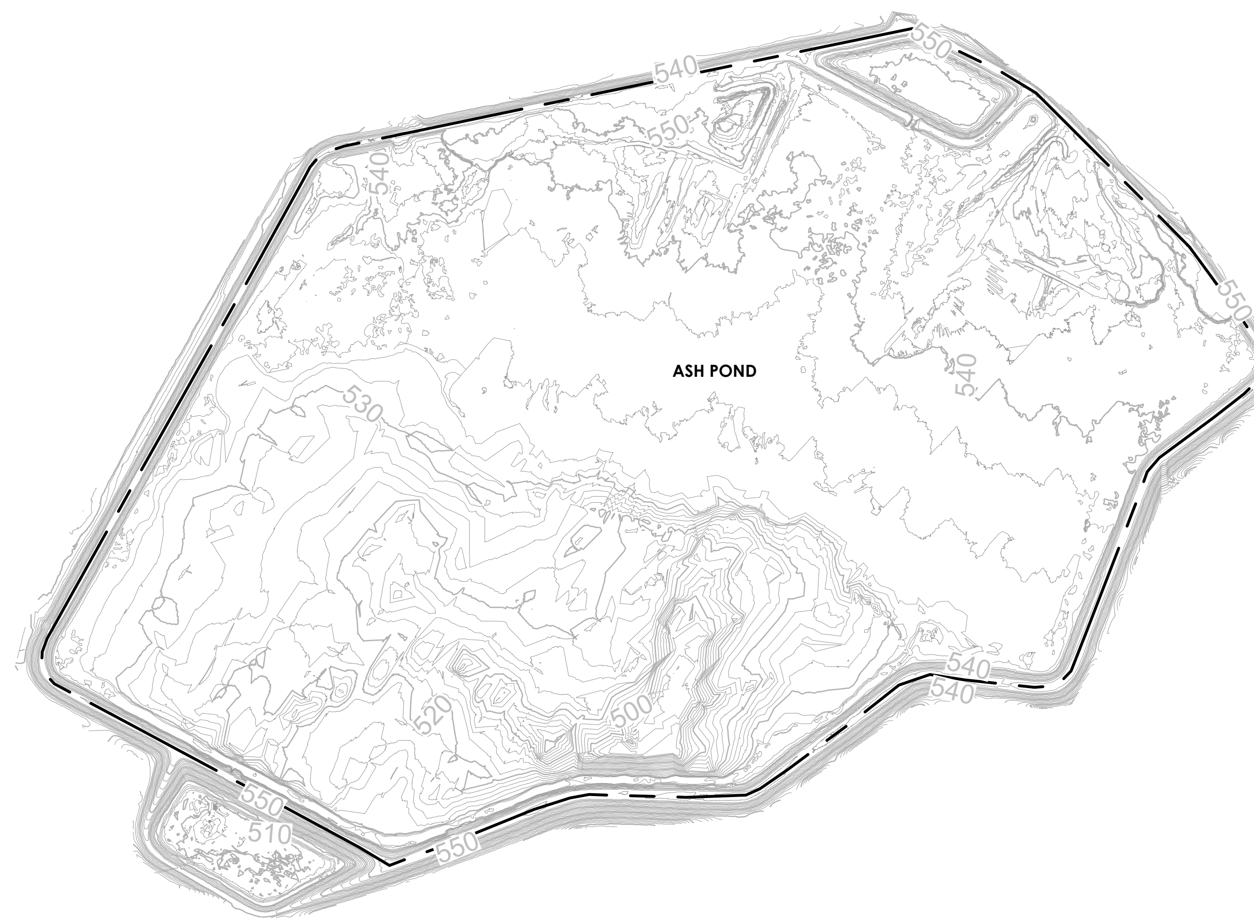
[24] F. A. Huff, "Time Distributions of Heavy Rainstorms in Illinois," State Water Survey, Department of Energy and Natural Resoruces, State of Illinois, Champaign, Illinois, 1990.

[25] Office of Natural Resources, "Procedural Guidelines for Preparation of Technical Data to be included in Applications for Permits for Construction and Maintenance of Dams," Department of Natural Resoruces, State of Illinois, Springfield, Illinois, Undated.

DRAWINGS



INITIAL SURVEY
12-01-2015 TOPOGRAPHY



PERIODIC SURVEY
02-26-2021 TOPOGRAPHY

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SCALE IN FEET

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY”, PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.

INITIAL TO PERIODIC SURVEY COMPARISON
ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

DRAWING 1

GLP8027.08 | MAY 2021

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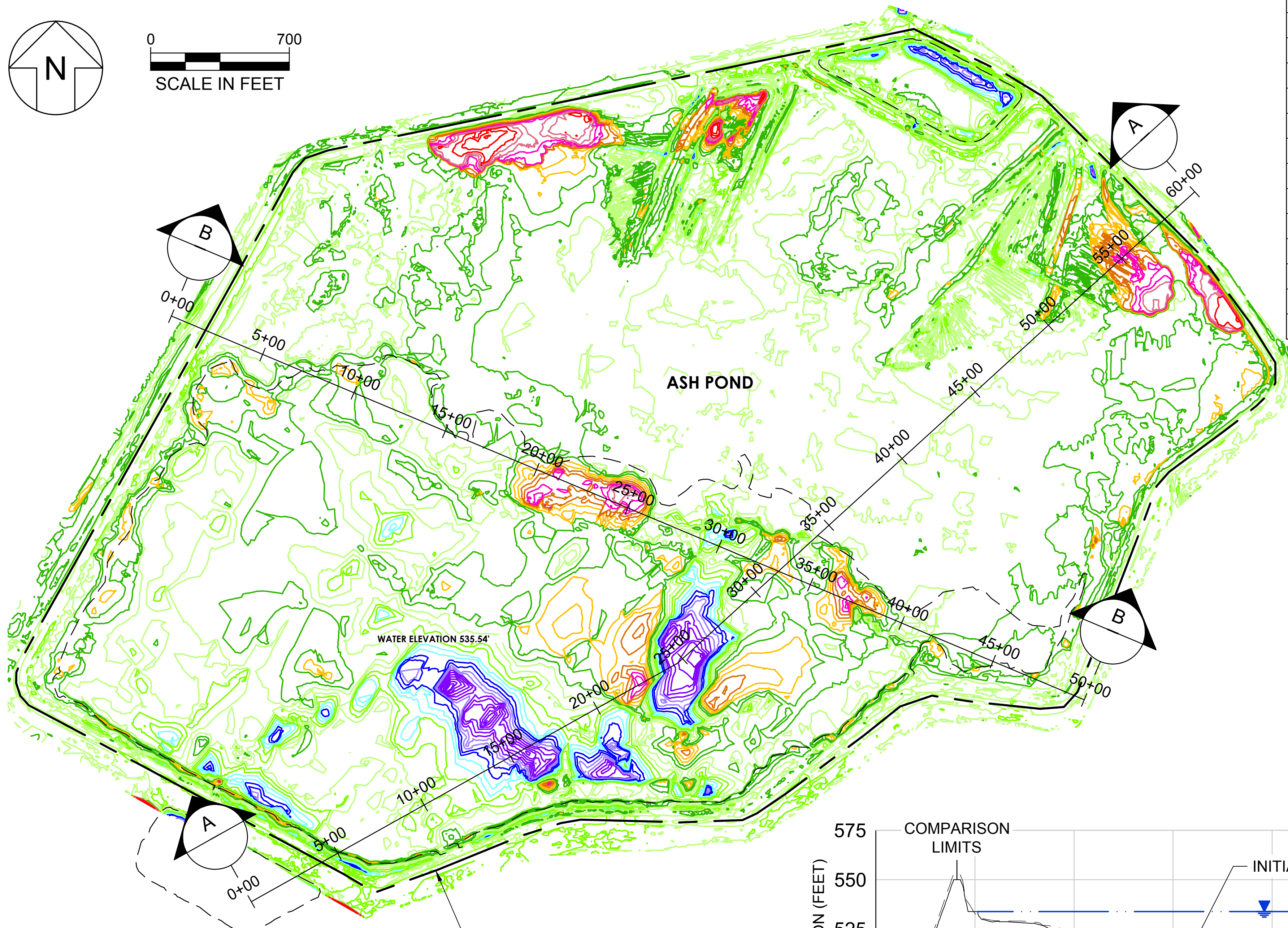


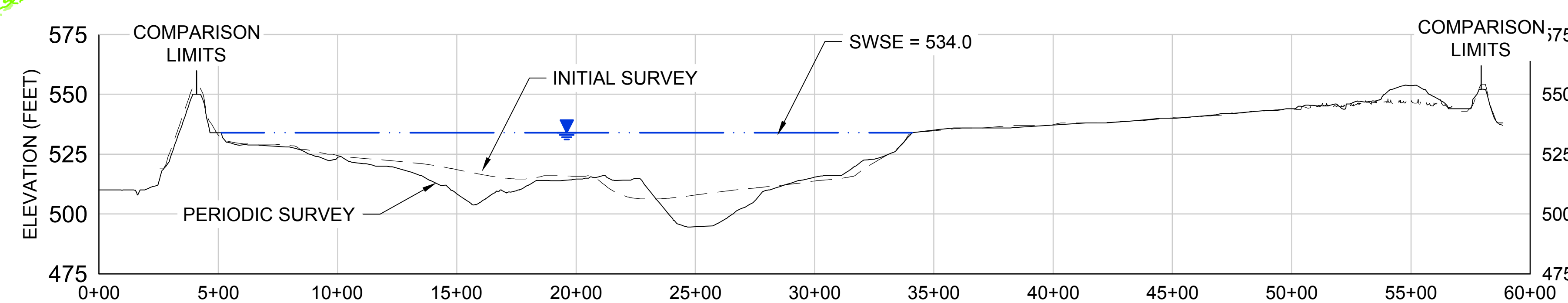
LIMITS OF INITIAL TO PERIODIC SURVEY COMPARISON, ASH POND

ISOPACH CONTOUR KEY		
COLOR	MIN ELEV	MAX ELEV
(purple)	-17	-10
(light purple)	-10	-8
(blue)	-8	-6
(cyan)	-6	-4
(bright green)	-4	-2
(light green)	-2	0
(green)	0	2
(yellow)	2	4
(orange)	4	6
(magenta)	6	8
(pink)	8	10
(red)	10	26

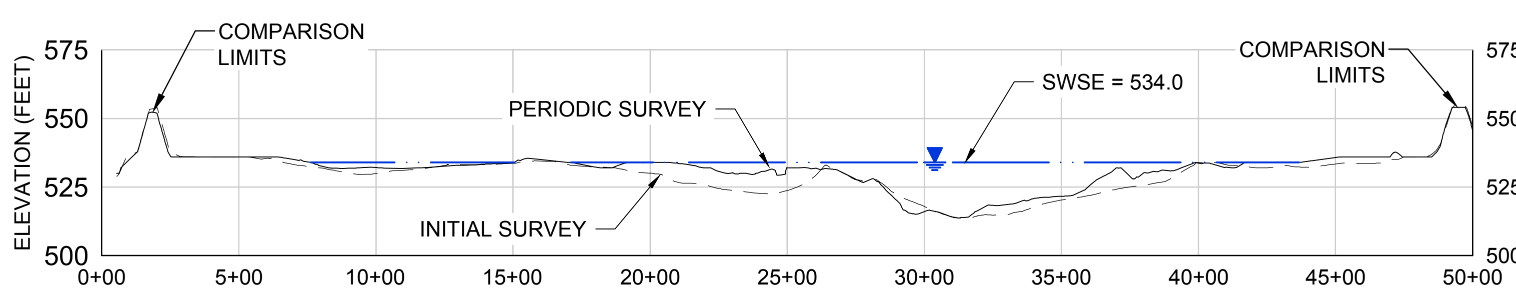
INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY			
SURFACE IMPOUNDMENT	CUT	FILL	NET (CU. YD.)
ASH POND	467,675	566,386	98,711(FILL)
ABOVE SWSE	144,793	330,169	185,376 (FILL)
BELOW SWSE	322,591	235,677	86,913 (CUT)

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY”, PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.
4. THE STARTING WATER SURFACE ELEVATION (SWSE) OF THE PRIMARY ASH POND IS EL. 534.0 FT, AS NOTED IN THE REPORT TITLED “CCR CERTIFICATION REPORT: INITIAL STRUCTURAL STABILITY ASSESSMENT, INITIAL SAFETY FACTOR ASSESSMENT, AND INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN FOR PRIMARY ASH POND AT NEWTON POWER STATION”, PREPARED BY AECOM, DATED OCTOBER, 2016.



SECTION A



SECTION B

0 700
HORZ: SCALE IN FEET

0 70
VERT: SCALE IN FEET

SURVEY COMPARISON ISOPACH
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

DRAWING 2

GLP8027.08 | MAY 2021

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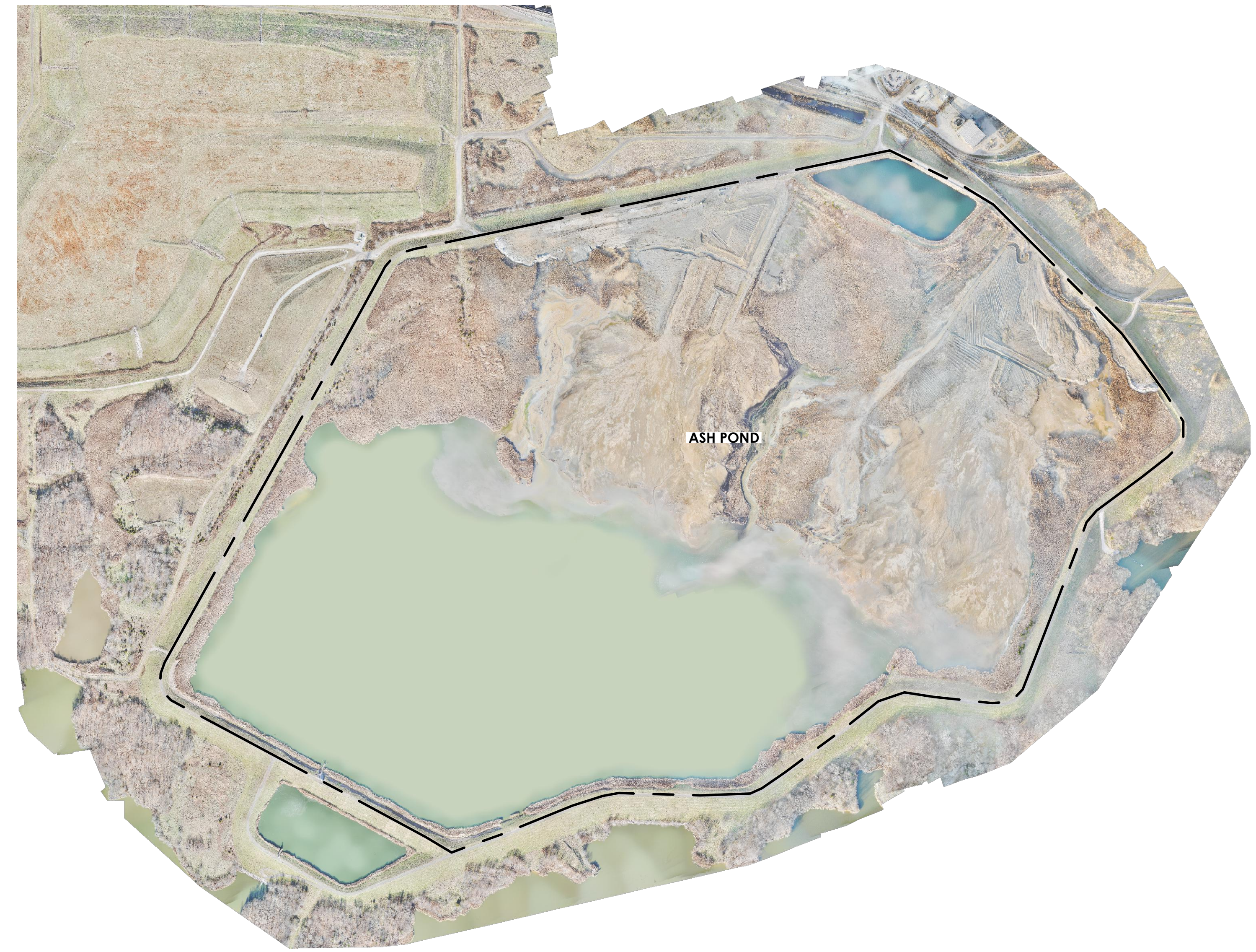
INITIAL AERIAL
12-01-2015 IMAGERY



PERIODIC AERIAL
02-26-2021 IMAGERY

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SCALE IN FEET

NOTES:

1. THE INITIAL IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY", PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY", PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.

INITIAL TO PERIODIC AERIAL IMAGERY COMPARISON ASH POND NEWTON POWER PLANT NEWTON, ILLINOIS		
Geosyntec consultants		DRAWING
GLP8027.08	MAY 2021	3

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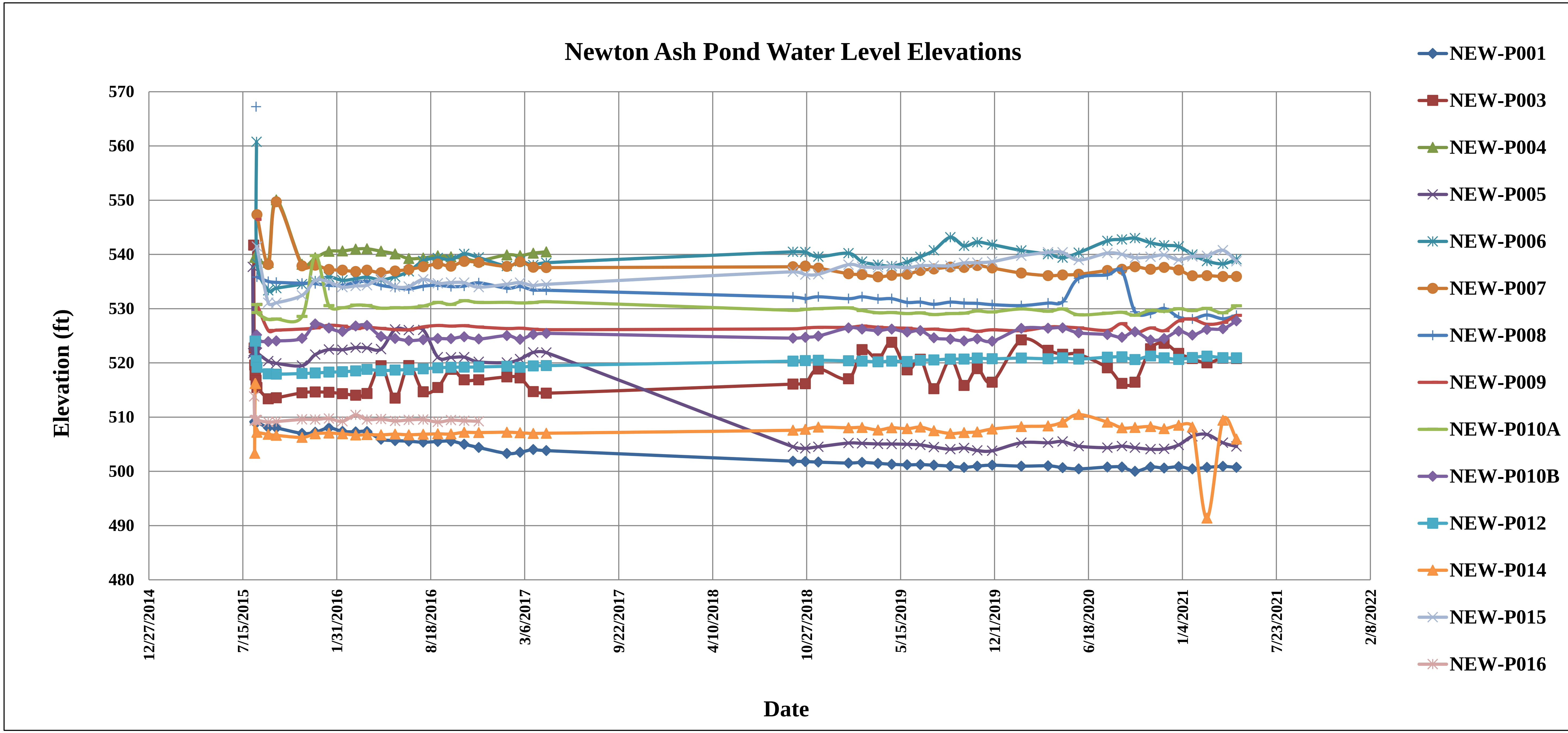
ATTACHMENTS

Attachment A

PAP Piezometer Data Plots



NOTES:

1. Piezometer data was taken from the spreadsheet titled "Newton Piezo Measurements_20160121", provided by the Newton Power Station.

PIEZOMETER DATA
PERIODIC CERTIFICATION
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

Figure 1

GLP8027 | 6/2/2021

\\STLOUISMO-01\Data\Company\Projects_post_2014\GLP8027_CCR_ReCert\500_Technical\509_NEW\509d_Periodic_Report\Supporting works\[NEW_GWL History Plot_06022021.xlsx]Newton

Attachment B

PAP Site Visit Photolog

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 01

Date: 5/21/2021

Direction Facing: NW

Comments: Photo of the ash pond from the east embankment. Example of vegetative coverage and phragmites within the ash basin.

Photo: 02

Date: 5/21/2021

Direction Facing: NE

Comments: Example of vegetative coverage for the downstream slope along the northeast embankment.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 03

Date: 5/21/2021

Direction Facing: W

Comments: Photo taken from the east embankment. Example of vegetative cover along the upstream slope of the embankment.

Photo: 04

Date: 5/21/2021

Direction Facing: SW

Comments: Photo taken from the east embankment. Example of vegetative cover along the downstream slope of the embankment.

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 05

Date: 5/21/2021

Direction Facing: E

Comments: Example of the vegetative cover of the upstream side of the embankment and within the ash basin. Some tree growth and phragmite growth within the ash basin.

Photo: 06

Date: 5/21/2021

Direction Facing: E

Comments: Tallest downstream slope along the south embankment and Newton Lake. Complete vegetative cover with no signs of instability or evidence of rapid draw down.

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 07

Date: 5/21/2021

Direction Facing: E

Comments: Upstream side of southern embankment. Example of vegetative cover. No signs of instability and erosion.

Photo: 08

Date: 5/21/2021

Direction Facing: W

Comments: Wave damage erosion observed along the downstream side of the southern embankment. At present this does not appear to be a stability concern for the embankment.

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 09 **Date:** 5/21/2021 **Direction Facing:** E **Comments:** Downstream side of the southern embankment. Good vegetative cover, no tree growth or signs of erosion or instability.	
Photo: 10 **Date:** 5/21/2021 **Direction Facing:** NW **Comments:** Upstream side of the southwest embankment. Good vegetative cover, no tree growth or signs of erosion or instability.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 11

Date: 5/21/2021

Direction Facing: N

Comments: Discharge point for the secondary Pond outlet pipe.

Photo: 12

Date: 5/21/2021

Direction Facing: N

Comments: Secondary pond downstream side embankments. Good vegetative cover, no tree growth or signs of erosion or instability.

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 13 **Date:** 5/21/2021 **Direction Facing:** NE **Comments:** Primary ash pond discharge structure. No signs of erosion along the structure and no signs of deterioration or damage of the structure.	
Photo: 14 **Date:** 5/21/2021 **Direction Facing:** N **Comments:** Downstream side of the western embankment. Good vegetative cover, no tree growth or signs of erosion or instability. Some vegetative growth observed on the embankment crest.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 15	
Date: 5/21/2021	
Direction Facing: W	
Comments: Some erosion along the access ramp on the western embankment. Geosyntec recommended regrading the ramp as part of regular maintenance.	

Photo: 16	
Date: 5/21/2021	
Direction Facing: N	
Comments: Downstream side of the western embankment. Good vegetative cover, no tree growth or signs of erosion or instability.	

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 17

Date: 5/21/2021

Direction Facing: S

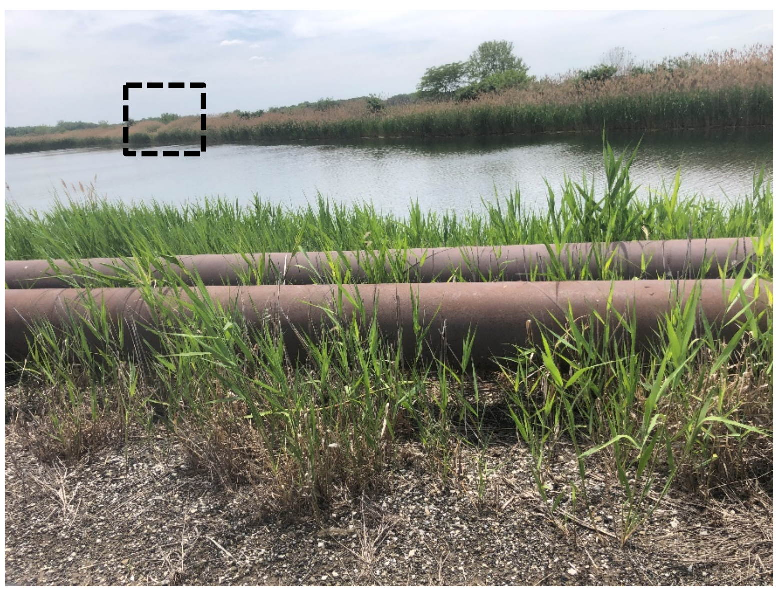
Comments: Sluice discharge west of the Secondary Settlement Pond. Discharge channel and sluiced ash flow to the southwest.

Photo: 18

Date: 5/21/2021

Direction Facing: S

Comments: Secondary Settlement Pond. Breach with Primary Ash Pond is visible. Phragmite growth observed along the separation berm between Primary Ash Pond and Secondary Settlement Pond.



Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 19	
Date: 5/21/2021	
Direction Facing: NW	
Comments: Downstream side of the northeastern embankment. Good vegetative cover, no tree growth or signs of erosion or instability.	

Photo: 20	
Date: 5/21/2021	
Direction Facing: S	
Comments: Erosion and poor vegetative cover underneath the sluice pipe racks along the northern embankment. Geosyntec recommended reseeding or applying erosion protective features on the side slope as part of regular maintenance.	

Attachment C

Periodic History of Construction Report Update Letter

Geosyntec consultants

1 McBride and Son Center Drive, Suite 202
Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 2021

Illinois Power Generating Company
6725 North 500th Street
Newton, Illinois 62448

Subject: Periodic History of Construction Report Update Letter
USEPA Final CCR Rule, 40 CFR §257.73(c)
Newton Power Plant
Newton, Illinois

At the request of Illinois Power Generating Company (IPGC), Geosyntec Consultants (Geosyntec) has prepared this Letter to documents updates to the Initial History of Construction (HoC) report for the Newton Power Plant (NPP), also known as the Newton Power Station (NEW). The Initial HoC report was prepared by AECOM in October of 2016 [1] in accordance with 40 Code of Federal Regulations (CFR) §257.73(c) of the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule, known as the CCR Rule [2]. This letter also includes information required by Section 845.220(a)(1)(B) (Design and Construction Plans) of the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 CCR Rule [3] that is not expressly required by §257.73(c).

BACKGROUND

The CCR Rule required that, by October 17, 2016, Initial HoC reports to be compiled for existing CCR surface impoundments with: (1) a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) a height of 20 feet or more. The Initial HoC report was required to contain, to the extent feasible, the information specified in 40 CFR §257.73(c)(1)(i)-(xii). The Initial HoC report for NEW, which included the existing CCR surface impoundment, the Primary Ash Pond (PAP), was prepared and subsequently posted to IPGC's CCR Website prior to October 17, 2016.

The CCR Rule requires that Initial HoC to be updated if there is a significant change to any information complied in the Initial HoC report, as listed below:

§ 257.73(c)(2): If there is a significant change to any information complied under paragraph (c)(1) of this section, the owner or operator of the CCR unit must update the relevant information and place it in the facility's operating record as required by § 257.105(f)(9).

IPGC retained Geosyntec to review the Initial HoC report, review reasonably and readily available information for the PAP generated since the Initial HoC report was prepared, and perform a site visit to NEW to evaluate if significant changes may have occurred since the Initial HoC report was prepared. This Letter contains the results of Geosyntec's evaluation and documents significant changes that have occurred at the PAP and NPP, as they pertain the requirements of §257.73(c)(1)(i)-(xii)

UPDATES TO HISTORY OF CONSTRUCTION REPORT

Geosyntec's evaluation for the NPP PAP determined that no known significant changes requiring updates to the information in the Initial HoC report pertaining to §257.73(c)(1)(ii)-(vi), (viii), (ix), (xi), and (xii) of the CCR Rule had occurred since the Initial HoC report was developed.

However, Geosyntec's evaluation determined that significant changes at the NEW PAP pertaining to §257.73(c)(1)(i), (vii), and (x) of the CCR Rule had occurred since the Initial HoC report had been developed. Additionally, information how long the CCR surface impoundments have been operating and the types of CCR in the surface impoundments, as required by Section 845.220(a)(1)(B) of the Part 845 Rule were not included in the Initial HoC report, as this information is not required by the CCR Rule. Each change and the subsequent updates to the Initial HoC report is described within this section.

Section 845.220(a)(1)(B): A statement of … how long the CCR surface impoundment has been in operation, and the types of CCR that have been placed in the surface impoundment.

<u>*Primary Ash Pond*</u>
The PAP was in operation from 1977 until today, for a total of approximately 44 years [1].

CCR placed in the PAP has included bottom ash and economizer ash, in addition to other non-CCR plant process wastewater [1].

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

A state identification numbers (IDs) for the PAP was assigned by the Illinois Environmental Protection Agency (IEPA). The ID is listed in **Table 1**.

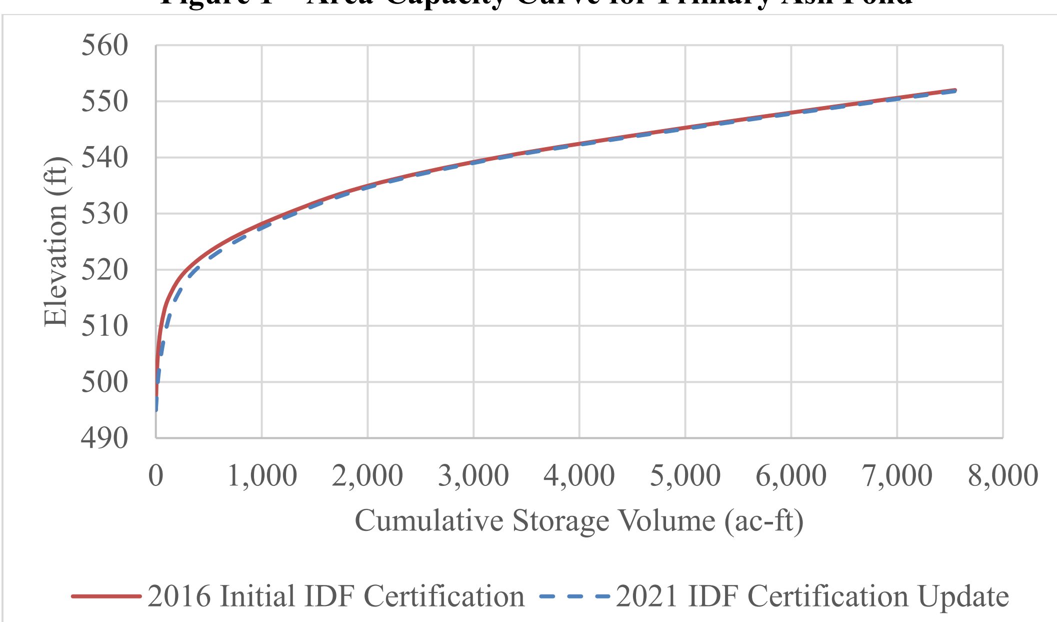
Table 1 – IEPA ID Numbers

CCR Surface Impoundment	State ID
Primary Ash Pond (PAP)	W0798070001-01

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Updated area-capacity curves were prepared for the PAP in 2021. These curves are provided in **Figures 1**.

Figure 1 – Area-Capacity Curve for Primary Ash Pond



§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

Updated discharge capacity calculations for the existing spillways were prepared in 2021 using HydroCAD 10 modeling software. The calculations indicate that the PAP has sufficient storage capacity and will not overtop the embankments during the Probable Maximum Precipitation (PMP), 24-hour, storm event. The results of the calculations are provided in **Table 2**.

Table 2 – Results of Updated Discharge Capacity Calculations

	Primary Ash Pond
Approximate Berm Minimum Elevation[1], ft	553.0
Starting Water Surface Elevation[1] (SWSE), ft	537.0
Peak Water Surface Elevation[1] (PWSE), ft	538.2
Time to Peak, hr	24.0
Surface Area[2], ac	272.0
Storage[3], ac-ft	281.1

Notes:
[1]Elevations are based on the NAVD88 datum
[2] Surface Area is defined as the water surface area at the PWSE
[3]Storage is defined as the volume between the SWSE and PWSE

CLOSING

This letter has been prepared to document Geosyntec's evaluation of changes that have occurred at the PAP at the NEW since the Initial HoC was developed, based on reasonably and readily available information provided by IPGC, observed by Geosyntec during the site visit, or generated by Geosyntec as part of subsequent calculations.

Sincerely,

Panos Andonyadis, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

REFERENCES

[1] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Newton Power Station, Newton, Illinois," October 2016.

[2] United Stated Environmental Protection Agency, "40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, 2015," 2015.

[3] Illinois Environmental Protection Agency, "35 Ill. Adm. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments," Springfield, IL, 2021.

Attachment D

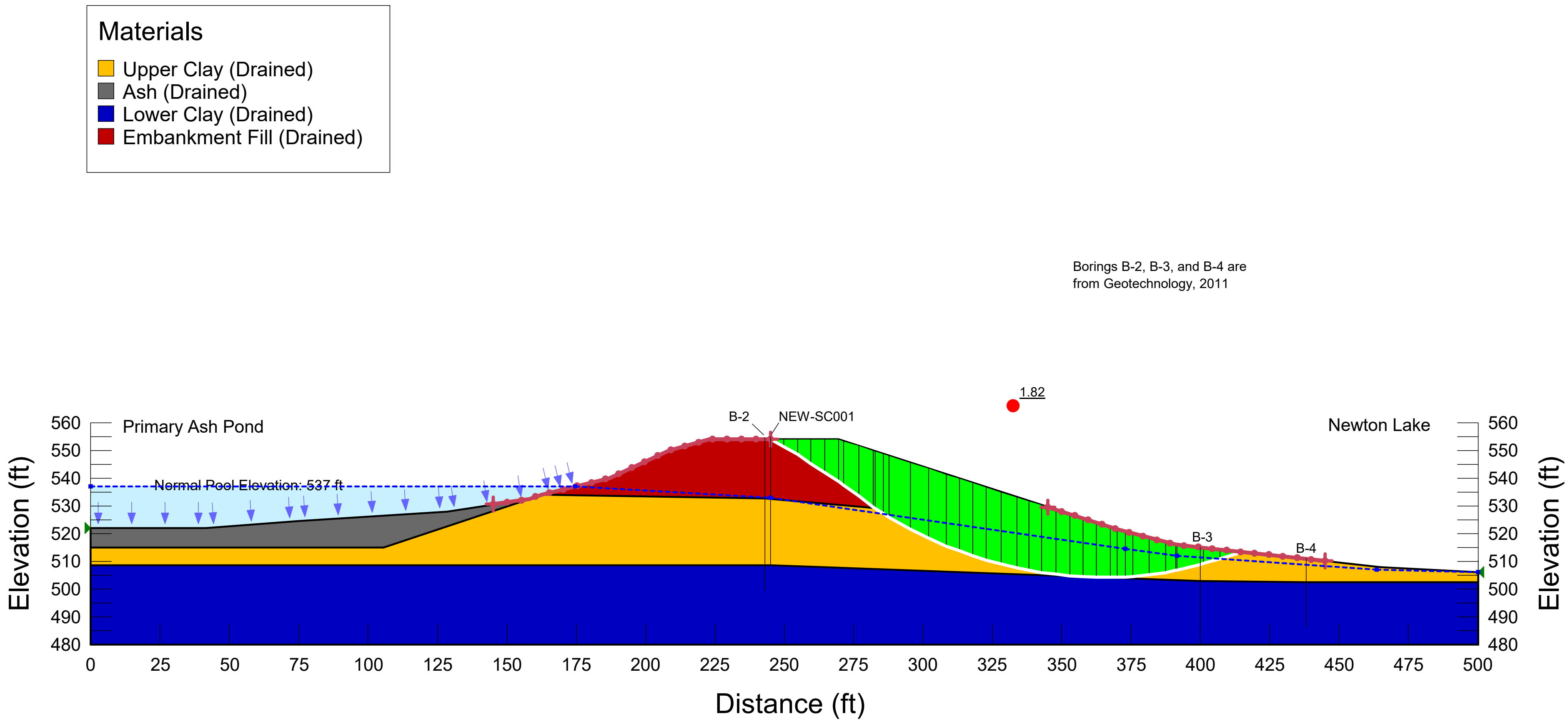
Periodic Structural Stability and Safety Factor Assessment Analyses

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Project Name: Newton Primary Ash Pond Stability Analysis-Section A

Analysis: Long Term (Drained)

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



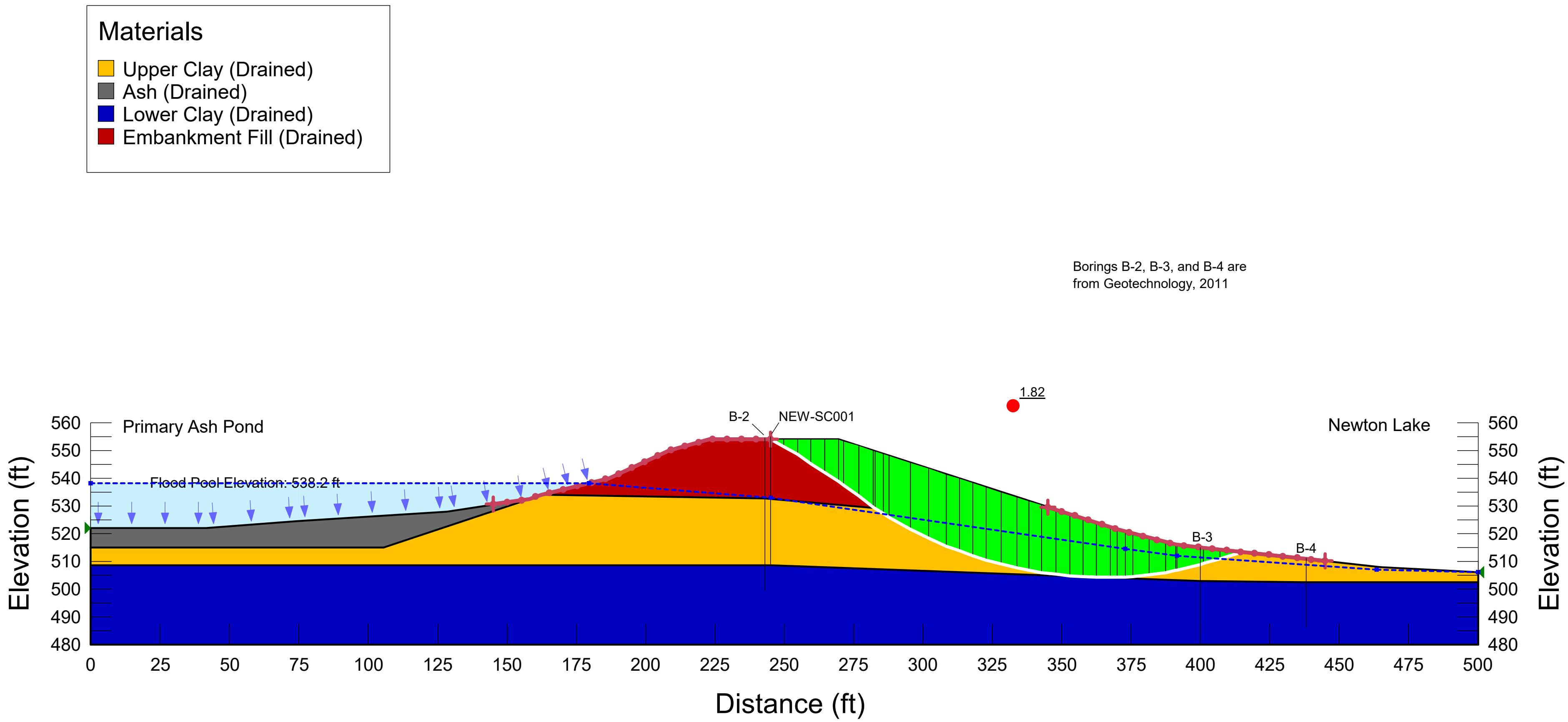
\\STLOUISMO-01\Data\Company\Projects_post_2014\GLP8027_CCR_ReCert\500_Technical\509_NEW\509d_Periodic_Report\Revised SFA\PAP\Section A\ Section A_PK_20210901.gsz

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Project Name: Newton Primary Ash Pond Stability Analysis-Section A

Analysis: Surcharge (Drained)

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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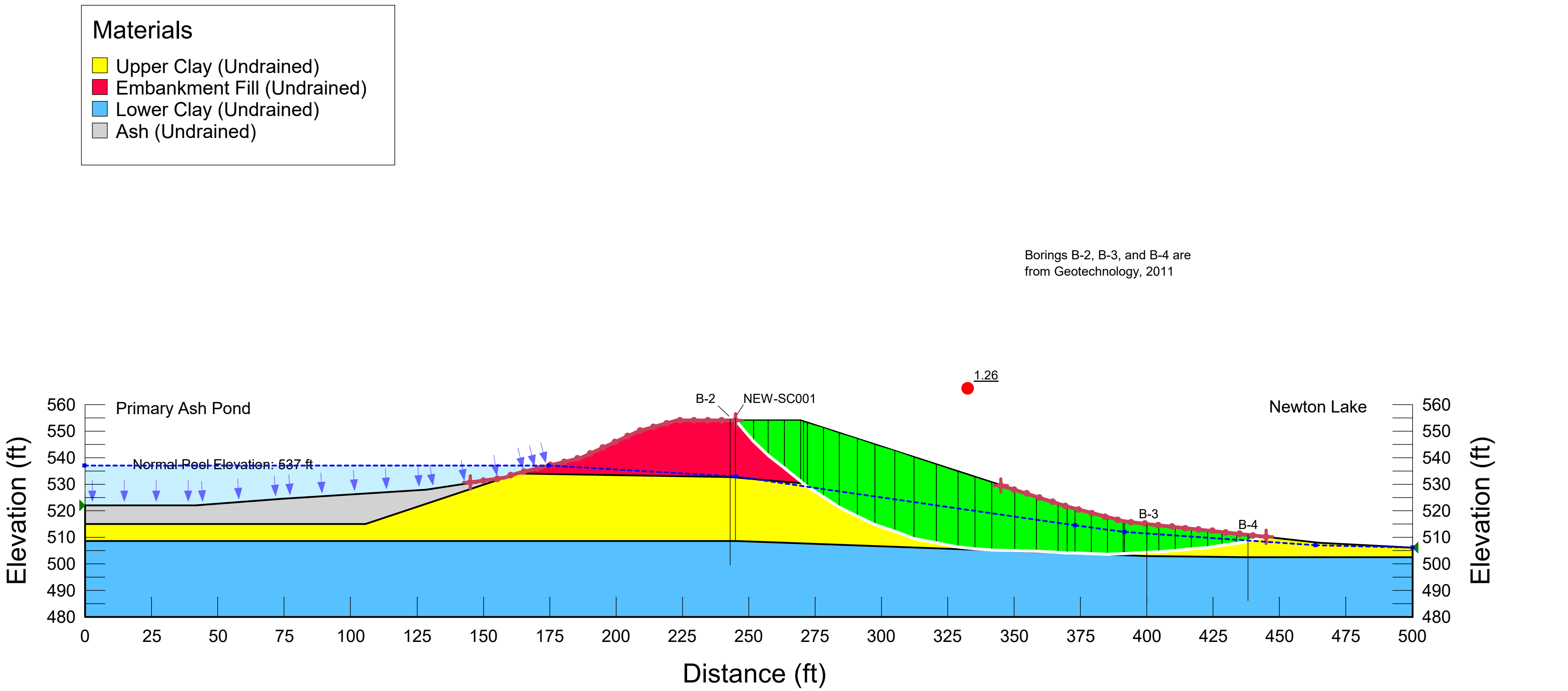
Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Project Name: Newton Primary Ash Pond Stability Analysis-Section A

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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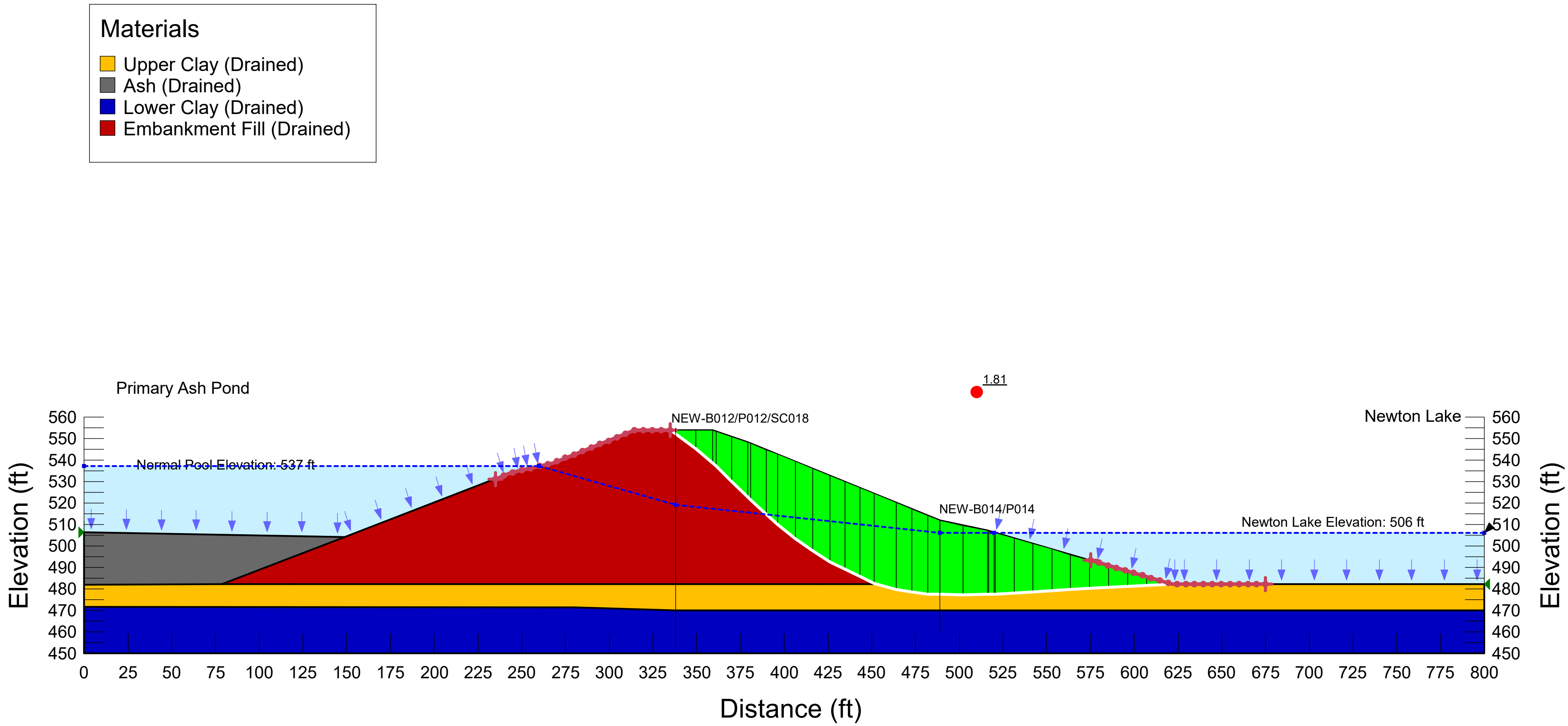
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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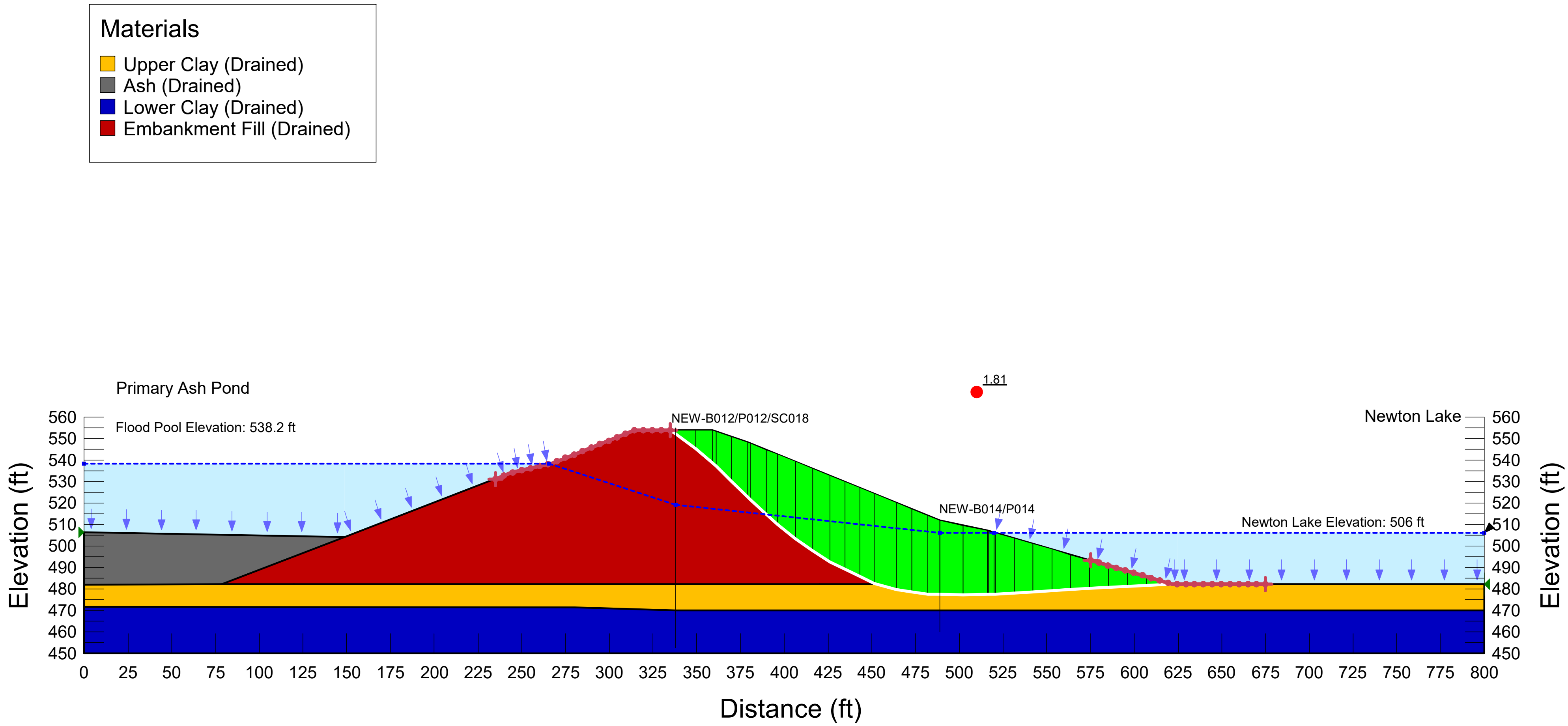
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Surcharge (Drained)

Calculated By: MJN	Date: 6/17/2016
Checked By: VMCh	Date: 6/20/2016
Modified By: PK	Date: 9/01/2021
Checked By:ZJF	Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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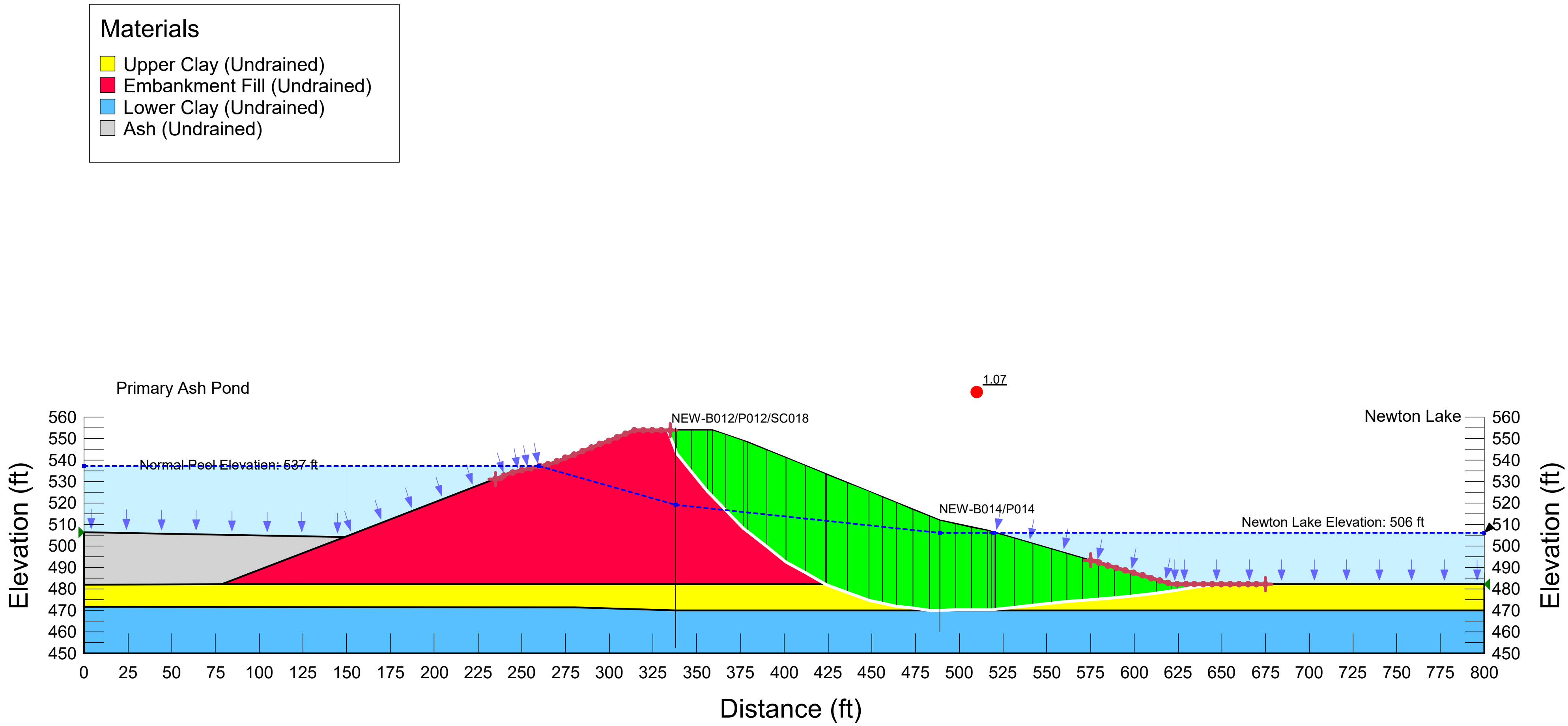
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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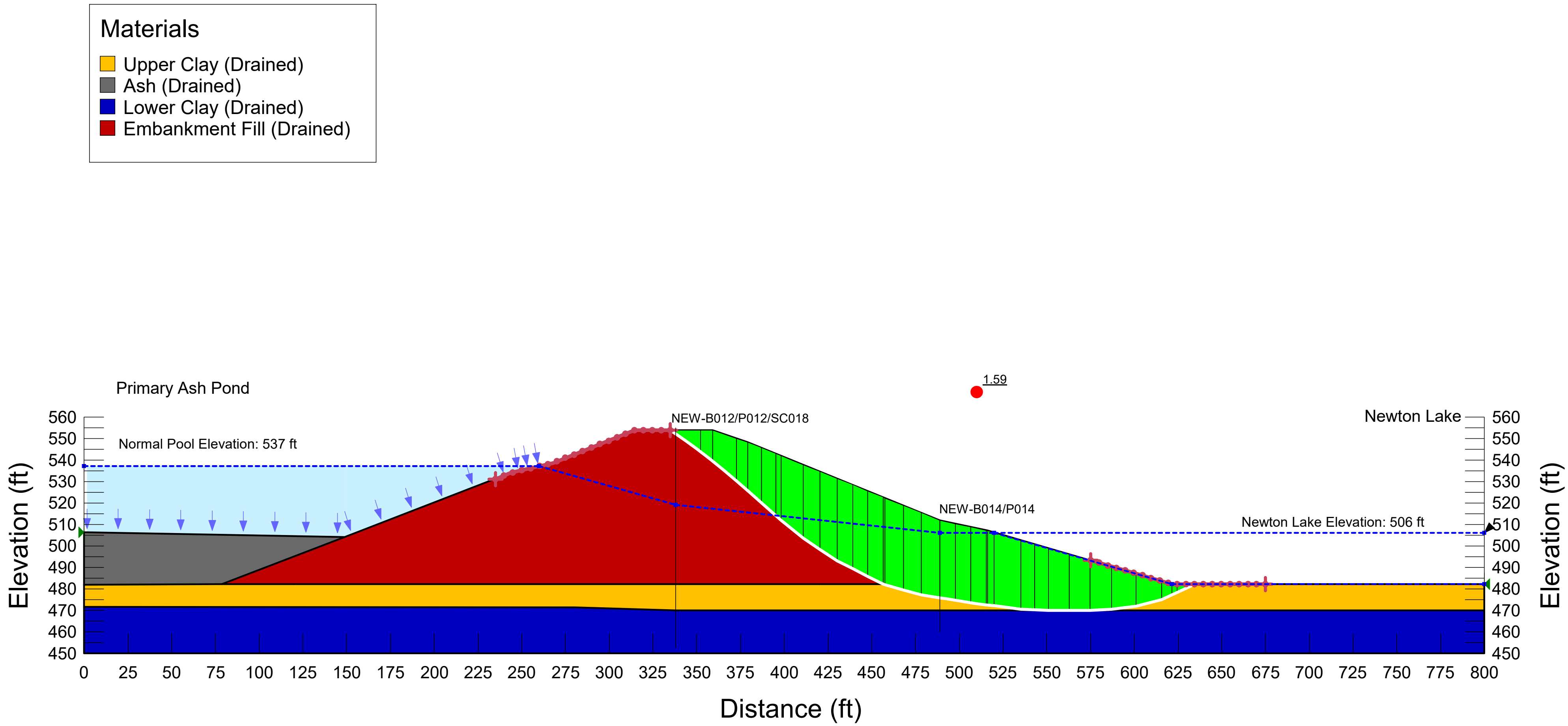
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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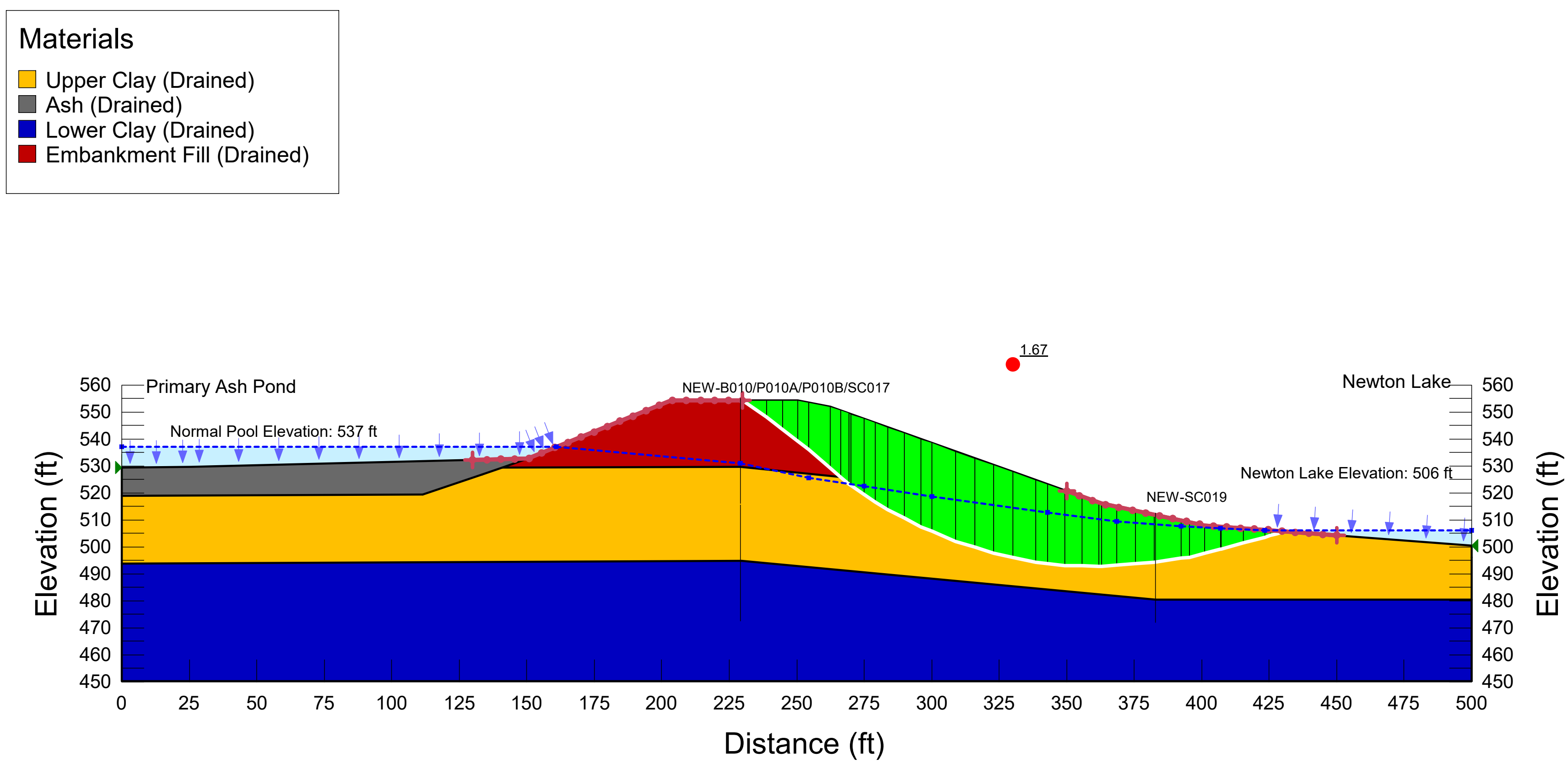
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Analysis: Long Term (Drained)

Calculated By: MJN	Date: 6/20/2016
Checked By: VMCh	Date: 6/20/2016
Modified By: PK	Date:9/01/2021
Checked By:ZJF	Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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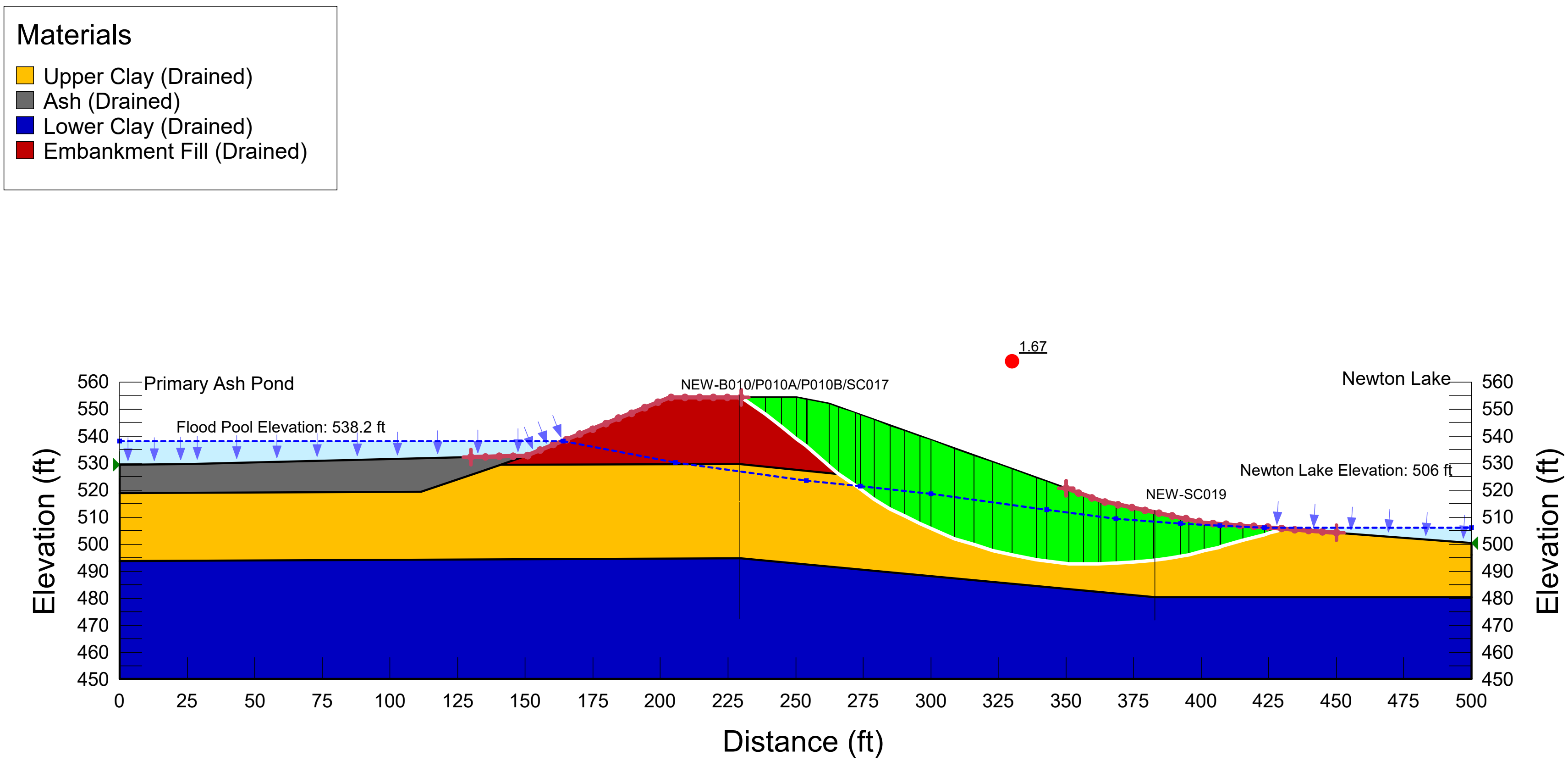
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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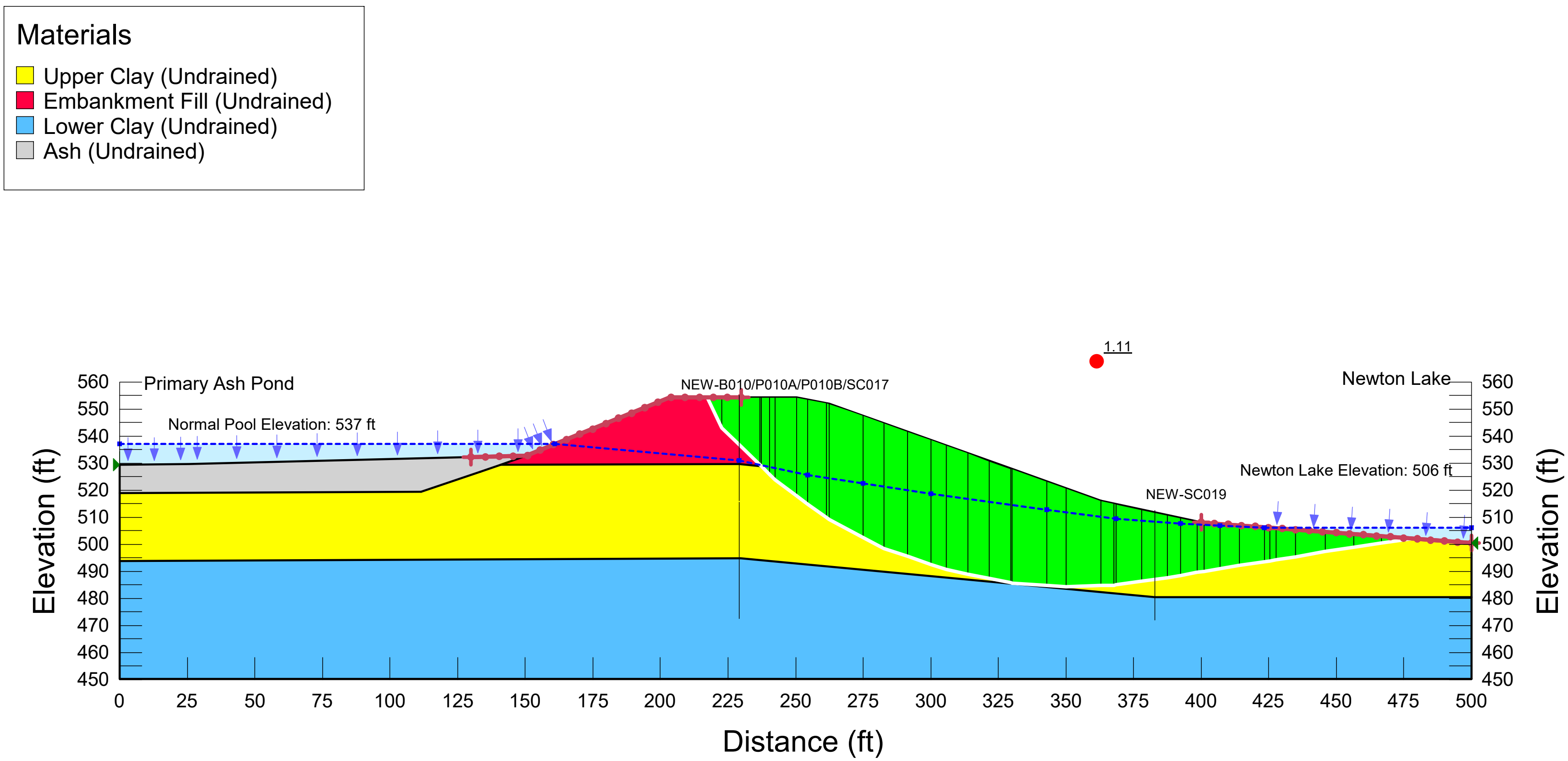
Project Name: **Newton Primary Ash Pond Stability Analysis-Section C**

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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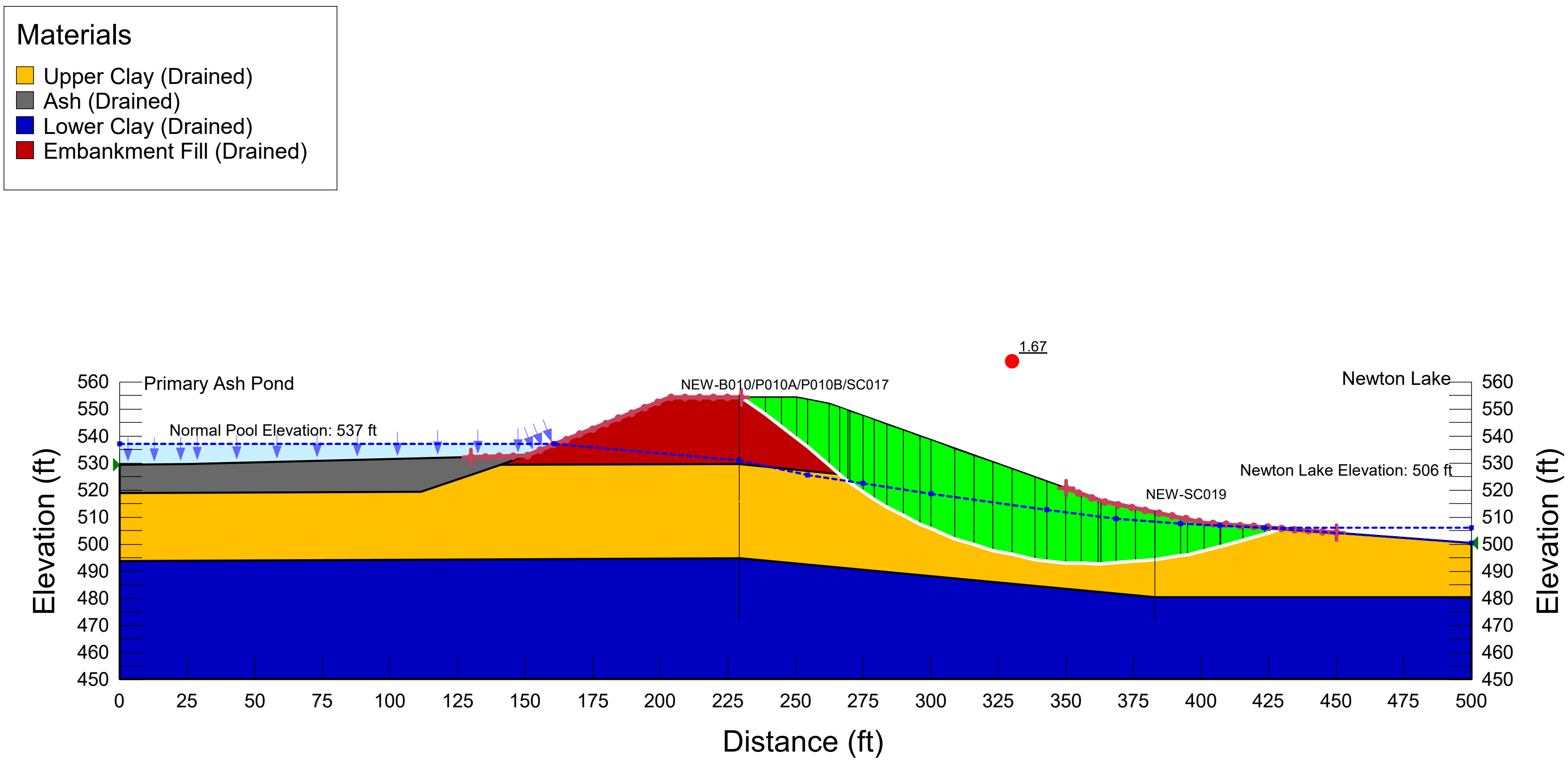
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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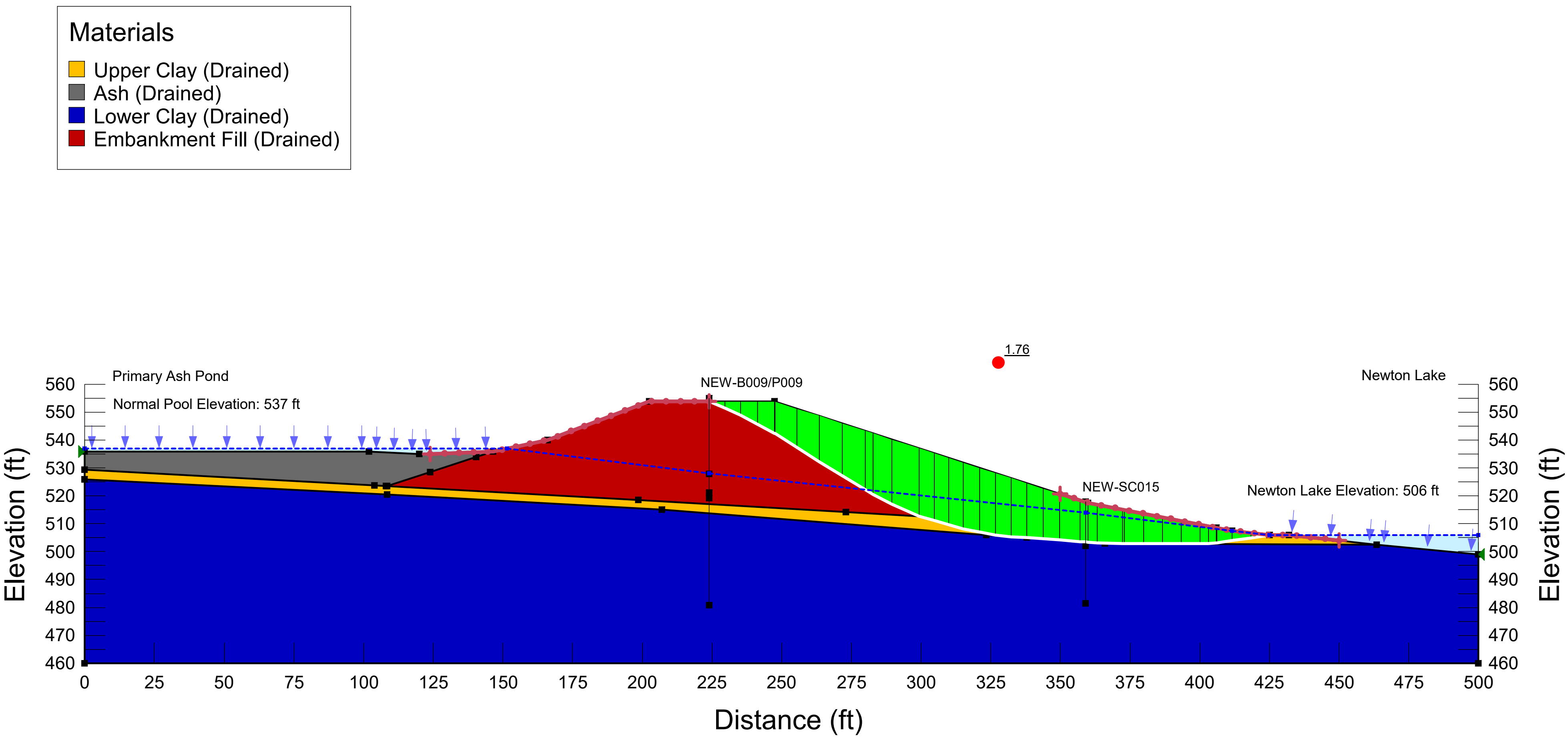
Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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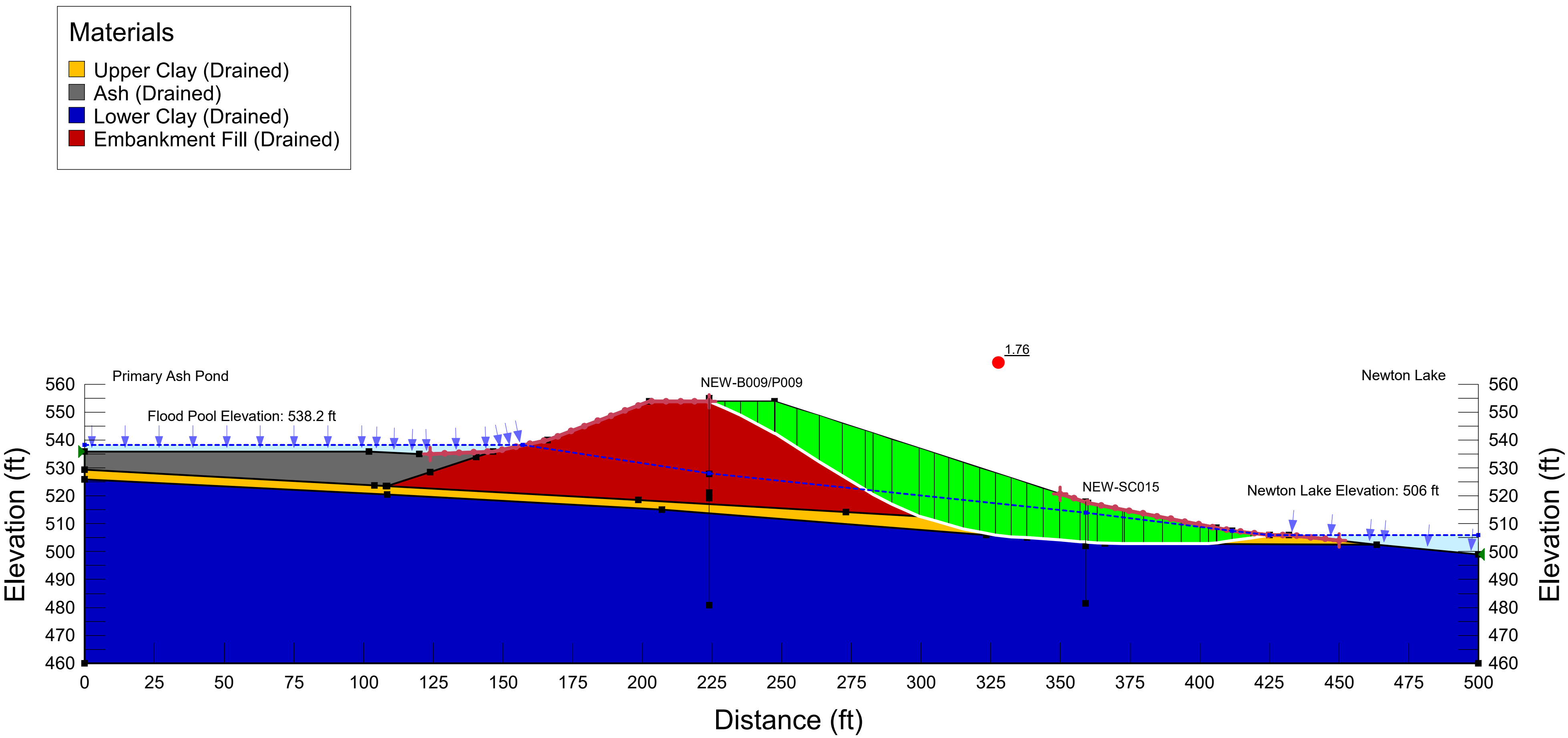
Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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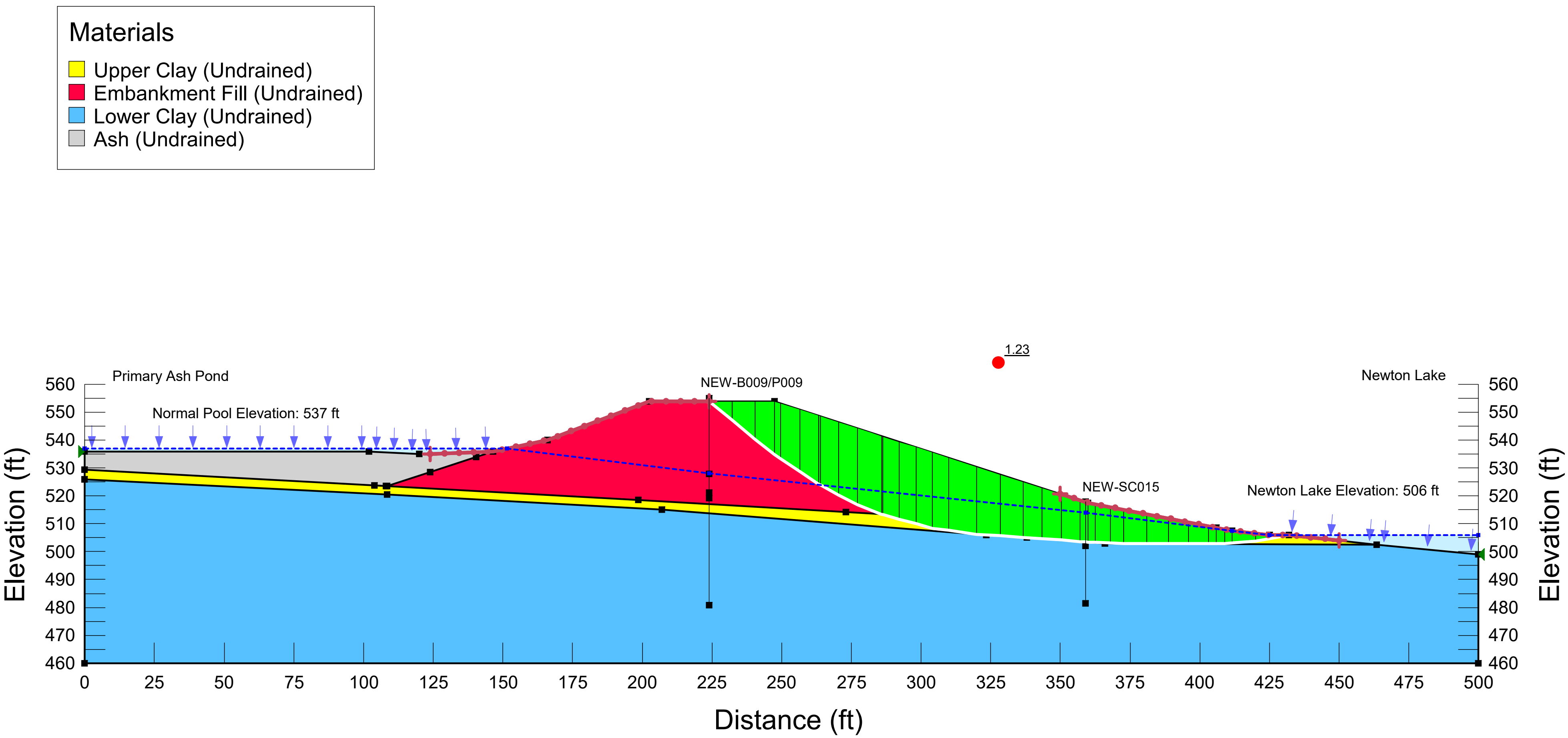
Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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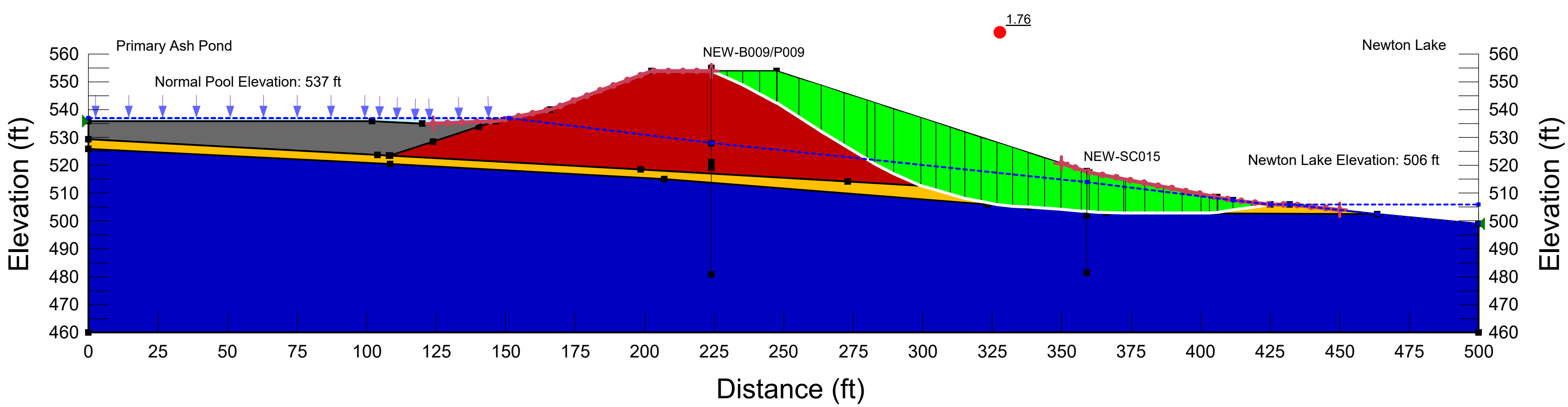
Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2

Materials
- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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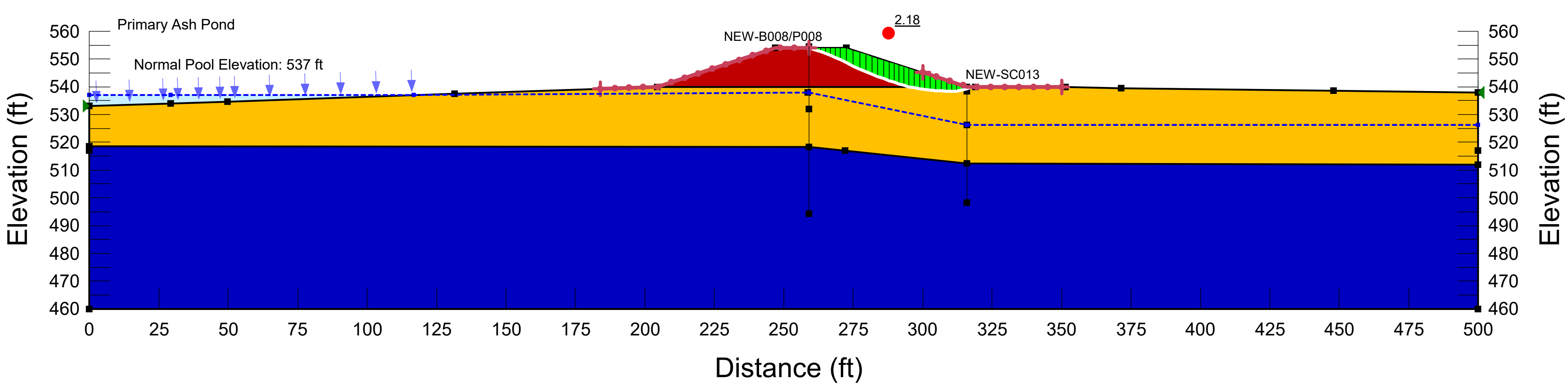
Project Name: **Newton Primary Ash Pond Stability Analysis-Section E**

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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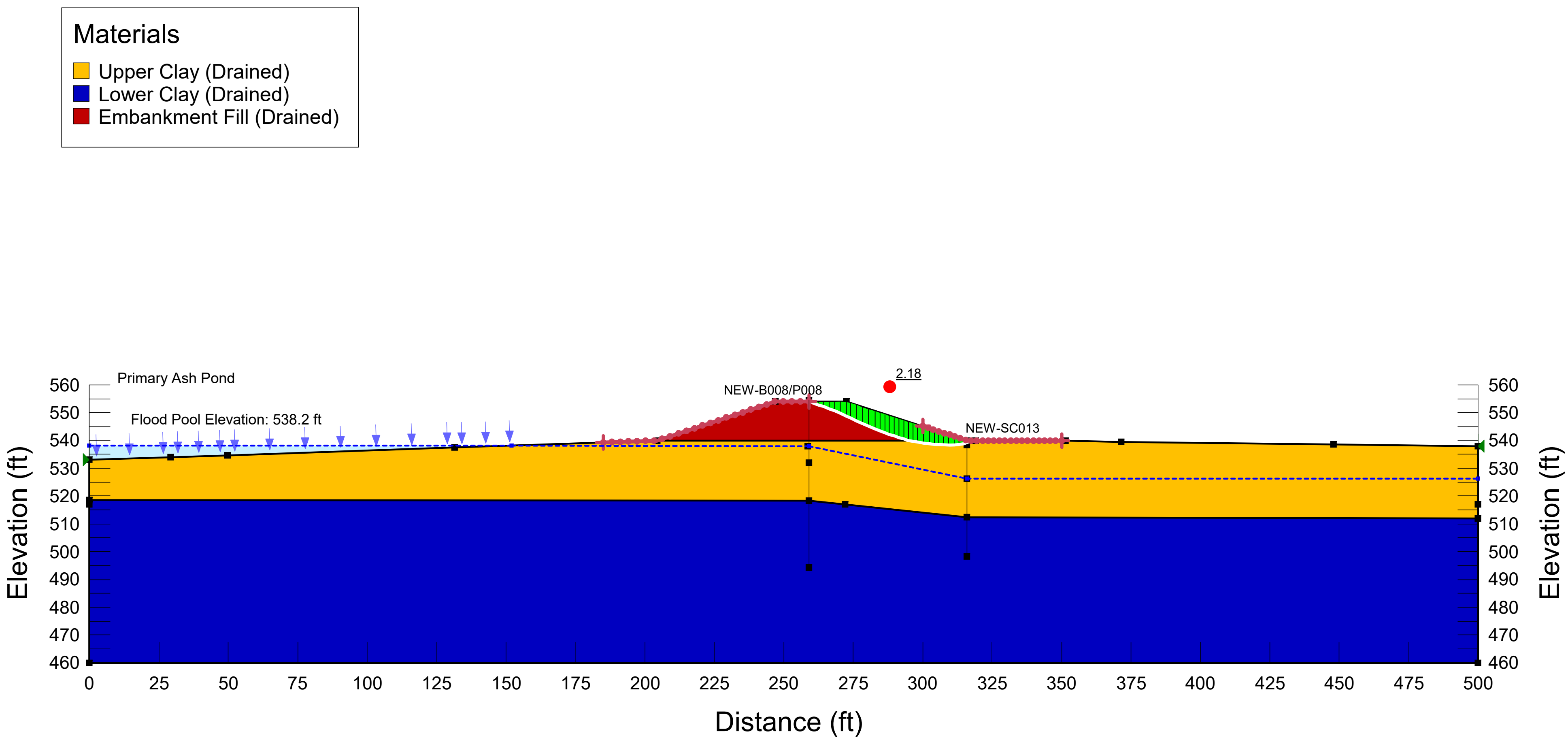
Project Name: **Newton Primary Ash Pond Stability Analysis-Section E**

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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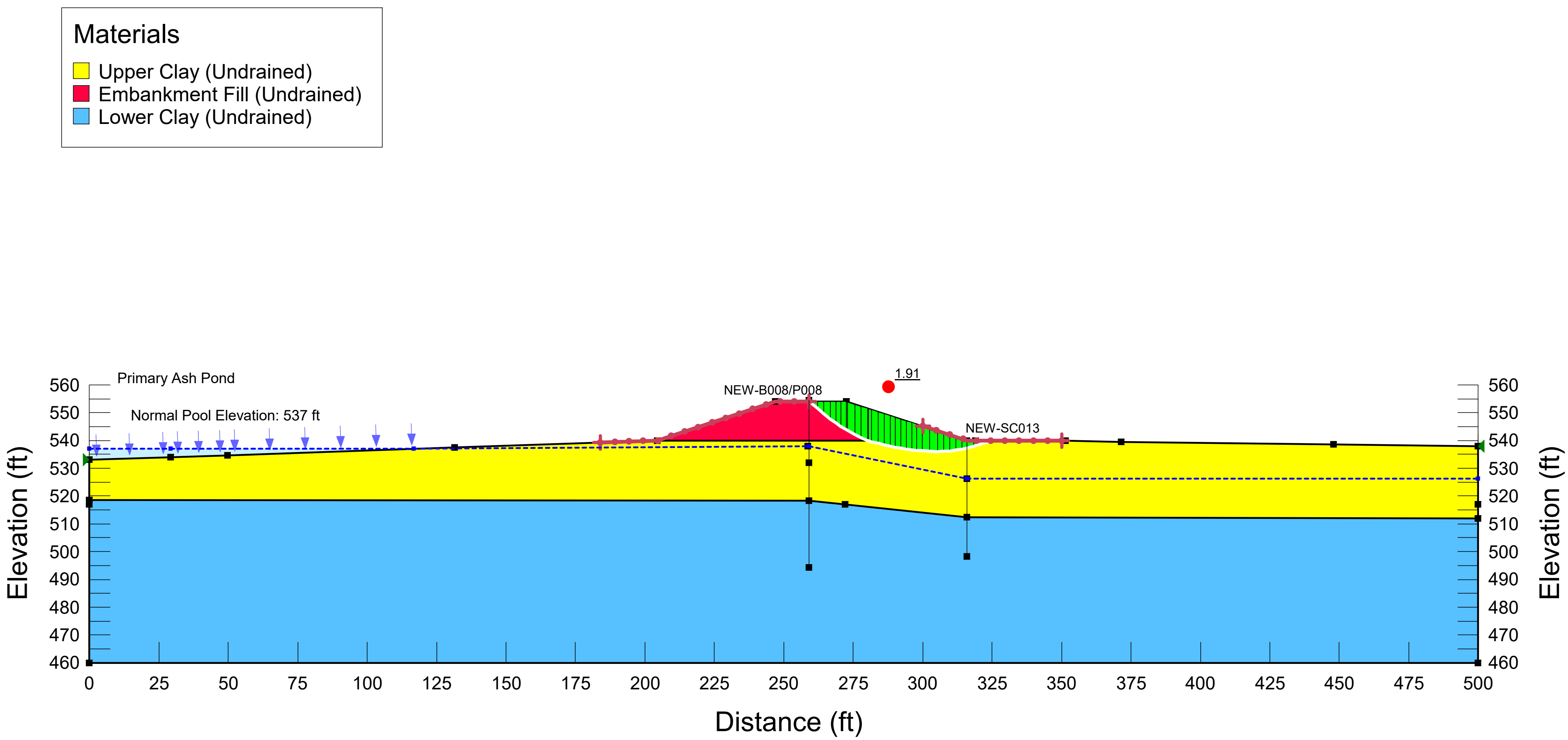
Project Name: Newton Primary Ash Pond Stability Analysis-Section E

Analysis: Pseudostatic (Undrained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °



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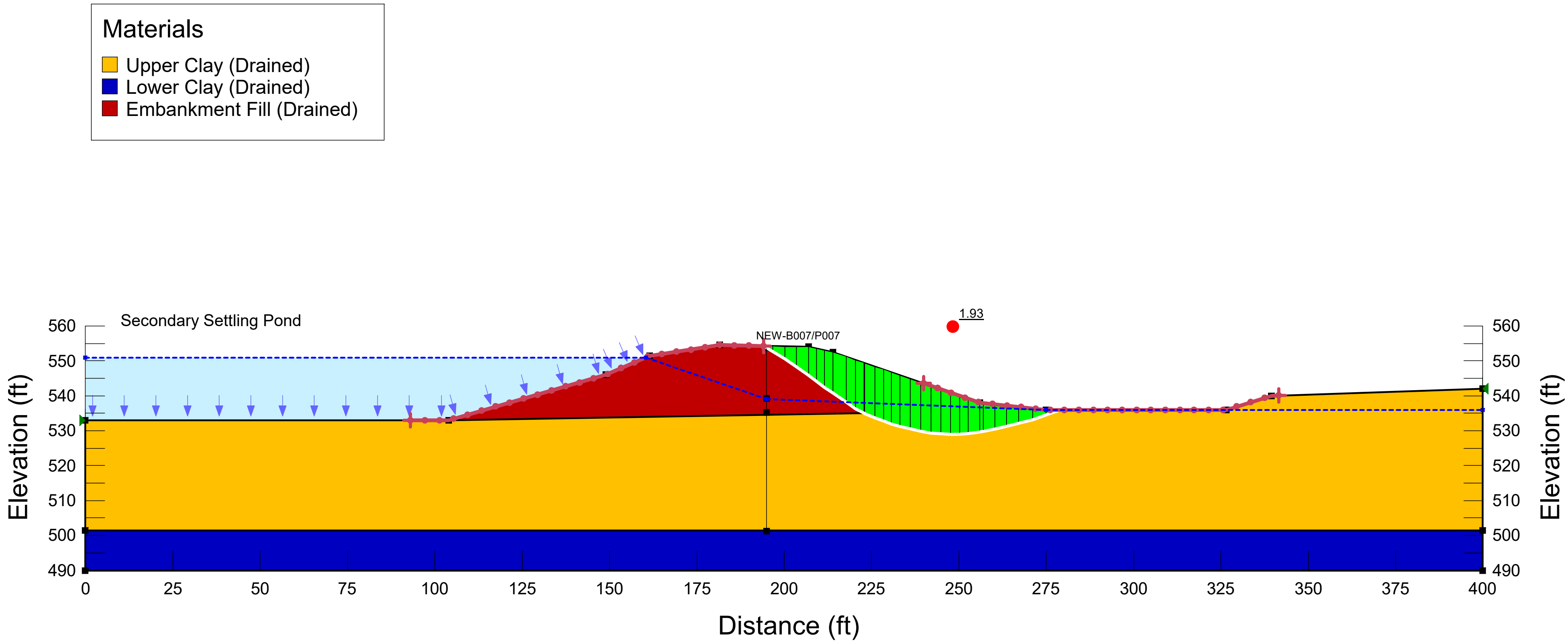
Project Name: Newton Primary Ash Pond Stability Analysis-Section F

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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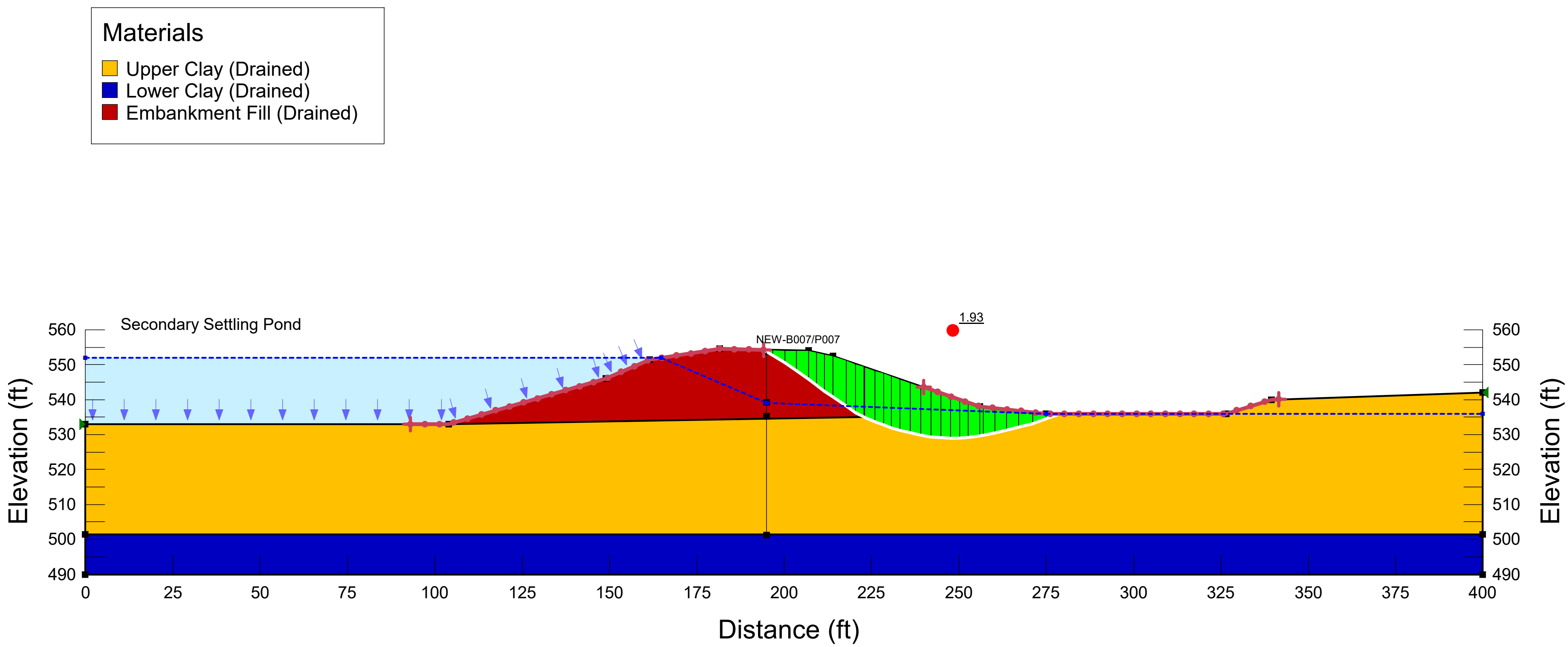
Project Name: **Newton Primary Ash Pond Stability Analysis-Section F**

Analysis: Surcharge (Drained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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Project Name: **Newton Primary Ash Pond Stability Analysis-Section F**

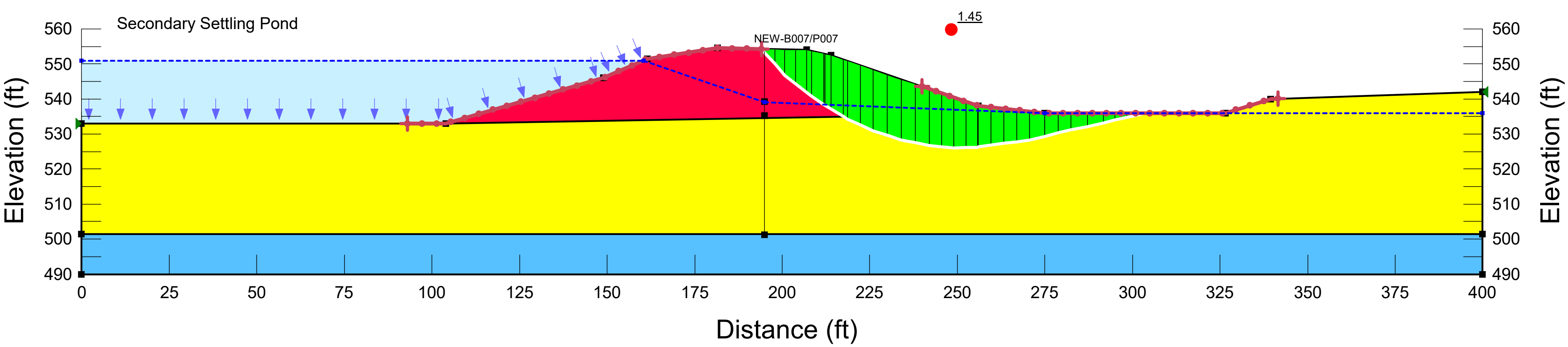
Analysis: Pseudostatic (Undrained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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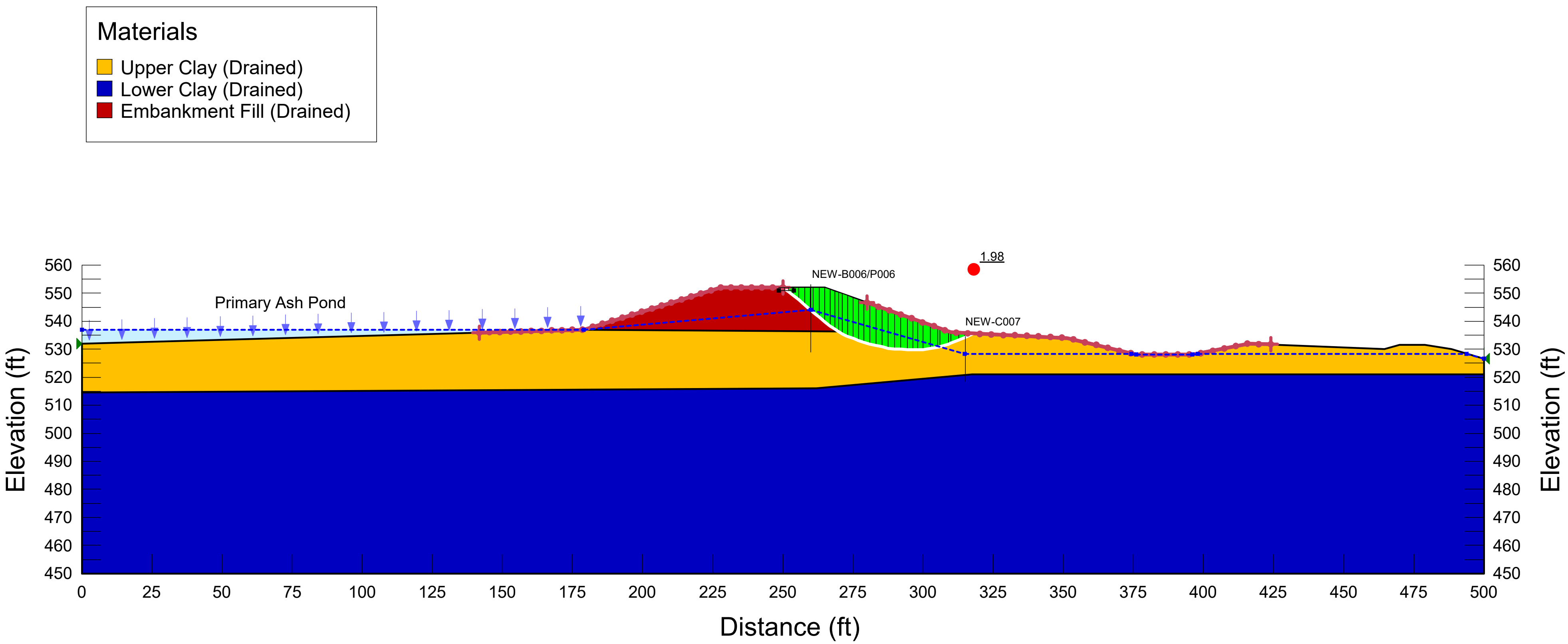
Project Name: **Newton Primary Ash Pond Stability Analysis-Section G**

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 06/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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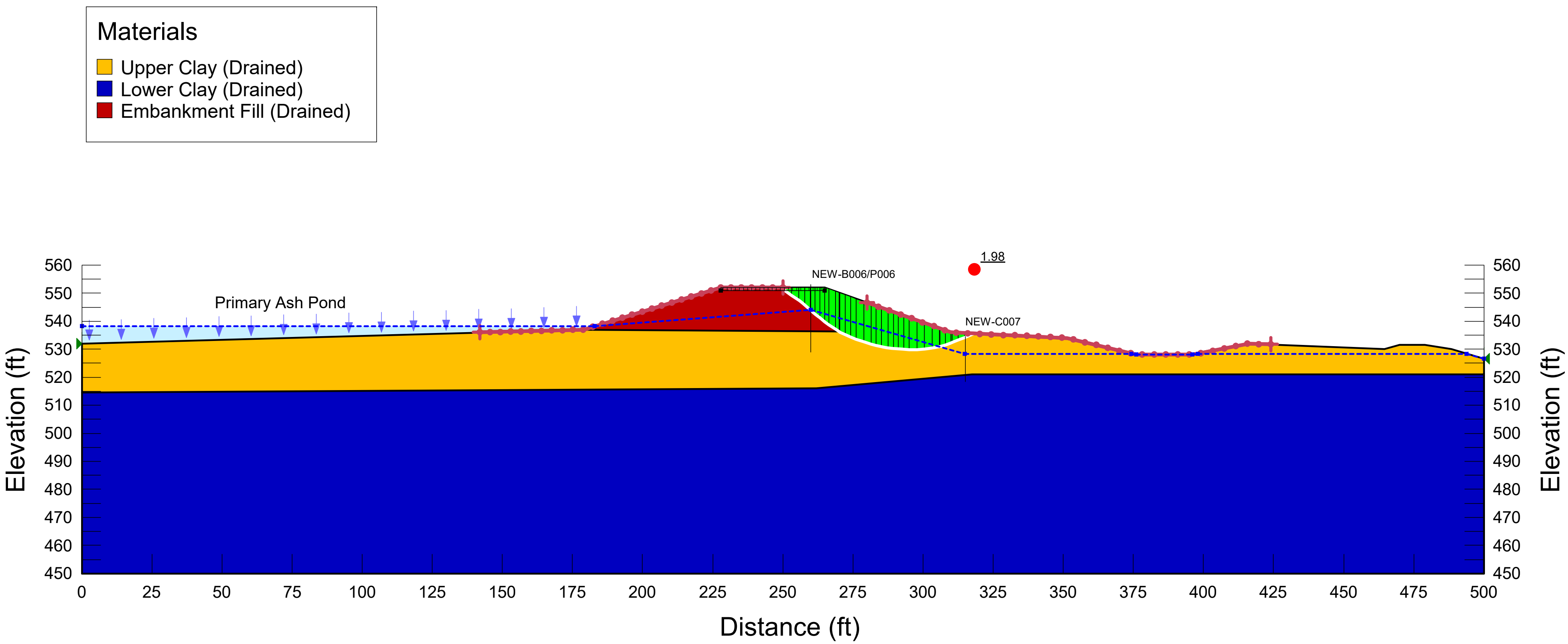
Project Name: **Newton Primary Ash Pond Stability Analysis-Section G**

Analysis: Surcharge (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 06/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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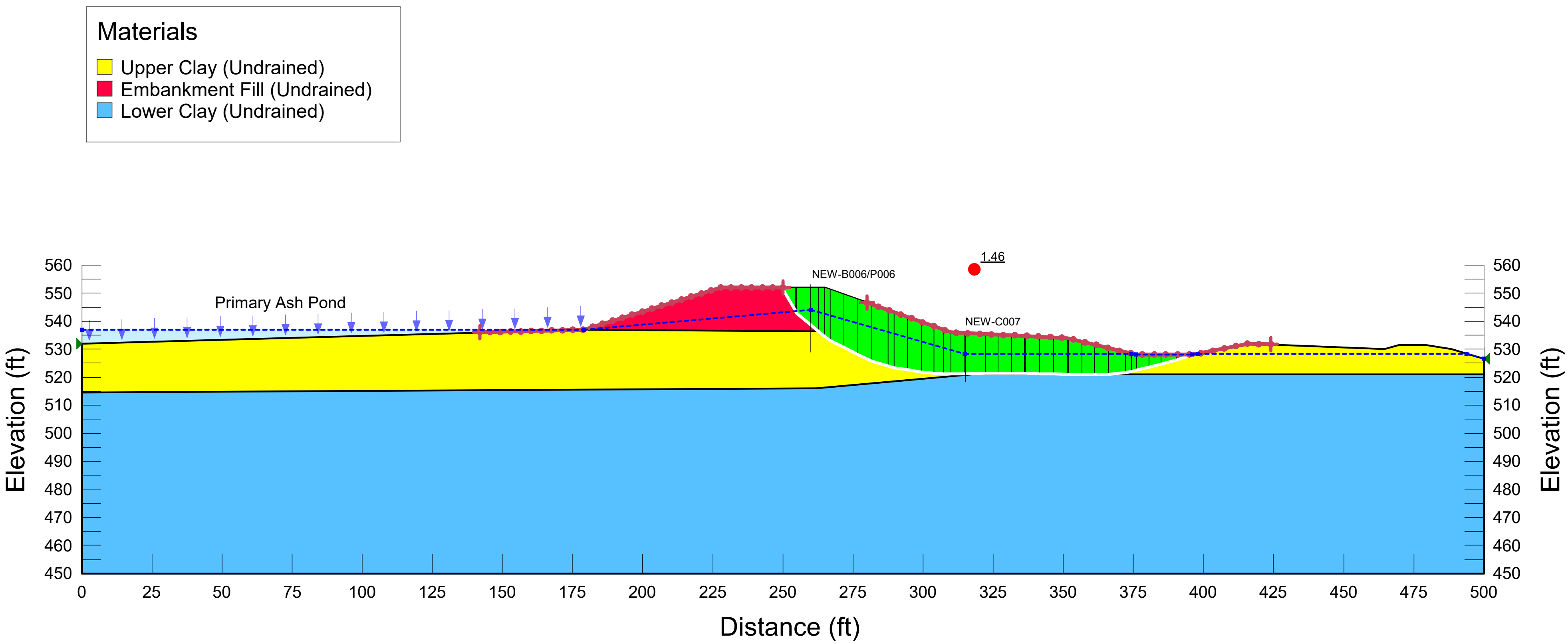
Project Name: **Newton Primary Ash Pond Stability Analysis-Section G**

Analysis: Pseudostatic (Undrained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 06/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °



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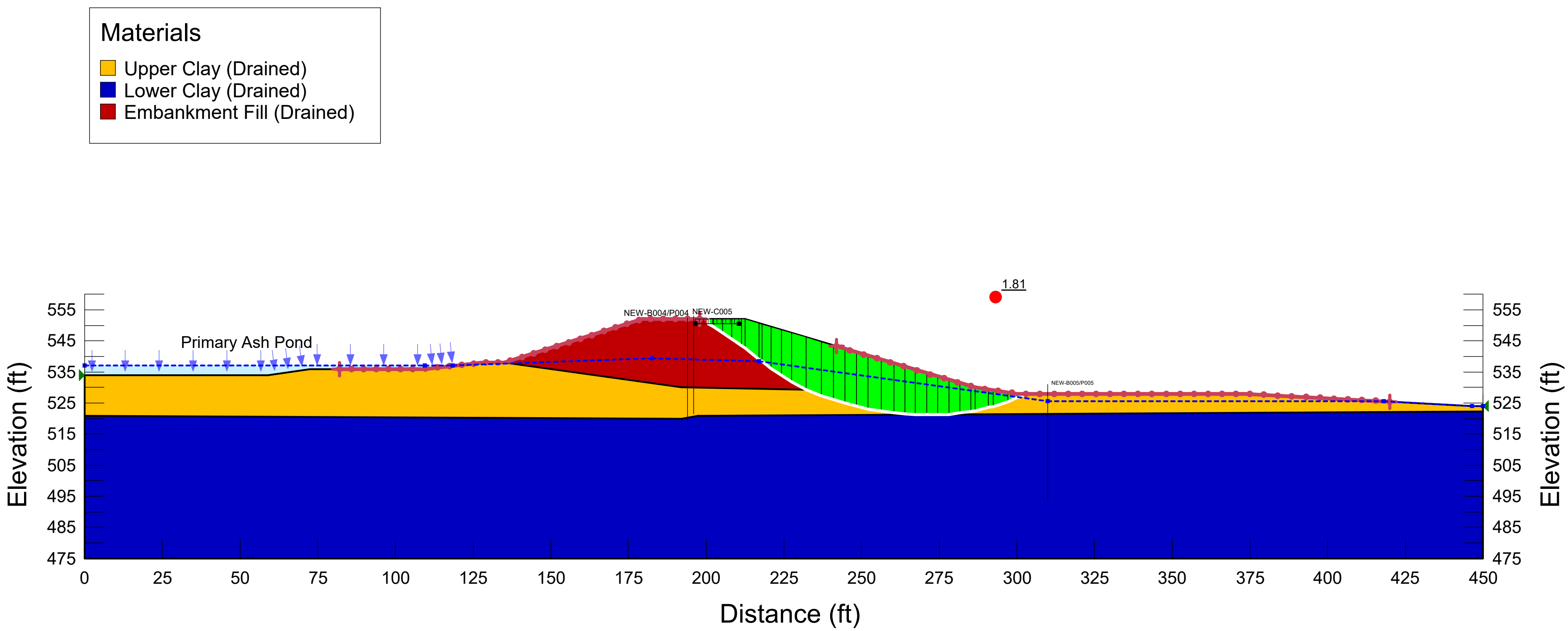
Project Name: Newton Primary Ash Pond Stability Analysis-Section H

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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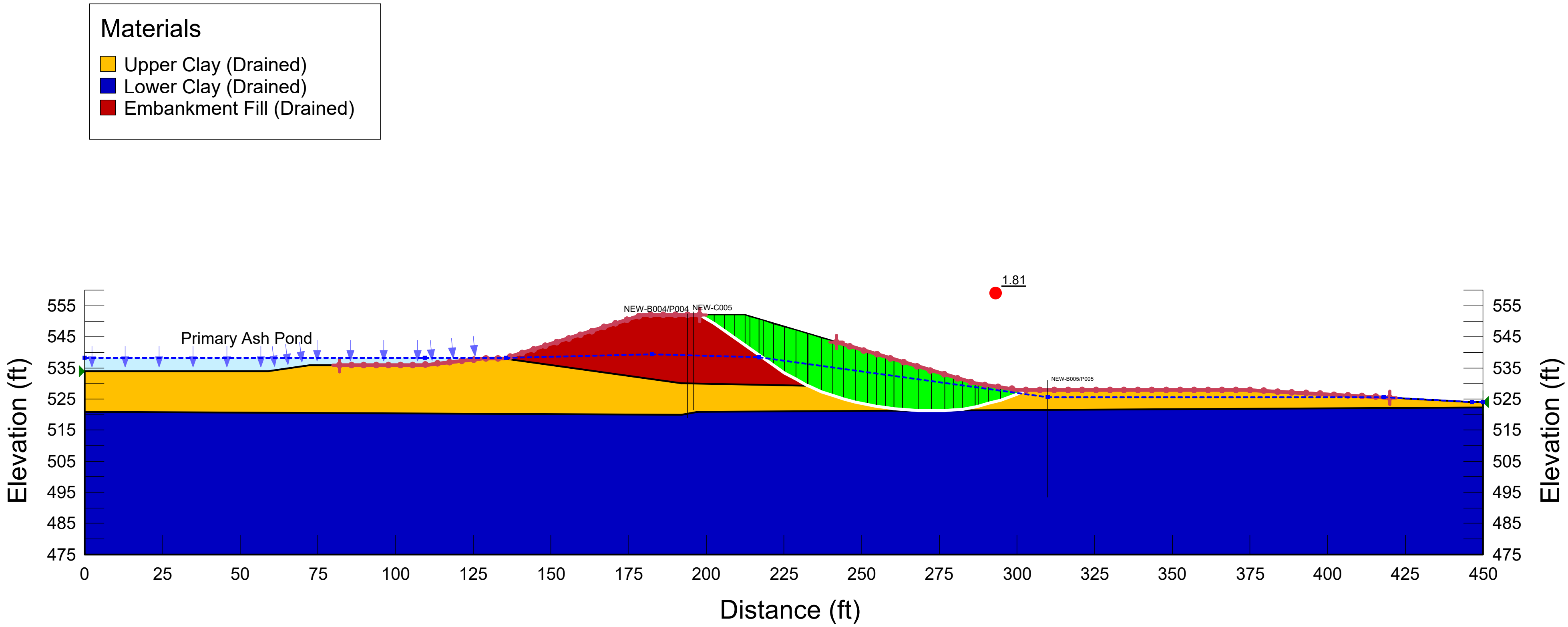
Project Name: Newton Primary Ash Pond Stability Analysis-Section H

Analysis: Surcharge (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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Project Name: **Newton Primary Ash Pond Stability Analysis-Section H**

Analysis: Pseudostatic (Undrained)

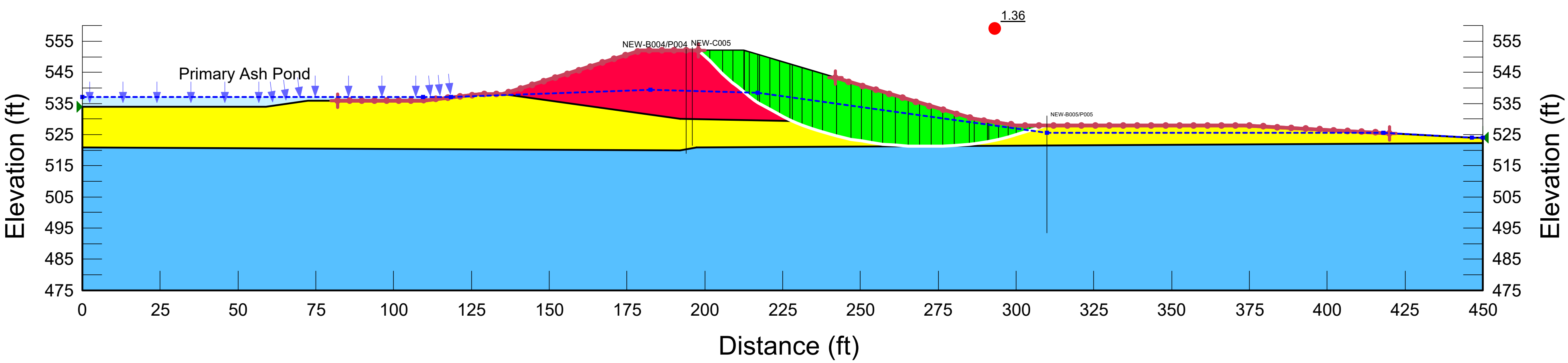
Calculated By: ZJF   Date: 5/23/16
Checked By: VMCh   Date: 6/20/16
Modified By: PK   Date:9/01/21
Checked By:ZJF   Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained)   Model: Shear/Normal Fn.   Unit Weight: 130 pcf   Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained)   Model: Shear/Normal Fn.   Unit Weight: 130 pcf   Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained)   Model: Mohr-Coulomb   Unit Weight: 130 pcf   Cohesion': 5,000 psf   Phi': 0 °

Materials

- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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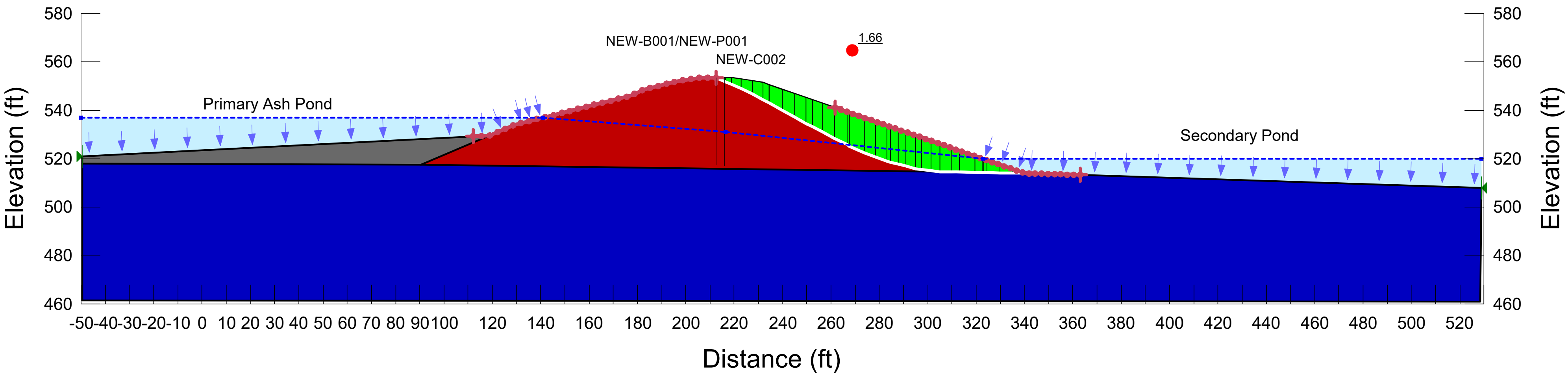
Project Name: Newton Primary Ash Pond Stability Analysis-Section I

Analysis: Long Term (Drained)

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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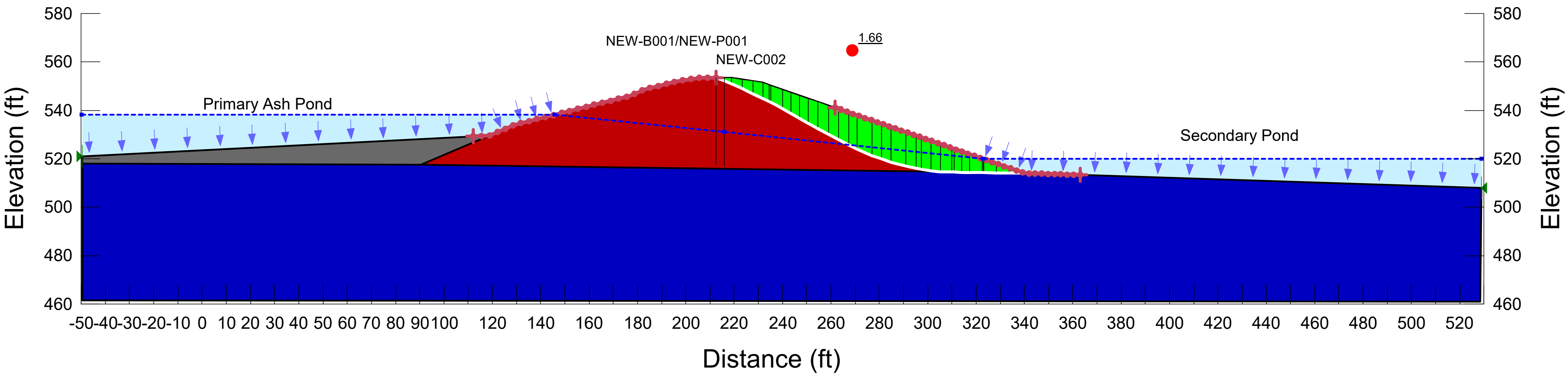
Project Name: Newton Primary Ash Pond Stability Analysis-Section I

Analysis: Surcharge (Drained)

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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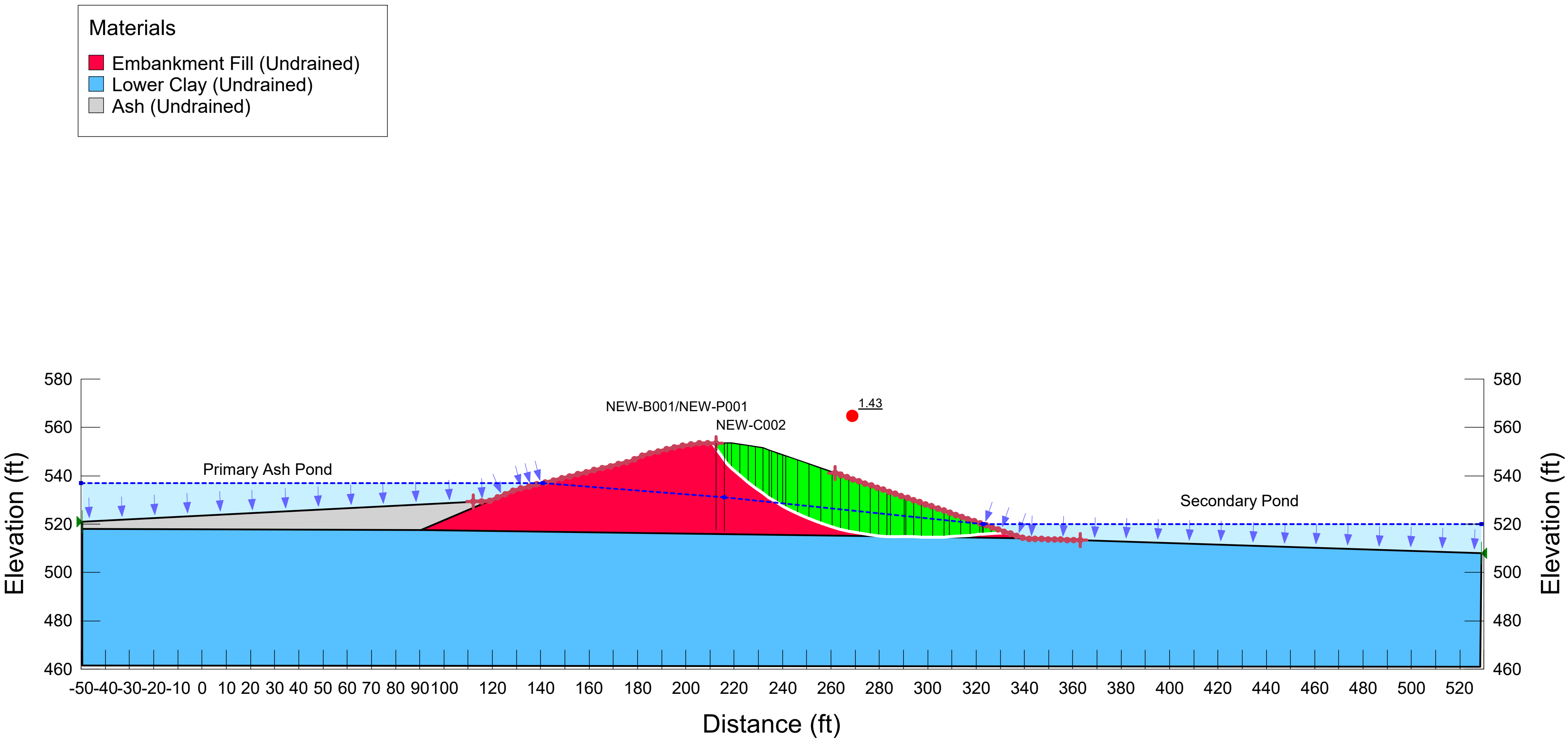
Project Name: Newton Primary Ash Pond Stability Analysis-Section I

Analysis: Pseudostatic (Undrained)

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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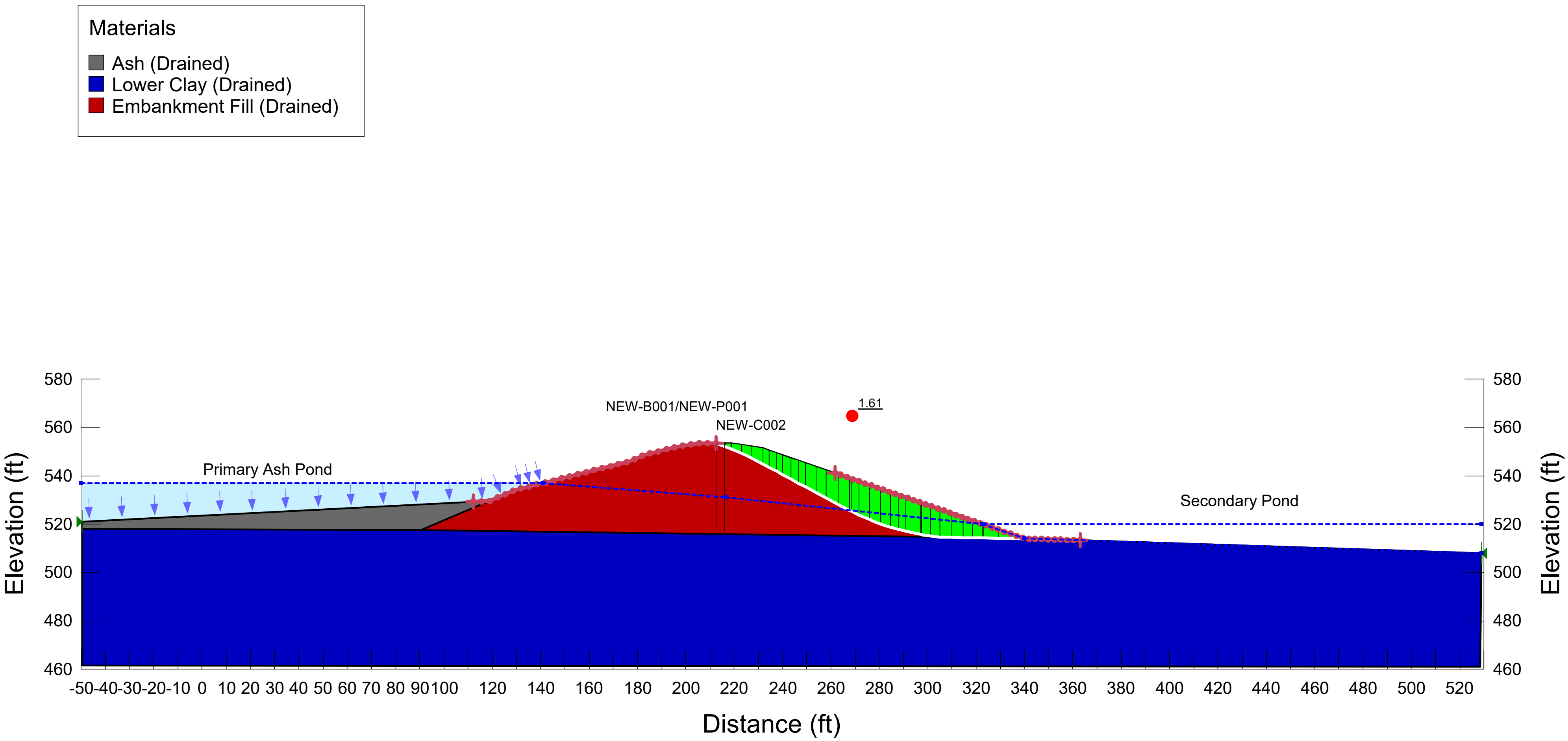
Project Name: **Newton Primary Ash Pond Stability Analysis-Section I**

Analysis: Sudden Drawdown

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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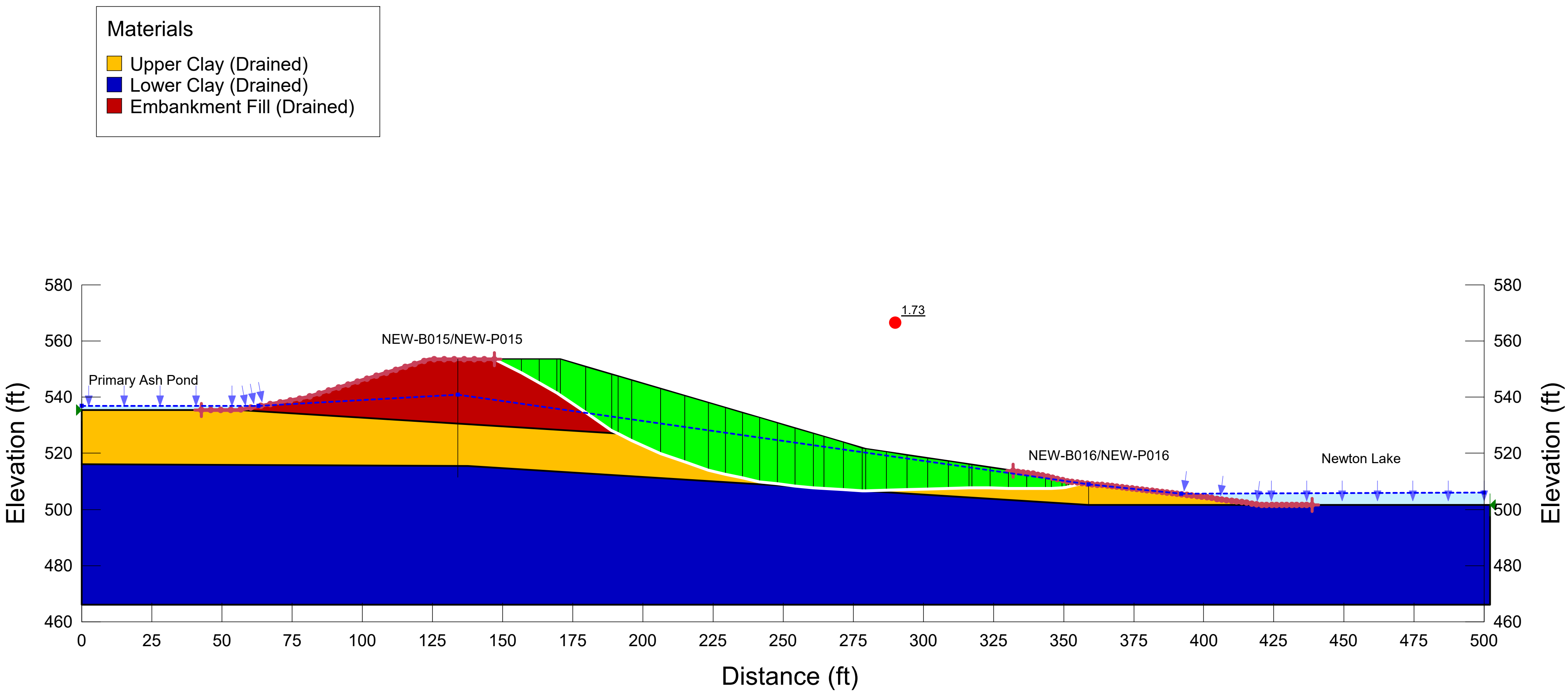
Project Name: Newton Primary Ash Pond Stability Analysis-Section K

Analysis: Long Term (Drained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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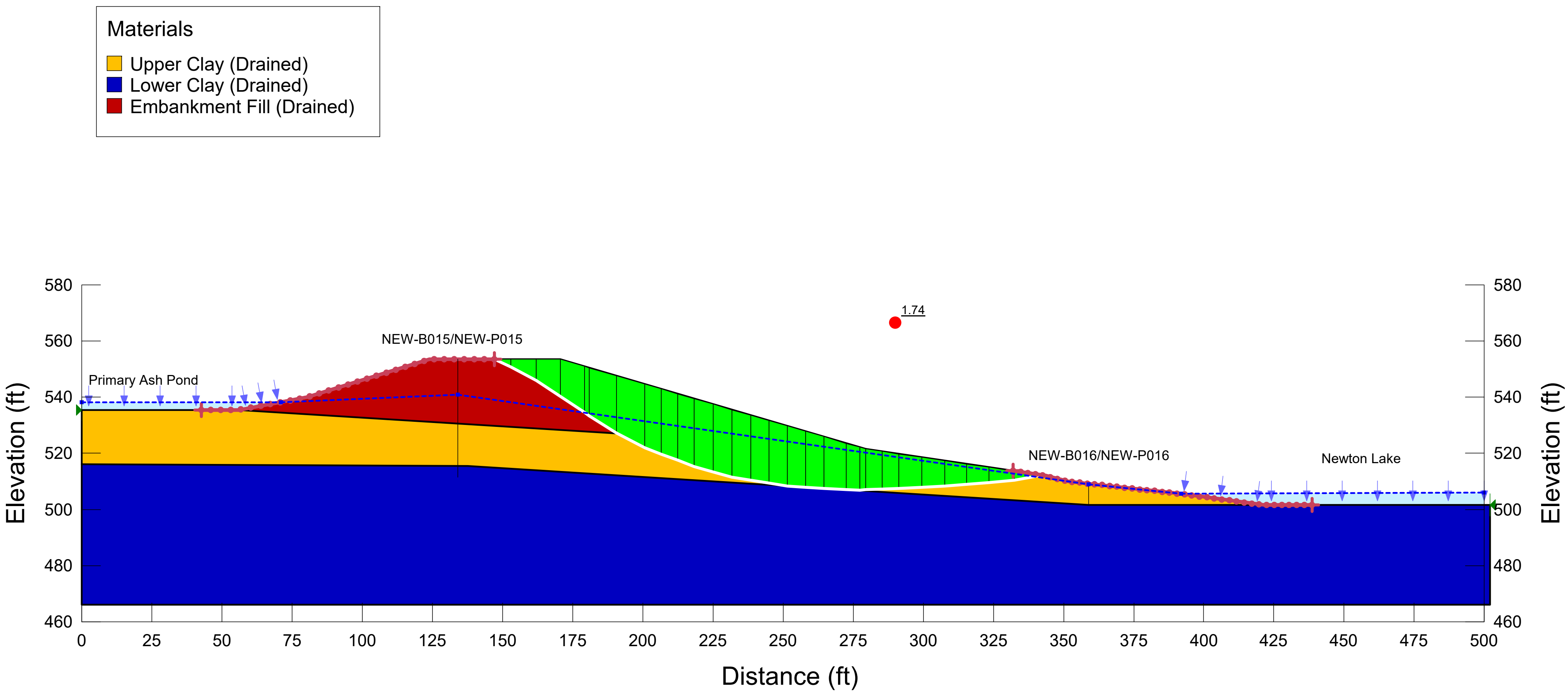
Project Name: **Newton Primary Ash Pond Stability Analysis-Section K**

Analysis: Surcharge (Drained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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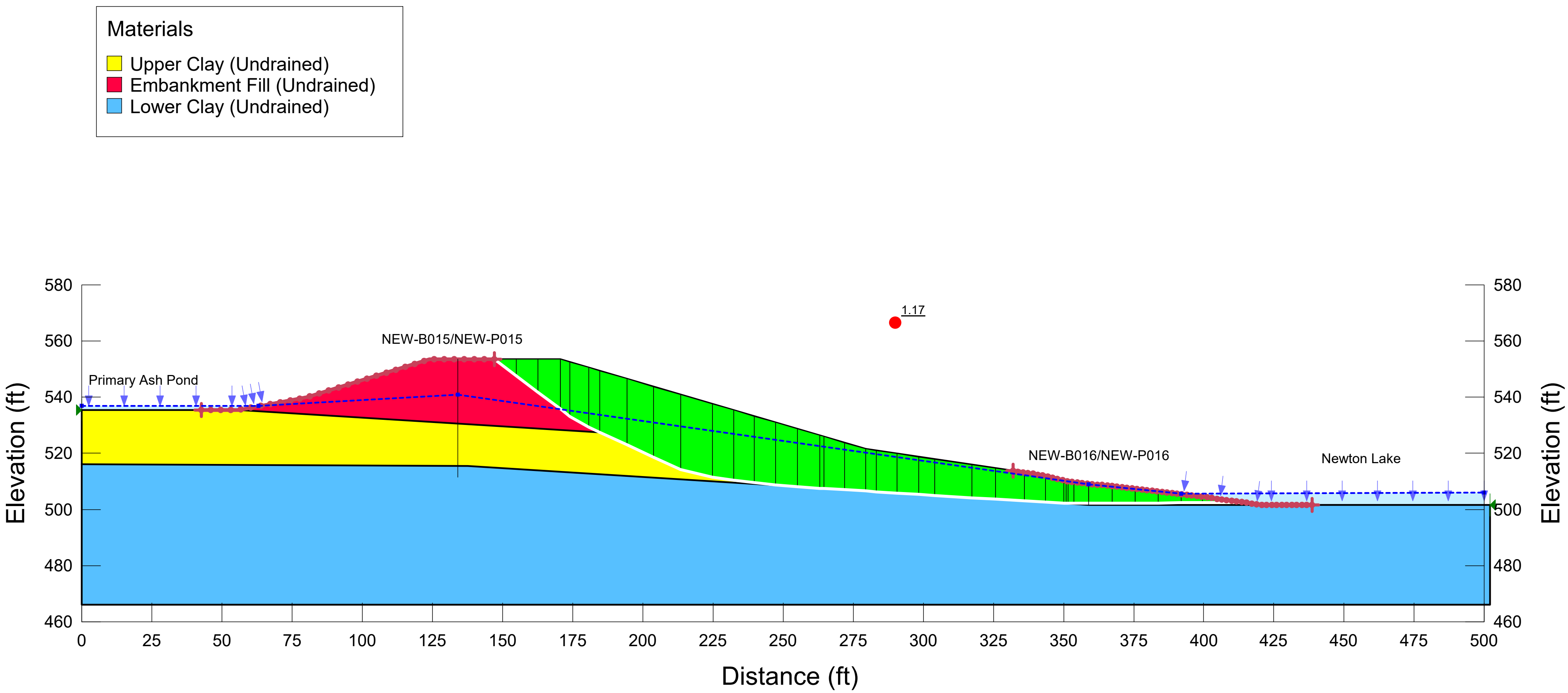
Project Name: **Newton Primary Ash Pond Stability Analysis-Section K**

Analysis: Pseudostatic (Undrained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Undrained (Phi=0) Unit Weight: 130 pcf Cohesion': 5,000 psf



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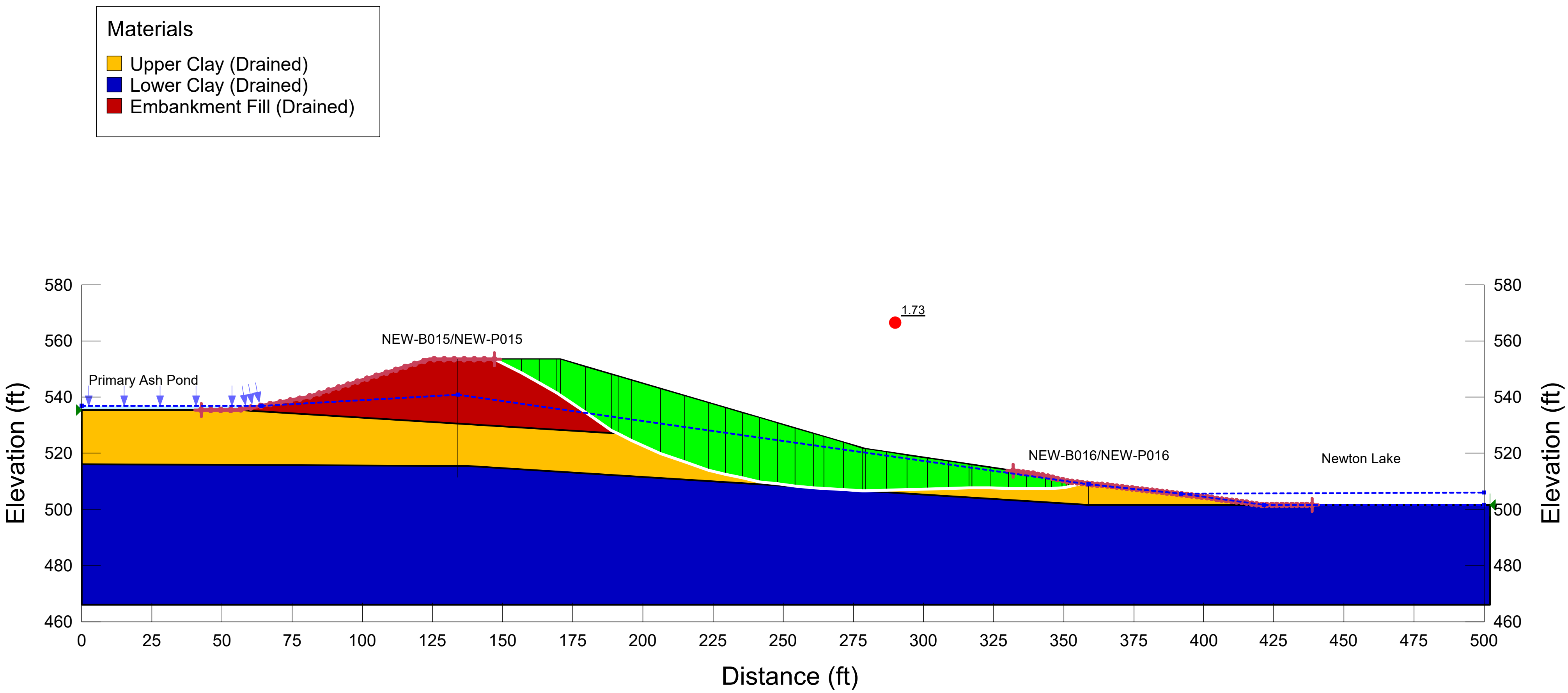
Project Name: Newton Primary Ash Pond Stability Analysis-Section K

Analysis: Sudden Drawdown

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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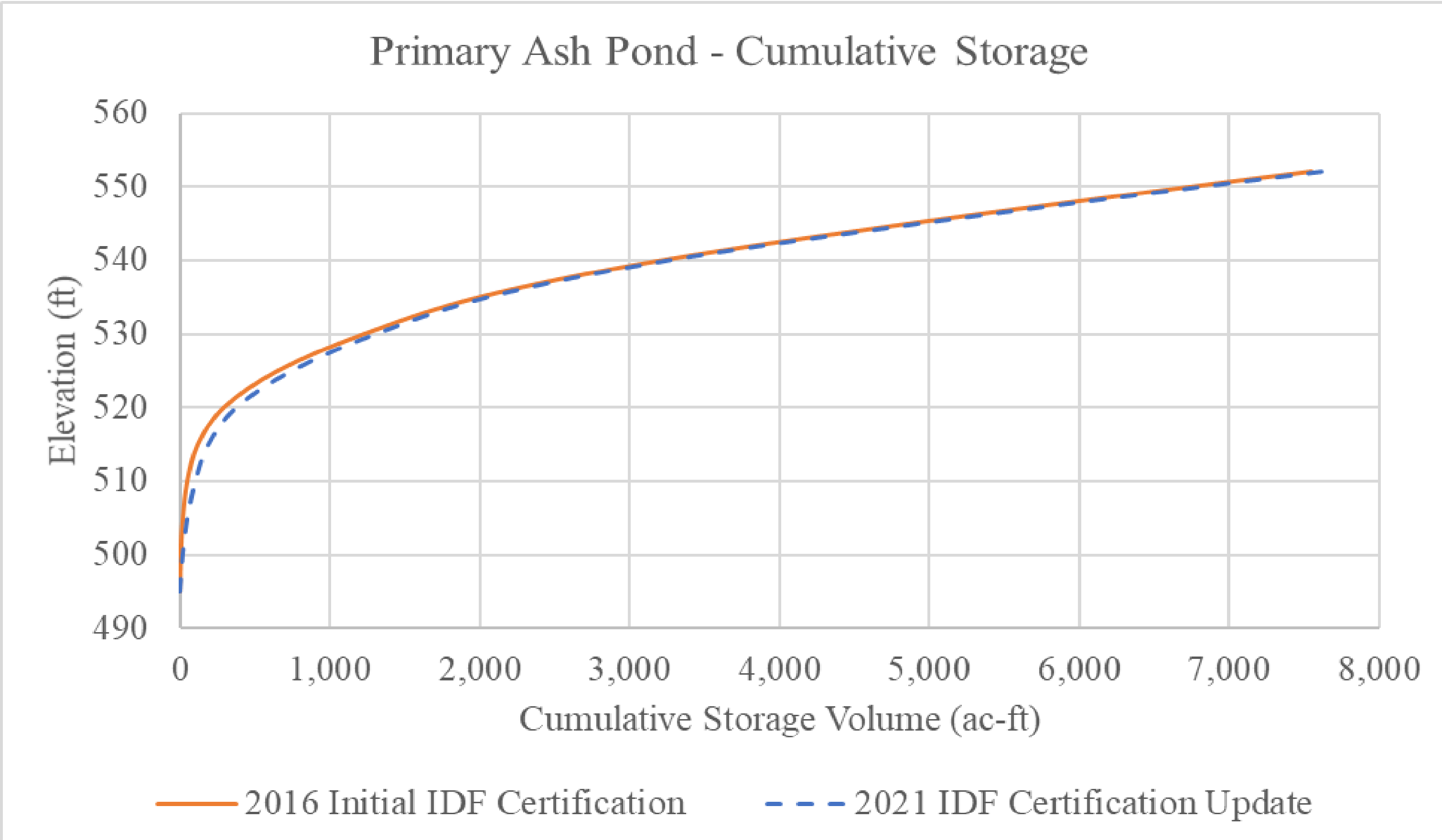
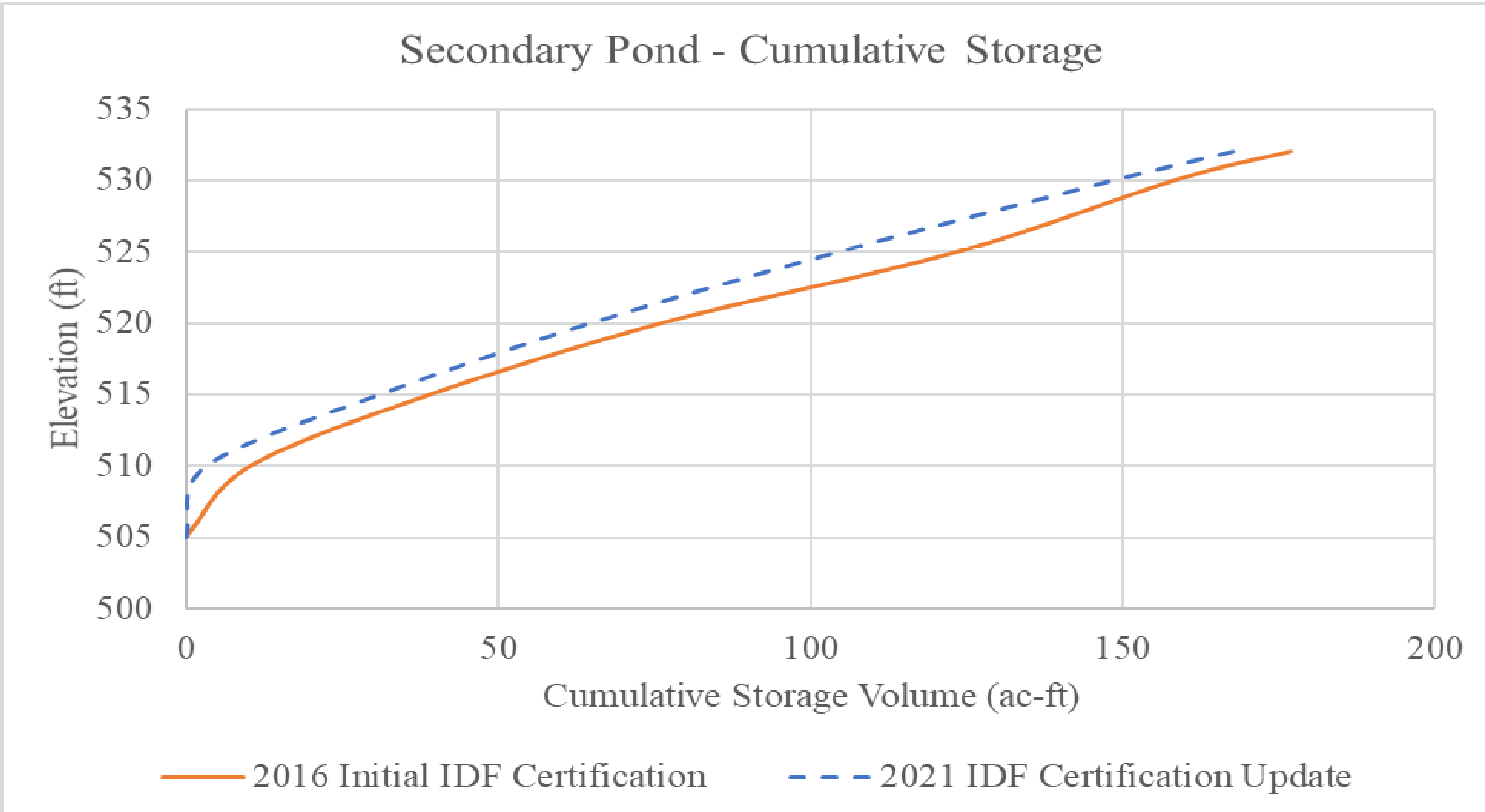
Attachment E

Periodic Inflow Design Flood Control System Plan Analyses

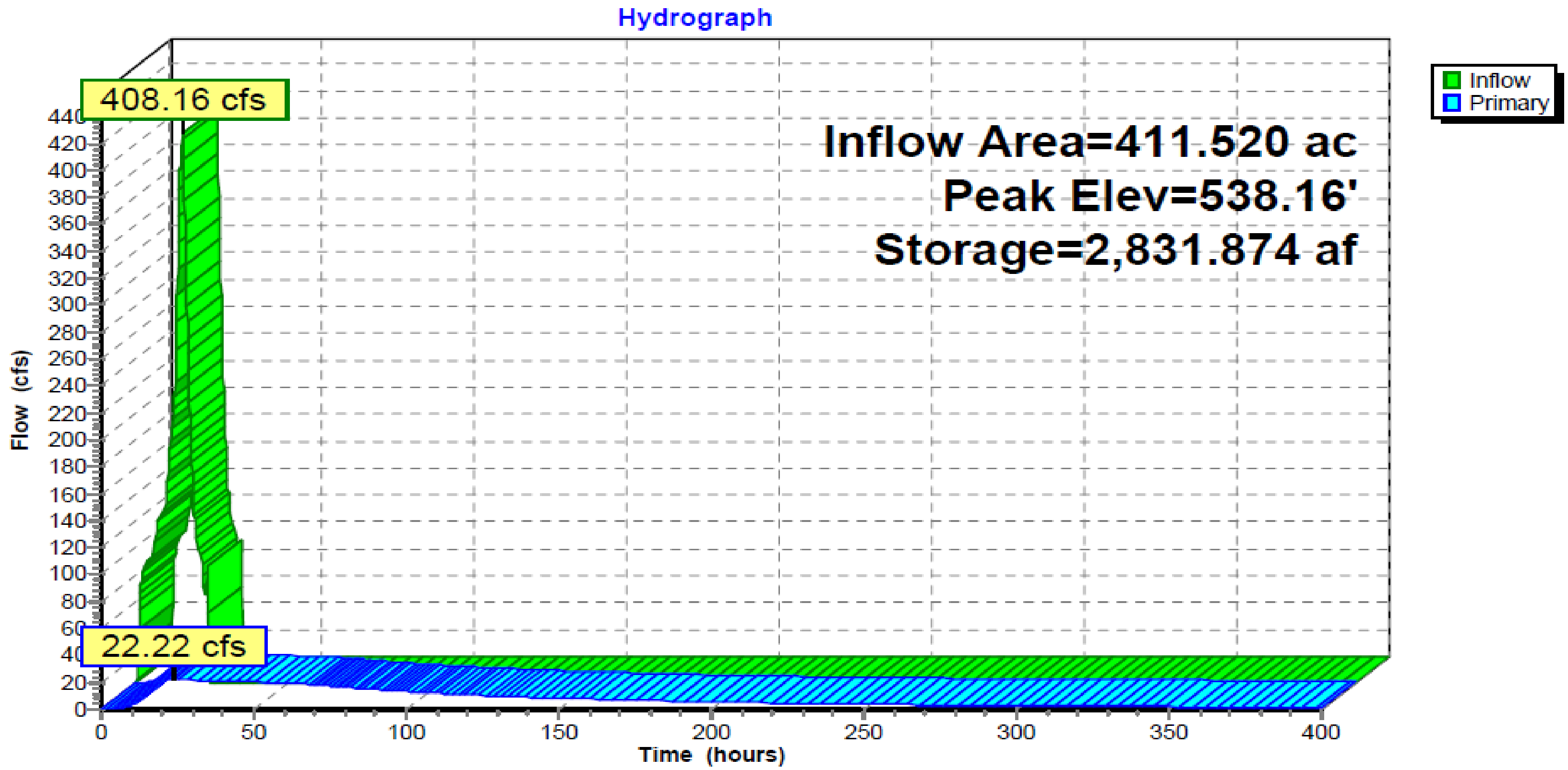


PRIMARY ASH POND CUMULATIVE STORAGE PERIODIC CERTIFICATION NEWTON POWER PLANT NEWTON, ILLINOIS	
Geosyntec consultants	Figure E-1
GLP8027 | 9/10/2021	

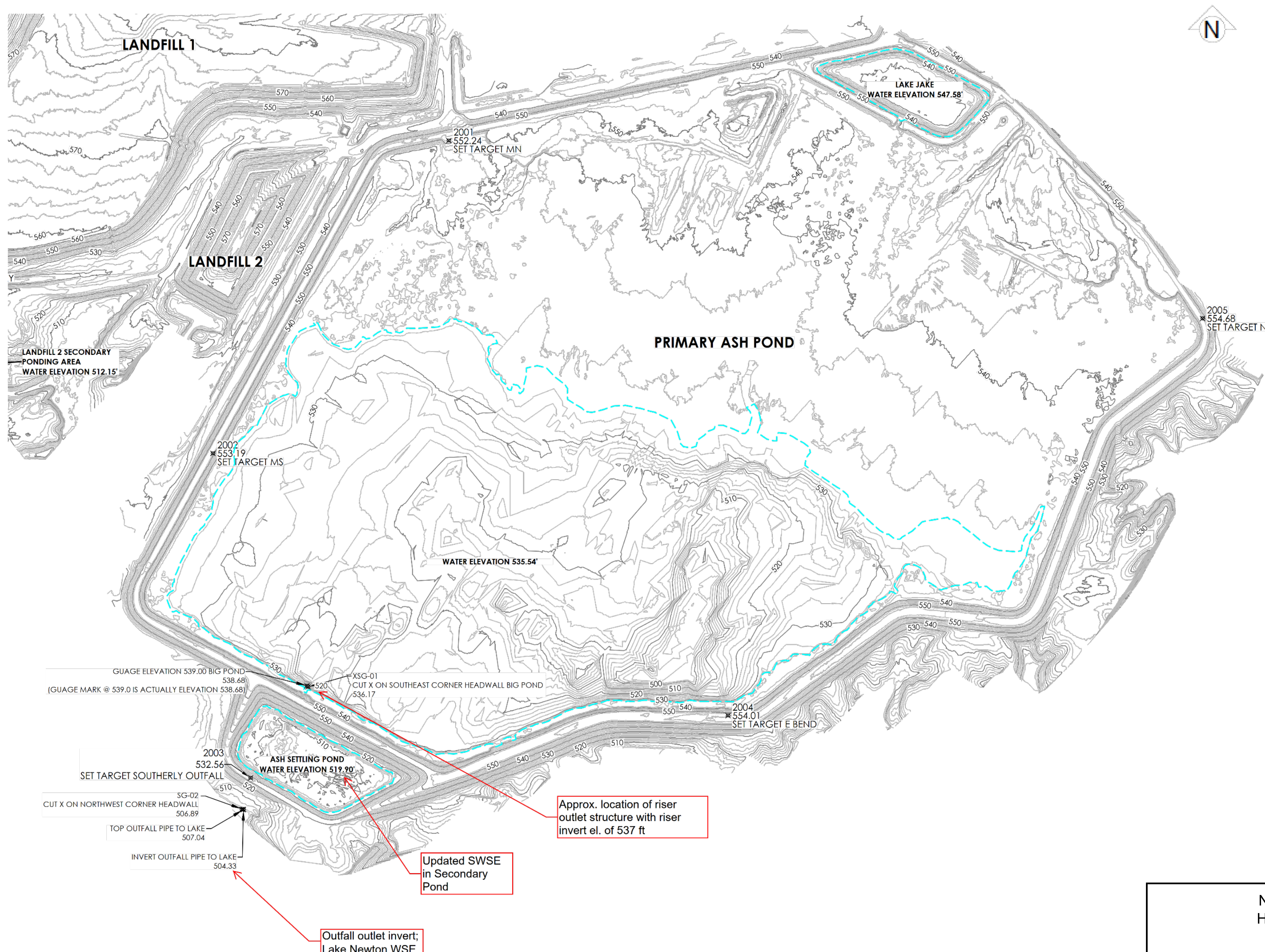


SECONDARY POND CUMULATIVE STORAGE PERIODIC CERTIFICATION NEWTON POWER PLANT NEWTON, ILLINOIS		
Geosyntec consultants		Figure E-2
GLP8027	9/10/2021	

Pond 1P: Primary Ash Pond



AP1 IDF HYDROGRAPH PERIODIC CERTIFICATION NEWTON POWER PLANT NEWTON, ILLINOIS		Figure E-3
Geosyntec consultants		
GLP8027	9/10/2021	



Newton Power Plant
Hydrologic Workmap

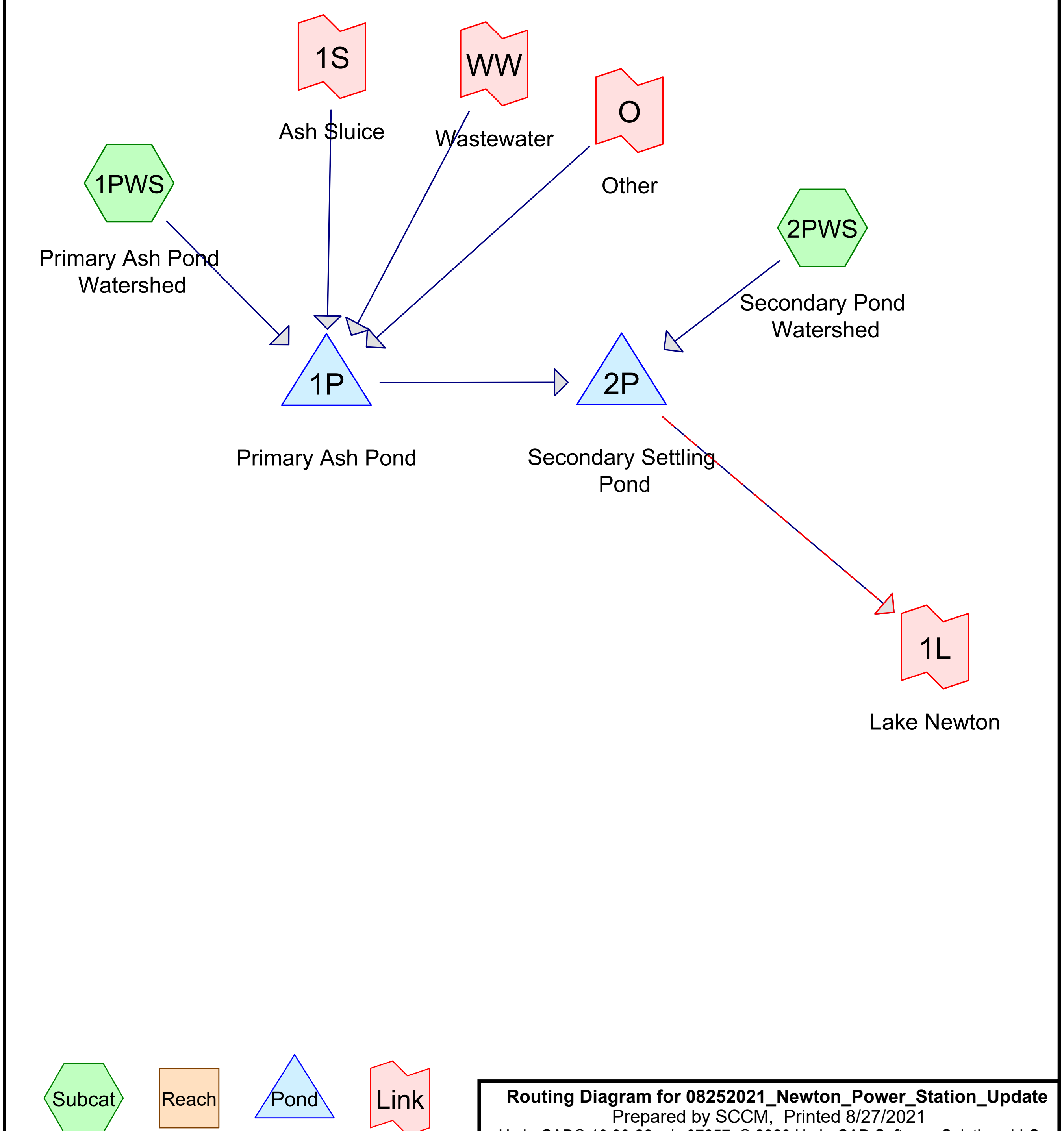
Geosyntec consultants

Figure E-4

GLP8027 | September 2021

Figure based on IngenAE 2020 Site Topo

DRAFT - NOT FOR CONSTRUCTION - NOT TO SCALE - ATTORNEY-CLIENT PRIVILEGED & CONFIDENTIAL



Routing Diagram for 08252021_Newton_Power_Station_Update
Prepared by SCCM, Printed 8/27/2021
HydroCAD® 10.00-26 s/n 07657 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
423.520	98	(1PWS, 2PWS)
423.520	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
423.520	Other	1PWS, 2PWS
423.520		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	423.520	423.520		1PWS, 2PWS
0.000	**0.000**	**0.000**	**0.000**	**423.520**	**423.520**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	512.18	508.00	220.0	0.0190	0.013	28.0	0.0	0.0
2	2P	505.00	504.33	226.0	0.0030	0.013	28.0	0.0	0.0

Time span=0.00-400.00 hrs, dt=0.15 hrs, 2668 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1PWS: Primary Ash Runoff Area=411.520 ac 100.00% Impervious Runoff Depth=8.77"
Tc=6.0 min CN=98 Runoff=408.16 cfs 300.740 af

Subcatchment 2PWS: Secondary Pond Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=8.77"
Tc=6.0 min CN=98 Runoff=11.90 cfs 8.770 af

Pond 1P: Primary Ash Pond Peak Elev=538.16' Storage=2,831.874 af Inflow=408.16 cfs 300.740 af
Outflow=22.22 cfs 260.432 af

Pond 2P: Secondary Settling Pond Peak Elev=519.90' Storage=64.320 af Inflow=28.79 cfs 269.202 af
Primary=61.56 cfs 333.516 af Secondary=0.00 cfs 0.000 af Outflow=61.56 cfs 333.516 af

Link 1L: Lake Newton Inflow=61.56 cfs 333.516 af
Primary=61.56 cfs 333.516 af

Link 1S: Ash Sluice Manual Hydrograph above 13.37 cfs below 13.37 cfs Inflow=13.37 cfs 171.338 af
Primary=0.00 cfs 0.000 af Secondary=13.37 cfs 171.338 af

Link O: Other Manual Hydrograph above 1.54 cfs below 1.54 cfs Inflow=1.54 cfs 50.935 af
Primary=0.00 cfs 0.000 af Secondary=1.54 cfs 50.935 af

Link WW: Wastewater Manual Hydrograph above 23.39 cfs below 23.39 cfs Inflow=23.39 cfs 201.231 af
Primary=0.00 cfs 0.000 af Secondary=23.39 cfs 201.231 af

Total Runoff Area = 423.520 ac Runoff Volume = 309.510 af Average Runoff Depth = 8.77"
0.00% Pervious = 0.000 ac 100.00% Impervious = 423.520 ac

Summary for Subcatchment 1PWS: Primary Ash Pond Watershed

[49] Hint: Tc<2dt may require smaller dt

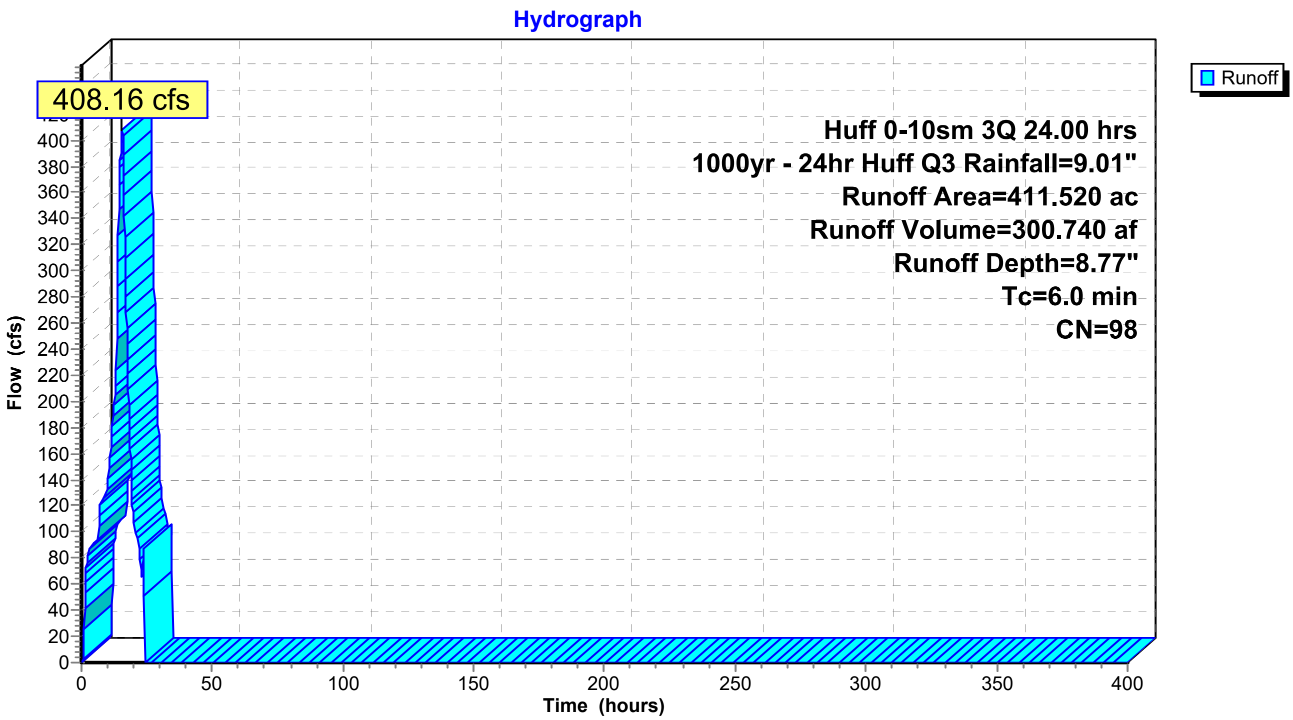
Runoff = 408.16 cfs @ 15.60 hrs, Volume= 300.740 af, Depth= 8.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Huff 0-10sm 3Q 24.00 hrs 1000yr - 24hr Huff Q3 Rainfall=9.01"

	Area (ac)	CN	Description
*	411.520	98	
	411.520		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1PWS: Primary Ash Pond Watershed



Summary for Subcatchment 2PWS: Secondary Pond Watershed

[49] Hint: Tc<2dt may require smaller dt

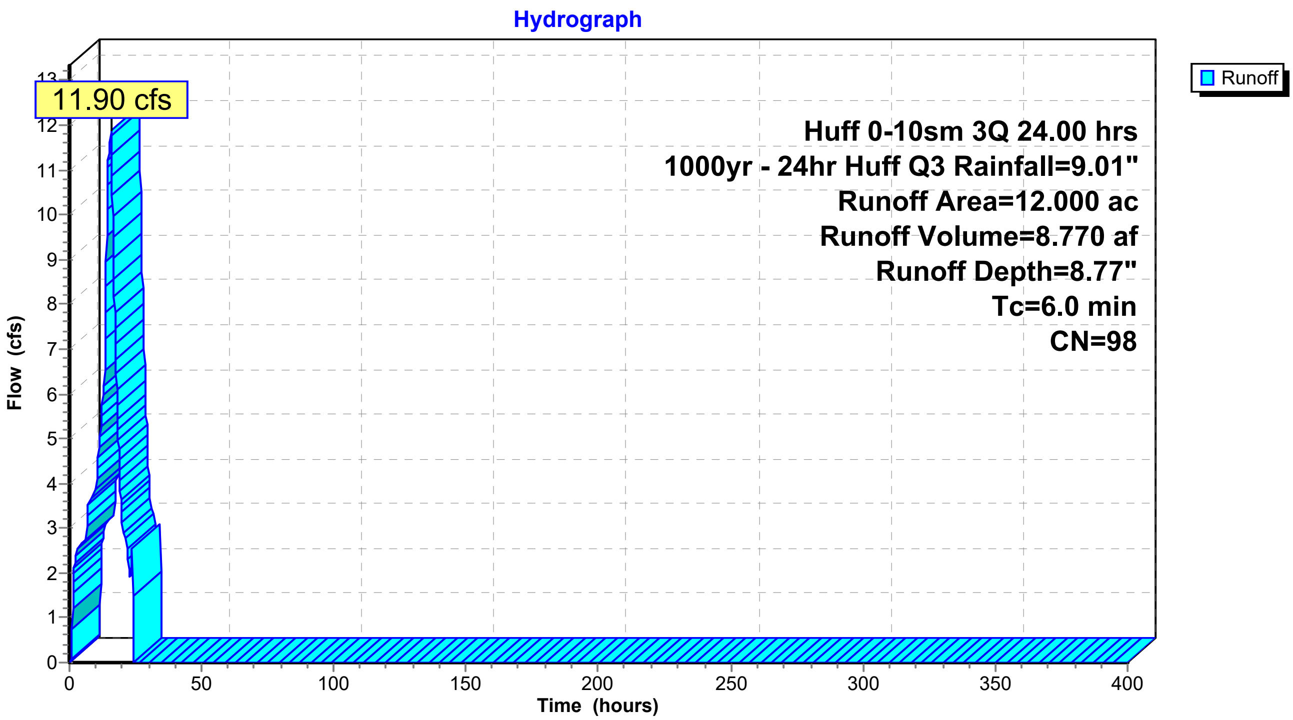
Runoff = 11.90 cfs @ 15.60 hrs, Volume= 8.770 af, Depth= 8.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Huff 0-10sm 3Q 24.00 hrs 1000yr - 24hr Huff Q3 Rainfall=9.01"

	Area (ac)	CN	Description
*	12.000	98	
	12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2PWS: Secondary Pond Watershed



Summary for Pond 1P: Primary Ash Pond

Inflow Area = 411.520 ac,100.00% Impervious, Inflow Depth = 8.77" for 1000yr - 24hr Huff Q3 event
Inflow = 408.16 cfs @ 15.60 hrs, Volume= 300.740 af
Outflow = 22.22 cfs @ 24.18 hrs, Volume= 260.432 af, Atten= 95%, Lag= 514.8 min
Primary = 22.22 cfs @ 24.18 hrs, Volume= 260.432 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Starting Elev= 537.00' Surf.Area= 0.000 ac Storage= 2,550.800 af
Peak Elev= 538.16' @ 24.18 hrs Surf.Area= 0.000 ac Storage= 2,831.874 af (281.074 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 6,560.9 min (7,370.8 - 809.8)

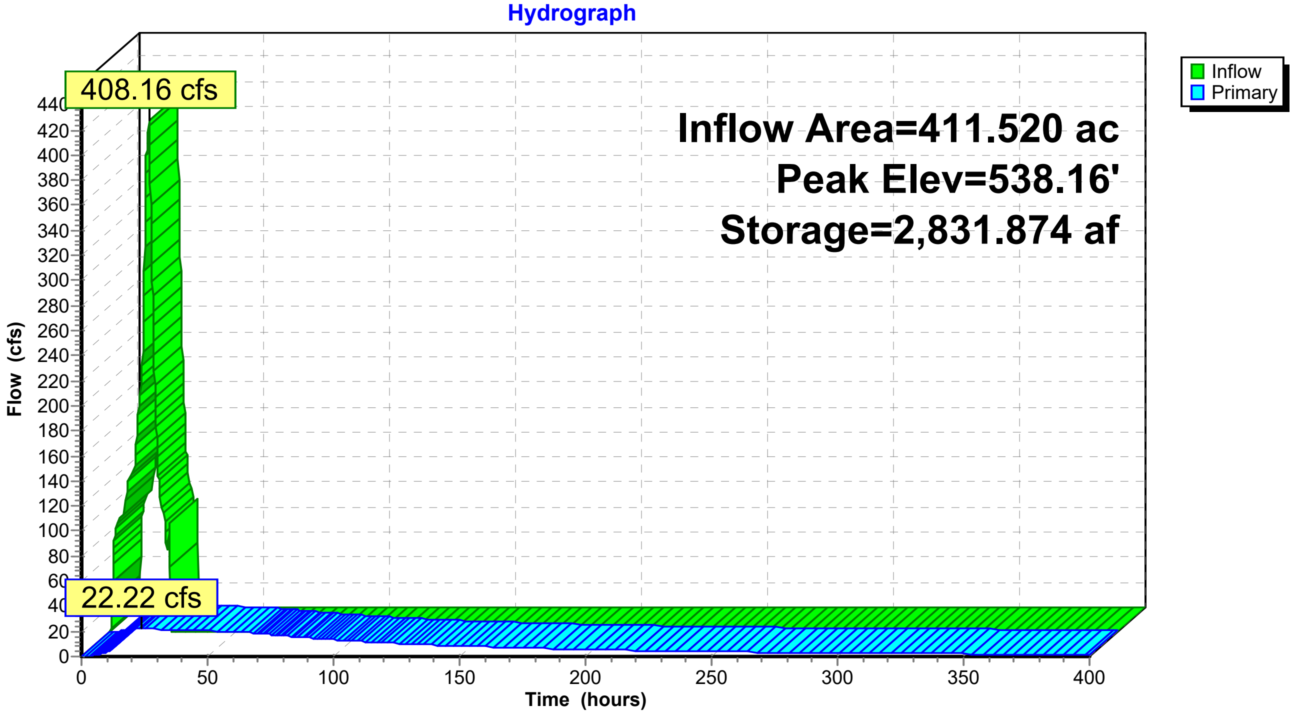
Volume	Invert	Avail.Storage	Storage Description
#1	495.00'	7,623.000 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
495.00	0.000
500.00	18.000
505.00	51.000
510.00	104.000
515.00	192.000
520.00	377.000
525.00	752.000
530.00	1,312.000
535.00	2,068.000
540.00	3,275.000
545.00	4,965.000
550.00	6,842.000
551.00	7,231.000
552.00	7,623.000

Device	Routing	Invert	Outlet Devices
#1	Primary	512.18'	**28.0" Round Culvert** L= 220.0' Ke= 0.820 Inlet / Outlet Invert= 512.18' / 508.00' S= 0.0190 '/' Cc= 0.900 n= 0.013, Flow Area= 4.28 sf
#2	Device 1	537.00'	**28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=22.22 cfs @ 24.18 hrs HW=538.16' TW=510.37' (Dynamic Tailwater)
└─**1=Culvert** (Passes 22.22 cfs of 84.54 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 22.22 cfs @ 5.20 fps)

Pond 1P: Primary Ash Pond



Summary for Pond 2P: Secondary Settling Pond

Inflow Area = 423.520 ac,100.00% Impervious, Inflow Depth > 7.63" for 1000yr - 24hr Huff Q3 event
Inflow = 28.79 cfs @ 16.35 hrs, Volume= 269.202 af
Outflow = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af, Atten= 0%, Lag= 0.0 min
Primary = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Starting Elev= 519.90' Surf.Area= 0.000 ac Storage= 64.320 af
Peak Elev= 519.90' @ 0.00 hrs Surf.Area= 0.000 ac Storage= 64.320 af

Plug-Flow detention time= 67.0 min calculated for 269.095 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	505.00'	168.000 af	**Custom Stage Data** Listed below

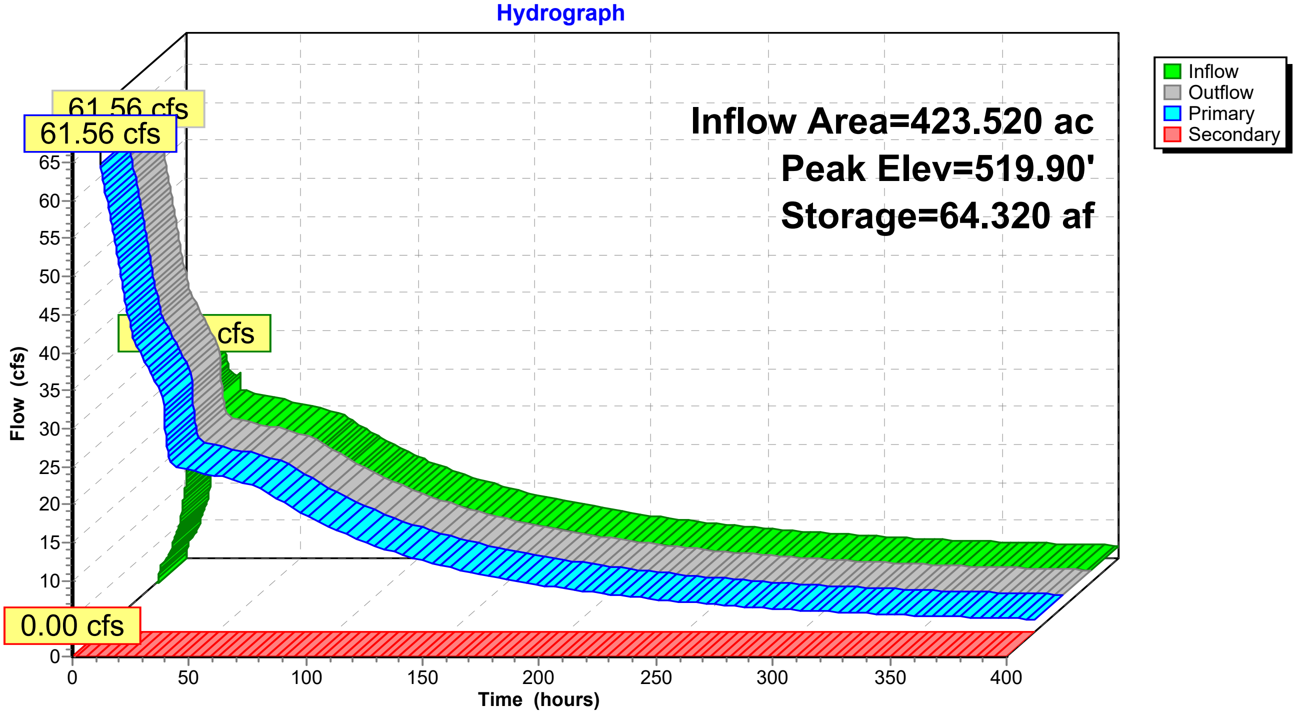
Elevation (feet)	Cum.Store (acre-feet)
505.00	0.000
510.00	3.000
515.00	31.000
520.00	65.000
525.00	105.000
530.00	149.000
531.00	158.000
532.00	168.000

Device	Routing	Invert	Outlet Devices
#1	Primary	505.00'	**28.0" Round Culvert** L= 226.0' Ke= 0.820 Inlet / Outlet Invert= 505.00' / 504.33' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 4.28 sf
#2	Secondary	528.50'	**5.0' long Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 Coef. (English) 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65

Primary OutFlow Max=61.56 cfs @ 0.00 hrs HW=519.90' TW=504.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 61.56 cfs @ 14.40 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=519.90' TW=504.33' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Secondary Settling Pond



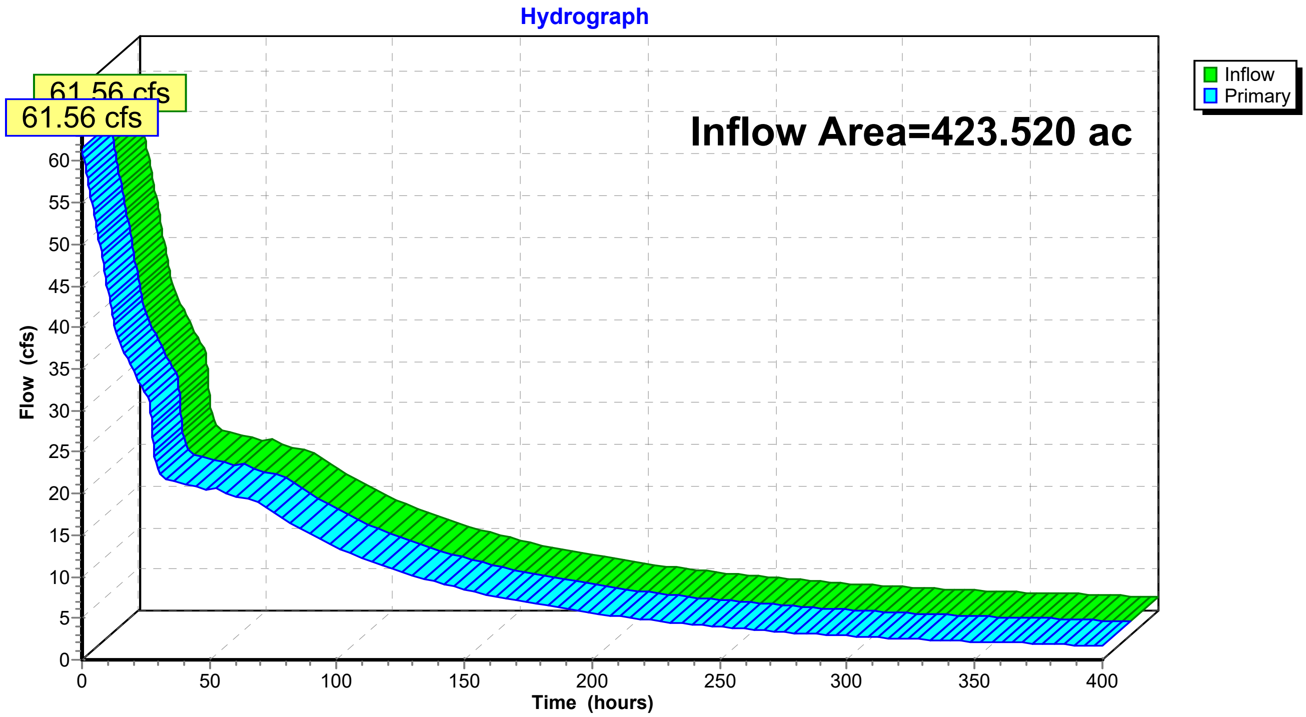
Summary for Link 1L: Lake Newton

Inflow Area = 423.520 ac,100.00% Impervious, Inflow Depth > 9.45" for 1000yr - 24hr Huff Q3 event
Inflow = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af
Primary = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

Fixed water surface Elevation= 504.33'

Link 1L: Lake Newton



Summary for Link 1S: Ash Sluice

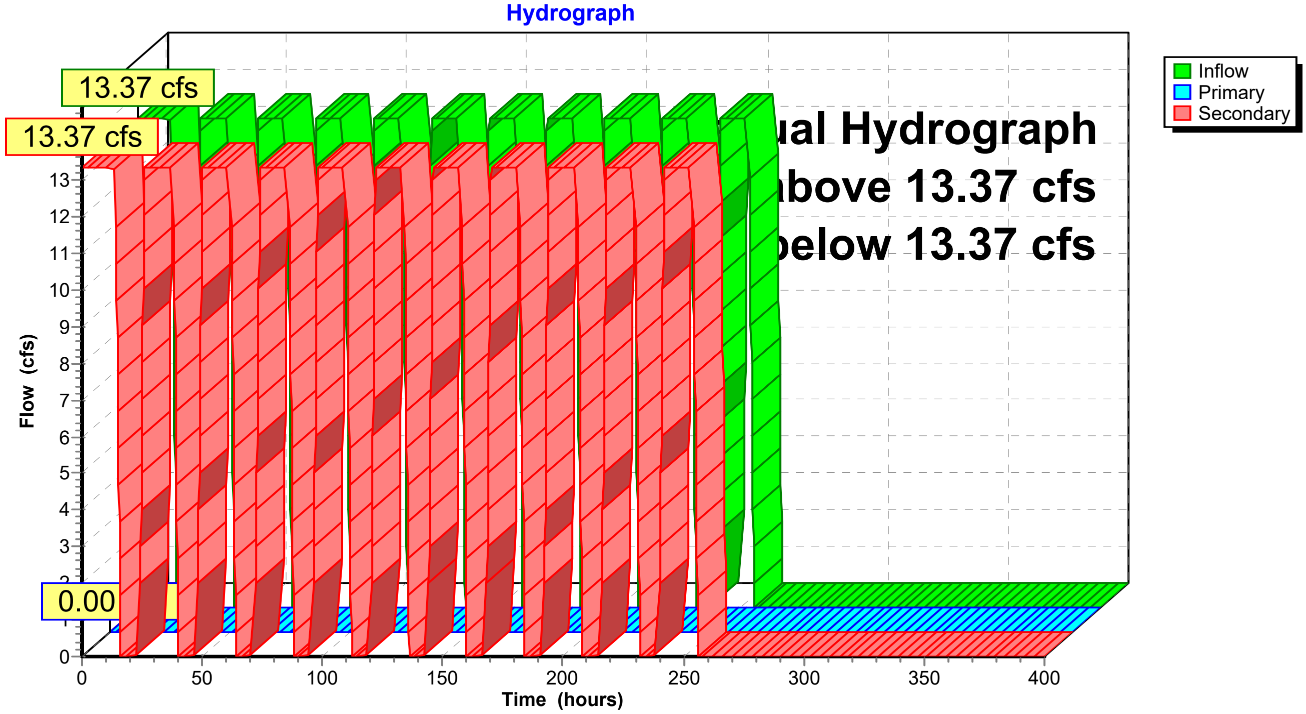
Inflow = 13.37 cfs @ 0.00 hrs, Volume= 171.338 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Secondary = 13.37 cfs @ 0.00 hrs, Volume= 171.338 af

Primary outflow = Inflow above 13.37 cfs below 13.37 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

132 Point manual hydrograph, To= 0.00 hrs, dt= 2.00 hrs, cfs =

13.37	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37
0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37
13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37
13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37
13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00
0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37
0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37
13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37
13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37
13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00
0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00								

Link 1S: Ash Sluice



Summary for Link O: Other

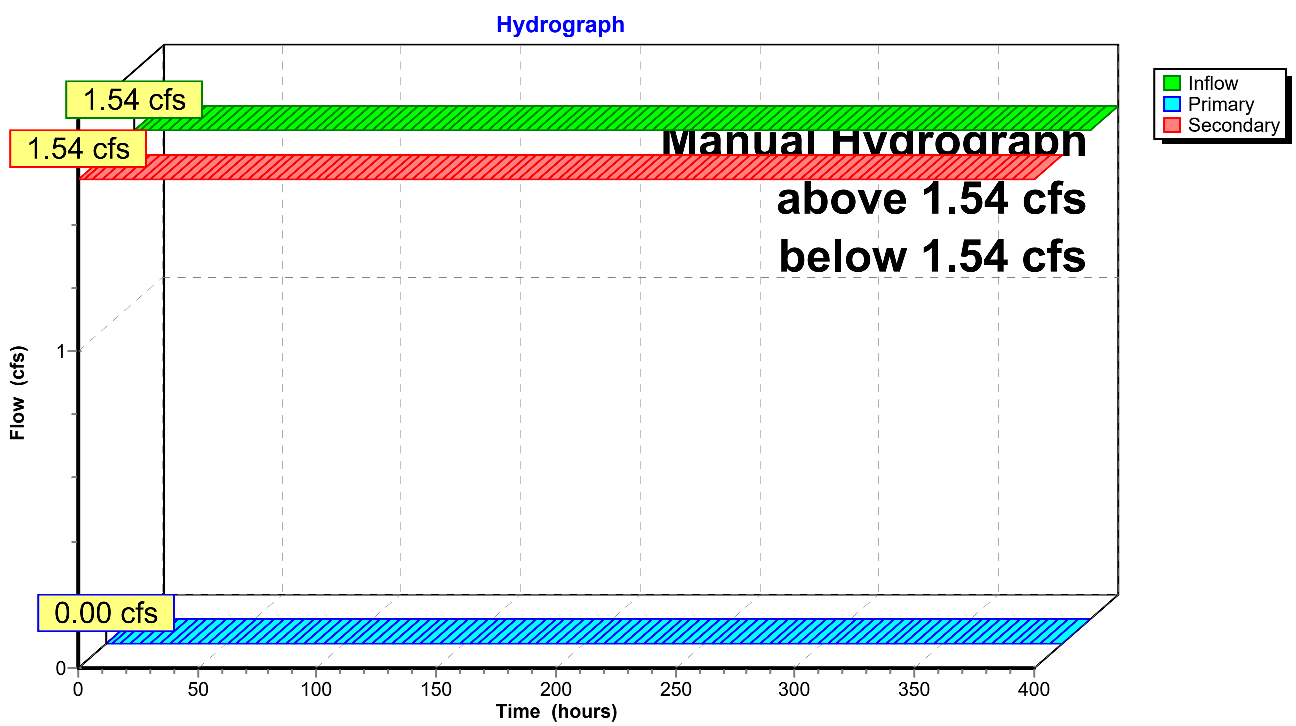
Inflow =	1.54 cfs @	0.00 hrs,	Volume=	50.935 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 100%, Lag= 0.0 min
Secondary =	1.54 cfs @	0.00 hrs,	Volume=	50.935 af	

Primary outflow = Inflow above 1.54 cfs below 1.54 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

126 Point manual hydrograph, To= 0.00 hrs, dt= 5.00 hrs, cfs =

1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54				

Link O: Other



Summary for Link WW: Wastewater

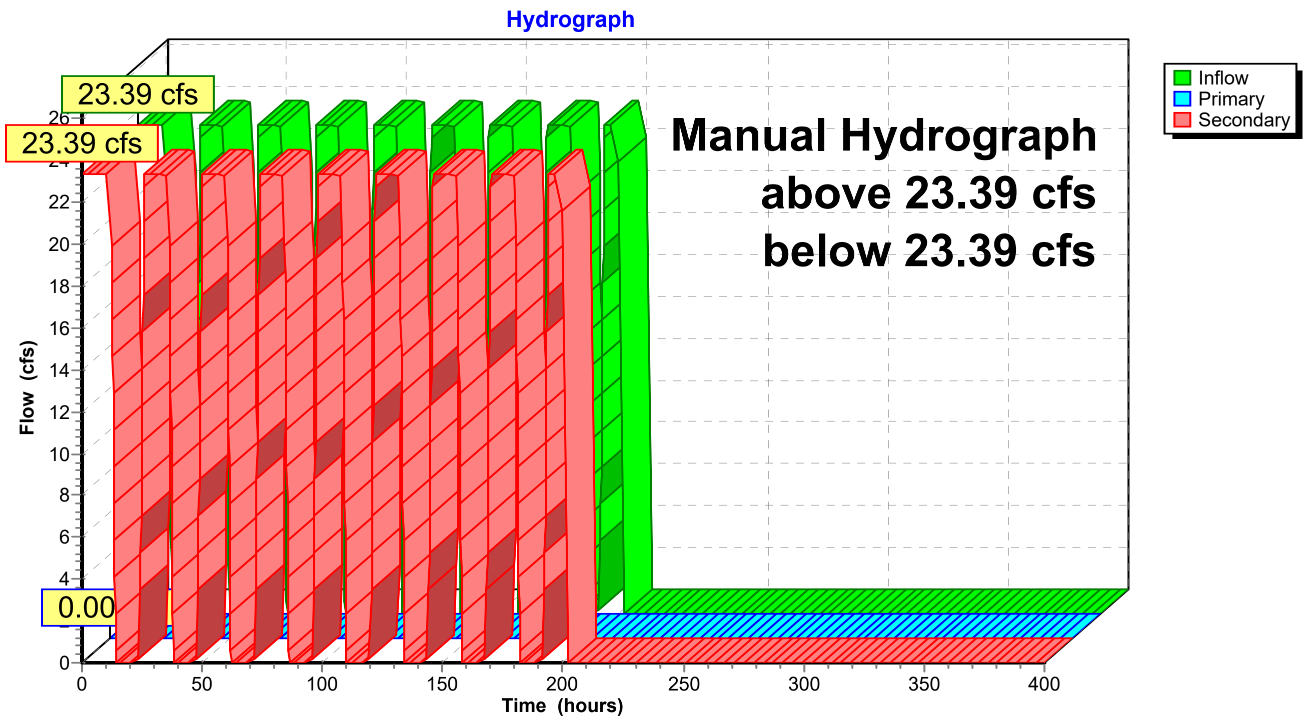
Inflow =	23.39 cfs @	0.00 hrs,	Volume=	201.231 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 100%, Lag= 0.0 min
Secondary =	23.39 cfs @	0.00 hrs,	Volume=	201.231 af	

Primary outflow = Inflow above 23.39 cfs below 23.39 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

101 Point manual hydrograph, To= 0.00 hrs, dt= 2.00 hrs, cfs =

23.39	23.39	23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00
0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00
0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39
23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39
23.39	23.39	23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39
23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00	0.00	0.00
0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00
0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00
0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39
23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39
23.39									

Link WW: Wastewater



Luminant

Office Memorandum

Date: October 1, 2021

To: Cynthia Vodopivec

cc: Charles Koudelka

From: Vic Modeer

Subject: Illinois Power Generating Company
Newton Power Station

BACKGROUND

The October 2016 certified "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan, Ash Pond at Newton Power Station" (CCR Certification Report)" prepared by AECOM describes the outlets at the Primary Ash Pond. There are two interconnected hydraulic structures that pass through the dike of the Primary Ash Pond. The Primary Ash Pond contains two concrete, stop-log weir box structures that discharge to the Secondary Pond. Weir box 1-A is located at the bottom of the embankment and is connected to the lower 30-inch diameter (dia.) cured-in-place pipe (CIPP). Weir Box 1-B is located approximately halfway up the embankment is connected to the upper 30-inch dia. CIPP. Both discharge pipes were originally 30-inch dia. corrugated metal pipe (CMP) and were lined in 2008 (see section § 257.73(c)(1)(xii) below for further information). The lower discharge pipe from weir box 1A passes through the embankment between the Primary Ash Pond and Secondary Pond. The upper discharge pipe from weir box 1B connects to the lower discharge pipe within the embankment. No other hydraulic structures pass through the dike of or underlie the base of the Primary Ash Pond.

Pipe Inspections and Structural Stability Statements. AECOM's 2016 report was certified that the pipe system met the requirements of §257.73(d)(1)(vi). The inspected pipes were free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris.

The following paragraph is from section 3.6 of the October 2016 CCR Certification Report:

"Both sliplined CMP pipes were inspected on October 30, 2015, using CCTV inspection equipment. The inspection found that the outlet structures are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris accumulation that may negatively affect the hydraulic operation of the structure. Based on these evaluations, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi).."

EVALUATION

2021 Pipe Inspection.

The August 5, 2021 inspection was performed by Vic Modeer when the upper the lower 30-inch diameter (dia.) cured-in-place pipe (CIPP) was not discharging, and the lower 30-inch dia. cured-in-place pipe (CIPP) was flowing full. The visual inspection of the upper the lower 30-inch dia. pipe did not show any deficiencies in the concrete riser drop inlet structure, outlet conduit or the pipe. The lower concrete riser drop inlet structure did not visually show any structural deficiency. The weekly monitoring of the flow into the lower 30-inch diameter pipe and into the secondary pond has been consistent with the plant operation, i.e., the inflow volume is approximately equivalent to the outflow during periods of no rain. The inflow into the pipe and outflow did not visually reveal any flow related issues.

The possibility of a structural failure was further evaluated by visually monitoring the ground surface above and around the pipe centerline for a loss of soil or sinkhole. This type of loss of ground is described in the following: (*Kumar, G., Cecchin, I., Thomé, A. and Reddy, K.R., "Failure of Coal Ash Containment Facilities: Causes, Impacts, Remediation, and Lessons Learned;" 5th International Conference on Forensic Geotechnical Engineering, ISSMGE, 2016*). There was no loss of ground or sinkhole indicating a loss of ground due to a pipe failure. In addition, the likelihood of a seepage failure though piping of water and soil from around the pipe was visually inspected. The soil type around the pipe is a medium to high plastic clay (CCR Certification Report) that are “much less likely” to be susceptible to piping in an engineered embankment less than 30 feet in height. (*Foster, M., Fell, R. and Spannagle, M., 2000. A method for assessing the relative likelihood of failure of embankment dams by piping. Canadian Geotechnical Journal, 37(5), pp.1025-106*1).

Based on these evaluations, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi). Please let me know if you have any questions.

Sincerely,

Vic Modeer, PE, D.GE
(IL, MO, IN, KY, OH, LA)
Consulting Engineer

VICTOR ALBERT MODEER JR.
062-043112
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

October 2021