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: Coffeen Power Plant GMF Gypsum Stack Pond; IEPA ID # W1350150004-03

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 Coffeen Power Plant GMF Gypsum Stack Pond (IEPA ID # W1350150004-03). 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 E Vodopivec

Cynthia Vodopivec
SVP-Environmental Health and Safety

Enclosures

Prepared for

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

INITIAL OPERATING PERMIT

COFFEEN GMF GYPSUM STACK POND

Prepared by

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

October 25, 2021

TABLE OF CONTENTS

1. Introduction 1
   - 1.1. Facility Information 1
   - 1.2. Owner Signatures 2
   - 1.3. Legal Description 2
   - 1.4. Previous Assessments 2
2. Operating Permit 4
   - 2.1. Initial Operating Permit 4
   - 2.2. History of Construction 4
   - 2.3. Chemical Constituents 4
   - 2.4. Location Standards Demonstration 4
   - 2.5. Permanent Markers 6
   - 2.6. Slope Maintenance 6
   - 2.7. Initial Emergency Action Plan 6
   - 2.8. Fugitive Dust Control Plan 6
   - 2.9. Groundwater Monitoring 7
   - 2.10. Initial Post-Closure Care Plan 7
   - 2.11. Liner Certification 8
   - 2.12. History of Groundwater Exceedances 8
   - 2.13. Financial Assurance Requirements 8
   - 2.14. Hazard Potential Classification 8
   - 2.15. Structural Stability Assessment 8
   - 2.16. Safety Factor Assessment 9
   - 2.17. Inflow Design Flood Control System Plan 9
   - 2.18. Safety and Health Plan 9
   - 2.19. Proposed Closure Priority Categorization 9
3. Permit Application 10

TABLE OF CONTENTS

ATTACHMENTS

Attachment A	Legal Description
Attachment B	History of Construction (845.220)
Attachment C	Chemical Constituent Analysis – CCR, Waste Streams
Attachment D	Fault Areas (845.320)
Attachment D	Placement Above the Uppermost Aquifer (845.300)
Attachment D	Seismic Impact Zones (845.330)
Attachment D	Unstable Areas and Floodplains (845.340)
Attachment D	Wetlands (845.310)
Attachment E	Permanent Markers (845.130)
Attachment F	Initial Emergency Action Plan (845.520)
Attachment G	Fugitive Dust Control Plan (845.500)
Attachment H	Hydrogeologic Site Characterization (845.620)
Attachment I	Groundwater Sampling and Analysis Program (845.640)
Attachment J	Slope Maintenance (845.320)
Attachment K	Post Closure Care Plan (845.780)
Attachment L	Liner Certification (845.400)
Attachment M	History of Known Groundwater Exceedances (845.600)
Attachment N	Financial Assurance Requirements (845.900)
Attachment O	Hazard Potential Classification Assessment (845.440)
Attachment P	Structural Stability Assessment (845.450)
Attachment Q	Safety Factor Assessment (845.460)
Attachment R	Inflow Design Flood Control System Plan (845.510)
Attachment S	Safety and Health Plan (845.530)
Attachment T	Proposed Closure Priority Categorization (845.700)
Attachment U	5-Year Updates

1. INTRODUCTION

Illinois Power Generating Company operates the coal-fired Coffeen Power Plant located in Montgomery County, Illinois. The IEPA assigned identification number assigned to this impoundment is: W1350150004-03 for the GMF Gypsum Stack Pond. The National Inventory of Dams (NID) number assigned for the GMF Gypsum Stack Pond by the Illinois Department of Natural Resources (IDNR) is IL50579.

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 GMF Gypsum Stack 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:	Coffeen GMF Gypsum Stack Pond Coffeen Power Plant 134 Cips Lane Coffeen, IL 62017
Owner/Operator:	Illinois Power Generating Company 1500 Eastport Plaza Drive Collinsville, Illinois 62234

1.2. <u>Owner Signatures</u>

<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 Coffeen 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.

> *<u>Section 845.210(d)(2):</u> 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.

> *<u>Section 845.210(d)(3):</u> 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.

> *<u>Section 845.210(d)(4):</u> 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

> <u>Section 845.230(d):</u> *Initial Operating Permit for Existing, Inactive and Inactive Closed CCR Surface Impoundments*

The Coffeen GMF Gypsum Stack 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

> <u>Section 845.230(d)(2)(A):</u> *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

> <u>Section 845.230(d)(2)(B):</u> *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 Coffeen GMF Gypsum Stack Pond is provided in Attachment C.

> <u>Section 845.230(d)(2)(C):</u> *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 Coffeen GMF Gypsum Stack Pond is provided in Attachment C.

2.4. Location Standards Demonstration

> <u>Section 845.230(d)(2)(D):</u> *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 Coffeen GMF Gypsum Stack Pond location standards as specified in Section 845.230(d)(2)(D) are described in the following sections.

<u>Section 845.230(d)(2)(D)(i):</u> 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.

<u>Section 845.230(d)(2)(D)(ii):</u> 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.

<u>Section 845.230(d)(2)(D)(iii):</u> 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.

<u>Section 845.230(d)(2)(D)(iv):</u> 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.

<u>Section 845.230(d)(2)(D)(v):</u> 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 GMF Gypsum Stack Pond were compared to the existing FEMA floodplain map, and it was determined that the GMF Gypsum Stack Pond is not located within the floodplain. 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 Coffeen GMF Gypsum Stack 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 Coffeen GMF Gypsum Stack 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

> Section 845.230(d)(2)(G): *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

> Section 845.230(d)(2)(H): *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

Section 845.230(d)(2)(I): Groundwater monitoring information:

The groundwater monitoring information for the Coffeen GMF Gypsum Stack Pond is described in the following sections.

Section 845.230(d)(2)(I)(i): Hydrogeologic site characterization (see Section 845.620);

Hydrogeologic site characterization for the Coffeen GMF Gypsum Stack Pond is provided in Attachment H.

Section 845.230(d)(2)(I)(ii): 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.

Section 845.230(d)(2)(I)(iii): 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 Coffeen GMF Gypsum Stack 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. Liner Certification

> <u>Section 845.230(d)(2)(L):</u> *The certification required by Section 845.400(h), or a statement that the CCR surface impoundment does not have a liner that meets the requirements of Section 845.400(b) or (c);*

A liner certification has been completed for the Coffeen GMF Gypsum Stack Pond as specified by Section 845.400(h) that states the surface impoundment does have a composite liner that meets the requirements of Section 845.400(b) is provided in Attachment L.

2.12. History of Groundwater Exceedances

> <u>Section 845.230(d)(2)(M):</u> *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.

2.13. Financial Assurance Requirements

> <u>Section 845.230(d)(2)(N):</u> *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.

2.14. Hazard Potential Classification

> <u>Section 845.230(d)(2)(O):</u> *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.

2.15. 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.

2.16. Safety Factor Assessment

> *Section 845.230(d)(2)(Q):* *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.

2.17. Inflow Design Flood Control System Plan

> *Section 845.230(d)(2)(R):* *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.

2.18. Safety and Health Plan

> *Section 845.230(d)(2)(S):* *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.

2.19. Proposed Closure Priority Categorization

> *Section 845.230(d)(2)(T):* *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 Coffeen GMF Gypsum Stack 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: W1350150004 **CCR Permit Number:** Initial Permit **Facility Name:** Coffeen 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 - Coffeen 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 134 CIPS Lane		
	County name Montgomery	County code (if known)	
	City or town Coffeen	State IL	Zip Code 62017
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.		
	W1350150004-03 (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: W1350150004 **CCR Permit Number:** Initial Permit **Facility Name:** Coffeen 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.
	GMF Gypsum Stack Pond
1.2	Identification number of the CCR surface impoundment (if one has been assigned by the Agency).
	W1350150004-03
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 B.

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.

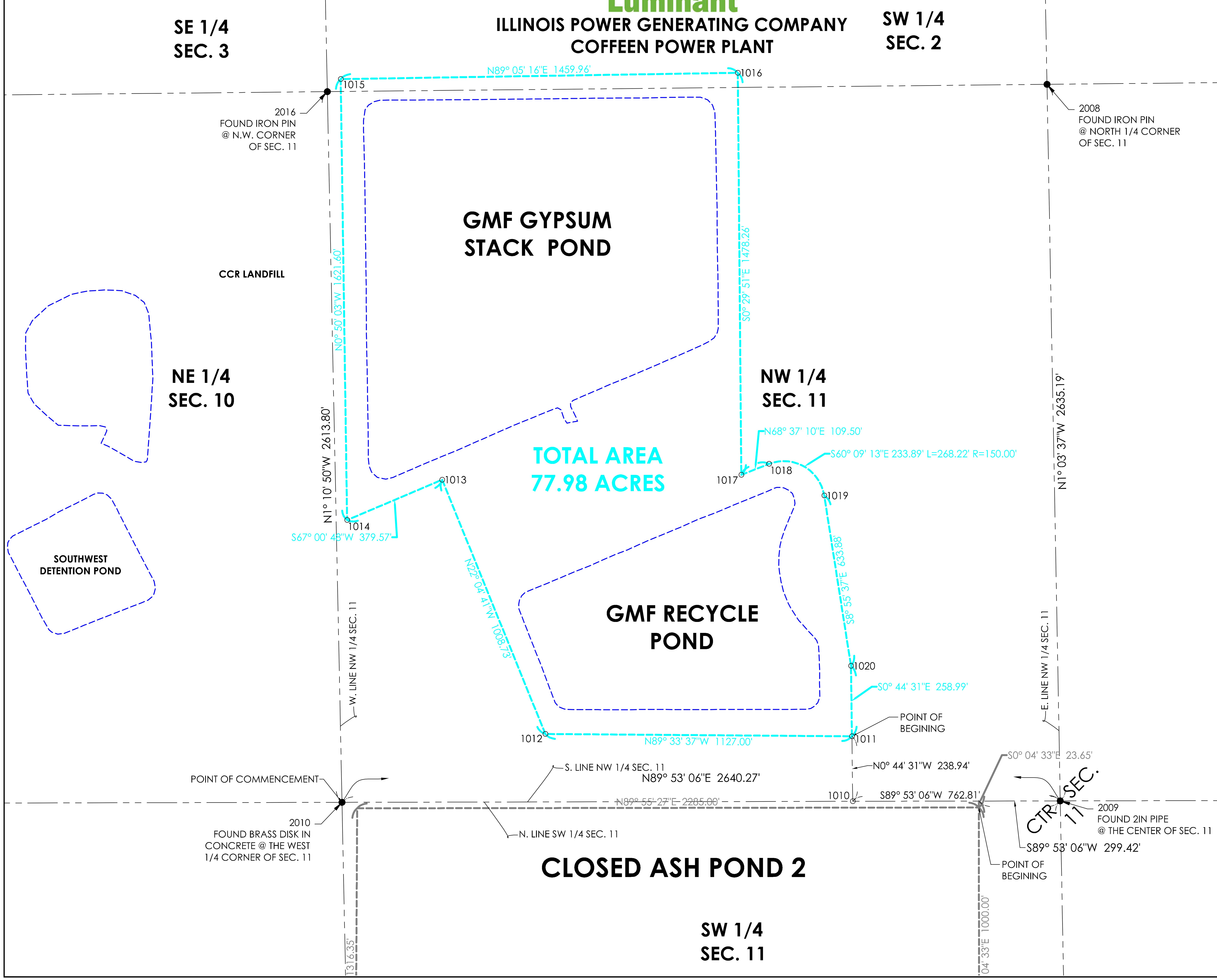
		☑	A groundwater sampling and analysis program that includes section of the statistical procedures to be used for evaluating groundwater monitoring data, required by 35 Ill. Adm. Code 845.640.
		☑	Proposed groundwater monitoring program that includes a minimum of eight independent samples for each background 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

CONTROL MONUMENTATION				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
2008	876619.65	2517127.46	623.84	FOUND IRON PIN @ NORTH 1/4 CORNER OF SEC. 11
2009	873984.91	2517176.22	614.30	FOUND 2IN PIPE @ THE CENTER OF SEC. 11
2010	873979.62	2514535.96	623.85	FOUND BRASS DISK IN CONCRETE @ THE WEST 1/4 CORNER OF SEC. 11
2016	876592.86	2514482.10	626.44	FOUND IRON PIN @ NW CORNER OF SEC. 11

Luminant

ILLINOIS POWER GENERATING COMPANY
COFFEEN POWER PLANT



N
0' 150' 300'

LEGEND
- SECTION LINE
- RESTRICTED USE BOUNDARY
- FACILITY BOUNDARY
- FOUND SURVEY MARKER AS NOTED

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 JULY 20, 2021. SURVEY COORDINATES, BEARINGS & DISTANCES ARE REFERENCED TO ILLINOIS WEST 1202 STATE PLANE COORDINATE SYSTEM NAD 1983.

CCR FACILITY BOUNDARY CORNERS		
Point #	Northing	Easting
1010	873983.38	2516413.41
1011	874222.30	2516410.32
1012	874230.94	2515283.35
1013	875165.70	2514904.19
1014	875017.48	2514554.77
1015	876638.91	2514531.16
1016	876662.16	2515990.93
1017	875183.95	2516003.77
1018	875223.87	2516105.73
1019	875107.47	2516308.60
1020	874481.26	2516406.96

Land Description of the Coffeen Power Plant GMF Gypsum Stack Pond and GMF Recycle Pond Facility Boundary
77.98 Acres

Part of the Northwest Quarter of Section 11 and part of the Southwest Quarter of Section 2 all in Township 7 North, Range 3 West of the Third Principal Meridian, Montgomery County, Illinois being more particularly described as follows:

Commencing at the Brass Plug in concrete found at the West Quarter Corner of Section 11, from which bears an Iron Pin at the Northwest corner of Section 11 North 1 degree 10 minutes 50 seconds West a distance of 2613.80 feet; thence from said commencement point at the West Quarter Corner of Section 11, North 89 degrees 53 minutes 06 seconds East, along the South line of the Northwest Quarter of Section 11, a distance of 2640.27 feet to the 2 inch Iron Pipe at the Center of Section 11, from which bears an Iron Pin at the North Quarter Corner of Section 11 North 1 degree 03 minutes 37 seconds West a distance of 2635.19 feet; thence from said 2 inch Iron Pipe at the Center of Section 11 South 89 degrees 53 minutes 06 seconds West back along the South line of the Northwest Quarter of Section 11 a distance of 762.81 feet; thence North 0 degrees 44 minutes 31 seconds West a distance of 238.94 feet to the Point of Beginning of the Tract described herein; thence North 89 degrees 33 minutes 37 seconds West a distance of 1127.00 feet; thence North 22 degrees 04 minutes 41 seconds West a distance of 1008.73 feet; thence South 67 degrees 00 minutes 48 seconds West a distance of 379.57 feet; thence North 0 degrees 50 minutes 03 seconds West a distance of 1621.60 feet; thence North 89 degrees 05 minutes 16 seconds East a distance of 1459.96 feet; thence South 0 degrees 29 minutes 51 seconds East a distance of 1478.26 feet; thence North 68 degrees 37 minutes 10 seconds East a distance of 109.50 feet; thence along a curve to the right having a radius of 150.00 feet a curve length of 268.22 feet a chord bearing South 60 degrees 09 minutes 13 seconds East a chord distance of 233.89 feet; thence South 8 degrees 55 minutes 37 seconds East a distance of 633.88 feet; thence South 0 degrees 44 minutes 31 seconds East a distance of 258.99 feet to the Point of Beginning and containing 77.98 Acres.

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

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

Submissions / Revisions:	Date:
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Luminant

Project Name & Location:
COFFEEN
POWER PLANT
134 CIPS Lane
Coffeen, IL 62017

Drawing Name:
CCR FACILITY BOUNDARY EXHIBIT

Date: 9/21/2021	Project No.
Type: SITE	Drawing No. 1
Drawn By: CB	
Approved By: BH	
Scale: AS NOTED	

CONTROL MONUMENTATION				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
2008	876619.65	2517127.46	623.84	FOUND IRON PIN @ NORTH 1/4 CORNER OF SEC. 11
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ILLINOIS POWER GENERATING COMPANY COFFEEN POWER PLANT

N

0' 150' 300'

LEGEND
SECTION LINE
RESTRICTED USE BOUNDARY
FACILITY BOUNDARY
• FOUND SURVEY MARKER AS NOTED

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 JULY 20, 2021. SURVEY COORDINATES, BEARINGS & DISTANCES ARE REFERENCED TO ILLINOIS WEST 1202 STATE PLANE COORDINATE SYSTEM NAD 1983.

CCR FACILITY BOUNDARY CORNERS		
Point #	Northing	Easting
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1014	875017.48	2514554.77
1015	876638.91	2514531.16
1016	876662.16	2515990.93
1017	875183.95	2516003.77
1018	875223.87	2516105.73
1019	875107.47	2516308.60
1020	874481.26	2516406.96

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

Submissions / Revisions:	Date:
1	
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Luminant

Project Name & Location:

COFFEEN
POWER PLANT

134 CIPS Lane
Coffeen, IL 62017

DO NOT SCALE PLANS
Copying, Printing, Software and other processes required to produce these prints can stretch or shrink the actual paper or layout. Therefore, scaling of this drawing may be inaccurate. Contact IngenAE with any need for additional dimensions or clarifications.

Drawing Name:
CCR FACILITY BOUNDARY EXHIBIT

Date: 9/21/2021	Project No.
Type: SITE	Drawing No. 2
Drawn By: CB	
Approved By: BH	
Scale: AS NOTED	

ATTACHMENT B

AECOM

October 2016

Illinois Power Generating Company
134 CIPS Lane
Coffeen, IL 62017

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

On behalf of Illinois Power Generating Company, AECOM has prepared the following history of construction for Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond at the Coffeen 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, construction specifications, etc. for Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond at the Coffeen 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 Plaza Drive Collinsville, IL 62234
CCR Units:	Ash Pond No. 1 Ash Pond No. 2 GMF Pond, IDNR Dam ID No. IL50579 GMF Recycle Pond, IDNR Dam ID No. IL50578

Ash Pond No. 1 and Ash Pond No. 2 do 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 locations of Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond have 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 following captures the purposes of the CCR units:

- Ash Pond No. 1 is being used to store and dispose of bottom ash and other-non-CCR waste and to clarify recycled process water for plant operations. Ash Pond No. 2 (inactive) was used to store and dispose of bottom ash and fly ash.
- The GMF Pond is being used to store and dispose of gypsum and to clarify recycled process water for plant operations.
- The GMF Recycle Pond was used to store and dispose of gypsum from the plant's scrubber operations prior to the in-service date of the GMF Pond in 2010. The GMF Recycle Pond currently only receives and stores clear process water from the GMF Pond.

Notice of intent to close Ash Pond No. 2 was provided in November, 2015.[1]

[1] This history of construction report was prepared on a facility-wide basis for CCR surface impoundments at the Coffeen Power Station. The inclusion of Ash Pond No. 2 in this history of construction report does not concede and should not be construed to concede that Ash Pond No. 2 is subject to the Design Criteria or all Operating Criteria in the CCR Rule.

AECOM

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

Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond are located in the Coffeen Lake Watershed with a 12-digit Hydrologic Unit Code (HUC) of 071402030304 and a drainage area of 11,695 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 and abutment materials of Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond consist of native fine-grained soils of wind-blown origin (loess), with some coarse-grained layers, underlain by glacial till. The physical properties of the fine-grained soils are described as low- to medium-plasticity silty clay, sandy lean clay, or lean clay with sand, often with trace amounts of gravel; or high plasticity fat clay, often with trace amounts of sand. The clay soils vary from soft to very stiff, moist to wet, and brown to gray. The physical properties of the coarse-grained soils are described as clayey sand, silty sand, or fine to coarse sand, with trace amounts of gravel. The sand is wet and varies from loose to dense and brown to gray. A thin layer of native silty or sandy lean clay is located immediately above the glacial till deposits. The clay is very soft to medium stiff, low to medium plasticity, wet, and orange brown to gray. The physical properties of the glacial till are described as lean clay, or silty to sandy lean clay, with trace amounts of fine gravel, hard, low plasticity, moist to wet, and brown to gray. An available summary of the engineering property typical ranges of the foundation and abutment materials is presented in **Table 1** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Ash Pond No. 1 and Ash Pond No. 2 are enclosed impoundments with embankments and do not have abutments. The GMF Pond and GMF Recycle Pond were constructed as incised impoundments enclosed by embankments.

Table 1. Summary of Foundation and Abutment Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	Post-Earthquake Shear Strength
		Cohesion, c′ (psf)	Friction Angle, ϕ’ (deg)	S_u/p'	S_{ur}/p'
Foundation Clay (Under Embankment)	125	0	32	S_u/p' = 0.39-0.45, Min. S_u = 700 psf	Peak Undrained
Foundation Clay (Free Field)	125	0	30	S_u/p' = 0.24-0.28, Min. S_u = 450 psf	Peak Undrained
Soft Foundation Clay	125	0	30	S_u/p' = 0.22-0.28, Min. S_u = 275 psf	S_u/p' = 0.13-0.16, Min. S_{ur} = 200 psf
Glacial Till	135	0	40	S_u/p' = 0.45-0.64, Min. S_u = 700 psf	Peak Undrained

§ 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 construction materials for Ash Pond No. 1, Ash Pond No. 2, GMF Pond, and GMF Recycle Pond are described as silty clay, sandy lean clay, or lean clay with sand, with trace amounts of fine gravel. The fill is soft to very stiff in consistency, low to medium plasticity, moist to wet, and brown to gray. Trace amounts of organic material and ash are present. The embankment fill generally appears to be well-compacted. An available summary of the engineering properties of the embankment construction materials 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 for Embankments

Material	**Unit Weight (pcf)**	**Peak Drained Shear Strength**		**Peak Undrained Shear Strength**	**Post-Earthquake Shear Strength**
		Cohesion, c′ (psf)	Friction Angle, f ’ (deg)	S_u/p'	S_{ur}/p'
Embankment Fill	135	0	31	S_u/p' = 0.60, Min. S_u = 450 psf	Peak Undrained

The GMF Pond and GMF Recycle Pond contain liner systems. The liner system within the GMF Pond consists of a 60-mil textured high density polyethylene (HDPE) geomembrane underlain by a 3-foot thick layer of compacted clay. A typical cross section profile of the GMF Pond liner system is shown on drawing C-10206 (sh. 9) presented in **Appendix B**. An available summary of the engineering properties of the GMF Pond liner construction materials from Hanson (2008) is presented in **Table 3** below. The liner system within the GMF Recycle Pond consists of a 60-mil textured HDPE geomembrane underlain by smooth-drum rolled native soil. A typical cross section profile of the GMF Recycle Pond liner system is shown on drawing C-10206 (sh. 20) presented in **Appendix B**.

Table 3. Summary of Construction Material Engineering Properties for Liner

Material	**Unit Weight (pcf)**	**Effective (drained) Shear Strength Parameters**		**Total (undrained) Shear Strength Parameters**	
		c’ (psf)	**Φ’ (°)**	**c (psf)**	**Φ (°)**
Clay Liner	121.2	0	28.3	1950	0

The method of site preparation and construction of Ash Pond No. 1 and Ash Pond No. 2 is not reasonably and readily available. Site preparation and construction of the GMF Pond and GMF Recycle Pond were completed in accordance with the applicable construction specification (see § 257.73(c)(1)(xi) below).

The approximate dates of construction of each successive stage of construction of Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond are provided in **Table 4** below.

Table 4. Approximate dates of construction of each successive stage of construction.

Date	Event
1964	Construction of Ash Pond No. 1
1971	Construction of Ash Pond No. 2
1978-1979	Installation of internal embankment and new recycle intake structure in Ash Pond No. 1 and abandonment of existing outfall structure
1984-1985	Closure of Ash Pond No. 2 by installing a clay cover
2000	Installation of a sheet pile wall to facilitate construction of drainage flume along the northeast corner of the Ash Pond No. 1
2009	Installation of well dewatering system in Ash Pond No. 2
2008-2010	Construction of the GMF Pond and the GMF Recycle Pond

§ 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 Ash Pond No. 1, Ash Pond No. 2, the GMF Pond, and the GMF Recycle Pond are listed in **Table 5** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available record documentation.

Table 5. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).

	Ash Pond No. 1	Ash Pond No. 2	GMF Pond	GMF Recycle Pond
Dimensional plan view (all zones)	B-35, S-44, S-45	B-560, A1000 (sh. 1)	C-10206 (sh. 4, 9, 10)	C-10206 (sh. 4, 19)
Dimensional cross sections	B-35, S-47 to S-50	B-561	C-10206 (sh. 9)	C-10206 (sh. 20)
Foundation Improvements	Not Applicable	Not Applicable	C-10206 (sh. 10)	C-10206 (sh. 20)
Drainage Provisions	Not Applicable	A1000 (sh. 4)	C-10206 (sh. 15, 16, 20)	C-10206 (sh. 21)
Spillways and Outlets	S-8, S-49	W1008 (sh. 2)	C-10206 (sh. 20)	C-10206 (sh. 22)
Diversion Ditches	Not Applicable	A1000 (sh. 1)	Not Applicable	Not Applicable
Instrument Locations	Plate 2, Figure 2A	Figure 2B	Not Applicable	C-10206 (sh. 19)
Slope Protection	S-49	B-561	C-10206 (sh. 9)	C-10206 (sh. 20)
Normal Operating Pool Elevation	S-8, S-49	Not Applicable	C-10201-25	Not Available
Maximum Pool Elevation	S-8	Not Applicable	C-10201-25	Not Available
Approximate Maximum Depth of CCR in 2016	15 feet	28 feet	16 feet	12 feet

All drawings referenced in **Table 5** 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 these CCR units 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 Ash Pond No. 1 and Ash Pond No. 2 include vibrating-wire and open-standpipe piezometers. The purpose of the piezometers is to measure the phreatic surface within and around the impoundments. Two (2) open-standpipe piezometers (AP-P1 and AP-P2) were installed at Ash Pond No. 2 in 2009 and the locations are presented on Figure 2A in **Appendix C**. Two (2) open-standpipe piezometers (B-2 and B-4) were installed at Ash Pond No. 1 in 2010 and the locations are presented on Plate 2 in **Appendix C**. Twelve (12) open-standpipe and vibrating-wire piezometers were installed at Ash Pond No. 1 and Ash Pond No. 2 in 2015 and the locations are presented on Figure 2A in **Appendix C**.

The GMF Pond does not contain existing instrumentation. Existing instrumentation at the GMF Recycle Pond consists of one (1) ultrasonic level transmitter. The purpose of the ultrasonic level transmitter is to measure the water level within the GMF Recycle Pond. The location of the ultrasonic level transmitter is shown on drawing C-10206 (sh. 19) presented in **Appendix B**.

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

Area-capacity curves for Ash Pond No. 2 and the GMF Recycle Pond are not reasonably and readily available. The area-capacity curves for Ash Pond No. 1 and the GMF Pond are presented in **Figures 1** and **2**, respectively, below. "Area-capacity curves", as defined by 40 CFR § 257.53, "means graphic curves which readily show the reservoir water surface area, in acres, at different elevations from the bottom of the reservoir to the maximum water surface, and the capacity or volume, in acre-feet, of the water contained in the reservoir at various elevations."

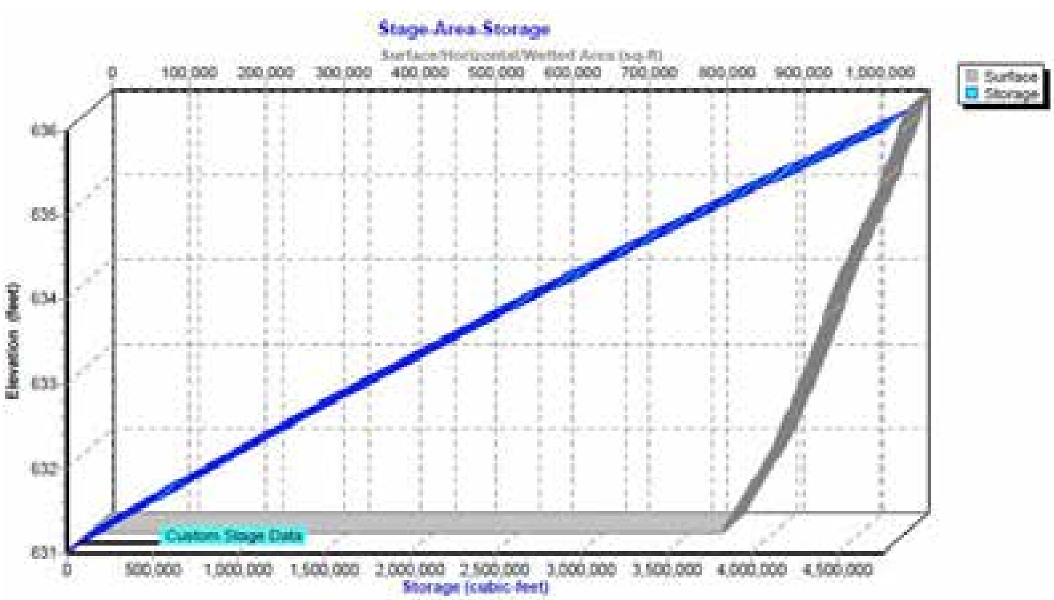


Figure 1. Area-capacity curve for Ash Pond No. 1

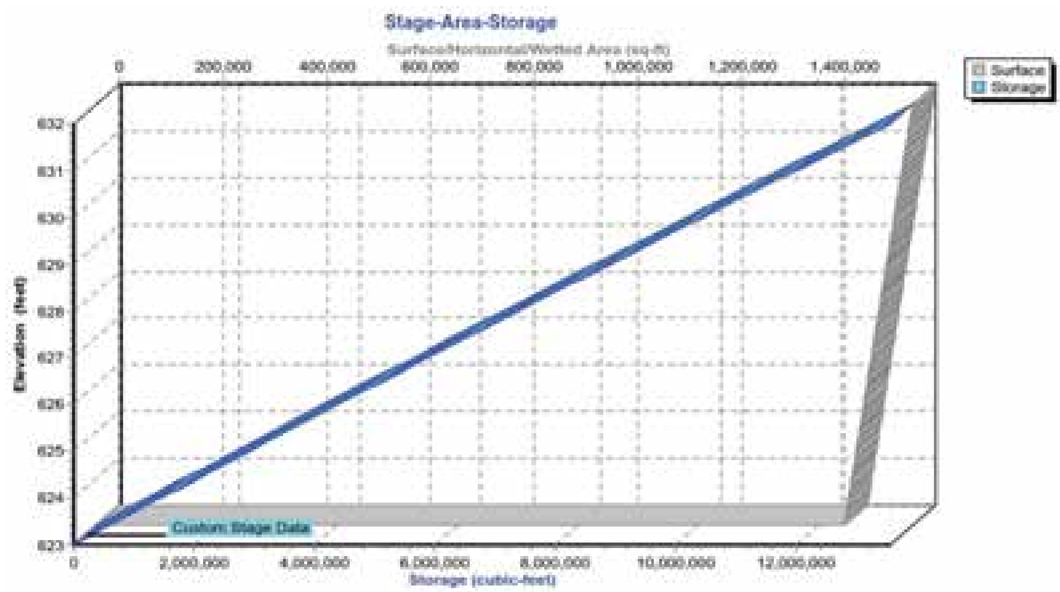


Figure 2. Area-capacity curve for GMF Pond

The area-capacity curves shown were taken from the pond modeling analysis. Actual pond capacity is limited to the approximate berm elevation listed in **Table 6** below. Any information above berm elevation should be disregarded.

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

Ash Pond No. 1 contains a concrete intake structure that drains into a 48-inch diameter (dia.) steel pipe. The steel pipe leads to the recycle pump house. In 2016, the discharge capacity of Ash Pond No. 1 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 6**.

Ash Pond No. 2 was closed in 1984-1985 by installing a clay cover. Non-contact stormwater is collected in ditches along the clay cover and drain off the pond cover via concrete-lined ditch outlets. CCR-contact stormwater collected within the pond is pumped into the GMF Pond via the well dewatering system at the discretion of plant personnel. The capacity of the diversion ditches and well pumps during a model rainfall event has not been evaluated.

The GMF Pond contains a 14-inch high-density polyethylene (HDPE) pipe culvert for normal flow and a weir-like spillway for high water flow. The GMF Pond also contains a 10-inch dia. HDPE siphon pipe used for dewatering. In 2016, the discharge capacity of the GMF 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 6**.

The GMF Recycle Pond contains a decant structure that drains into two (2) 18-inch dia. HDPE pipes that lead to a pump house. The capacity of the decant structure during a model rainfall event has not been evaluated.

Table 6. Results of HydroCAD 10 analyses

	Ash Pond No. 1	GMF Pond
Approximate Minimum Berm Elevation[1] (ft)	635.0	631.0
Approximate Emergency Spillway Elevation[1] (ft)	Not Applicable	624.0
Starting Pool Elevation[1] (ft)	631.0	621.2
Peak Elevation[1] (ft)	632.0	623.8
Time to Peak (hr)	24.4	24.1
Surface Area (ac)	20.4	33.4
Storage[2] (ac-ft)	19.5	88.3

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

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

The construction specifications for Ash Pond No. 1 and Ash Pond No. 2 are not reasonably and readily available. The construction specifications for the GMF Pond and the GMF Recycle Pond are located in *Project Specifications, Gypsum Stack and Recycle Pond Construction* presented in **Appendix D**.

The provisions for surveillance, maintenance, and repair of Ash Pond No. 1 are located in *Operation & Maintenance Manual for #1 Ash Pond* presented in **Appendix E**. The provisions for surveillance, maintenance, and repair of Ash Pond No. 2 are not reasonably and readily available. The provisions for surveillance, maintenance, and repair of the GMF Pond and the GMF Recycle Pond are located in *Operation and Maintenance Manual, Gypsum Management Facility* presented in **Appendix F**.

The operations and maintenance plans for the CCR units identified in this report are currently being revised by Illinois Power Generating Company.

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

In March, 2009, shallow sloughing was observed along the eastern embankment of Ash Pond No. 2. The sloughing was inspected by Hanson Professional Services Inc. A dewatering system was installed in Ash Pond No. 2 to lower the phreatic surface within the pond. In December, 2015, additional sloughing was observed on the embankment of Ash Pond No. 2 and on the embankment of Ash Pond No. 1. The sloughing was believed to be caused by recent heavy rains and was repaired. Photos of the 2015 sloughing repair are presented in **Appendix G**.

There is no record or knowledge of structural instability at the GMF Pond and the GMF Recycle Pond at Coffeen 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
Program Manager

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

REFERENCES

Hanson Professional Services Inc. (2008), *Support Document for IDNR/OWR Permit Application, Coffeen Power Generating Station Gypsum Management Facility Montgomery County, Illinois*

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.

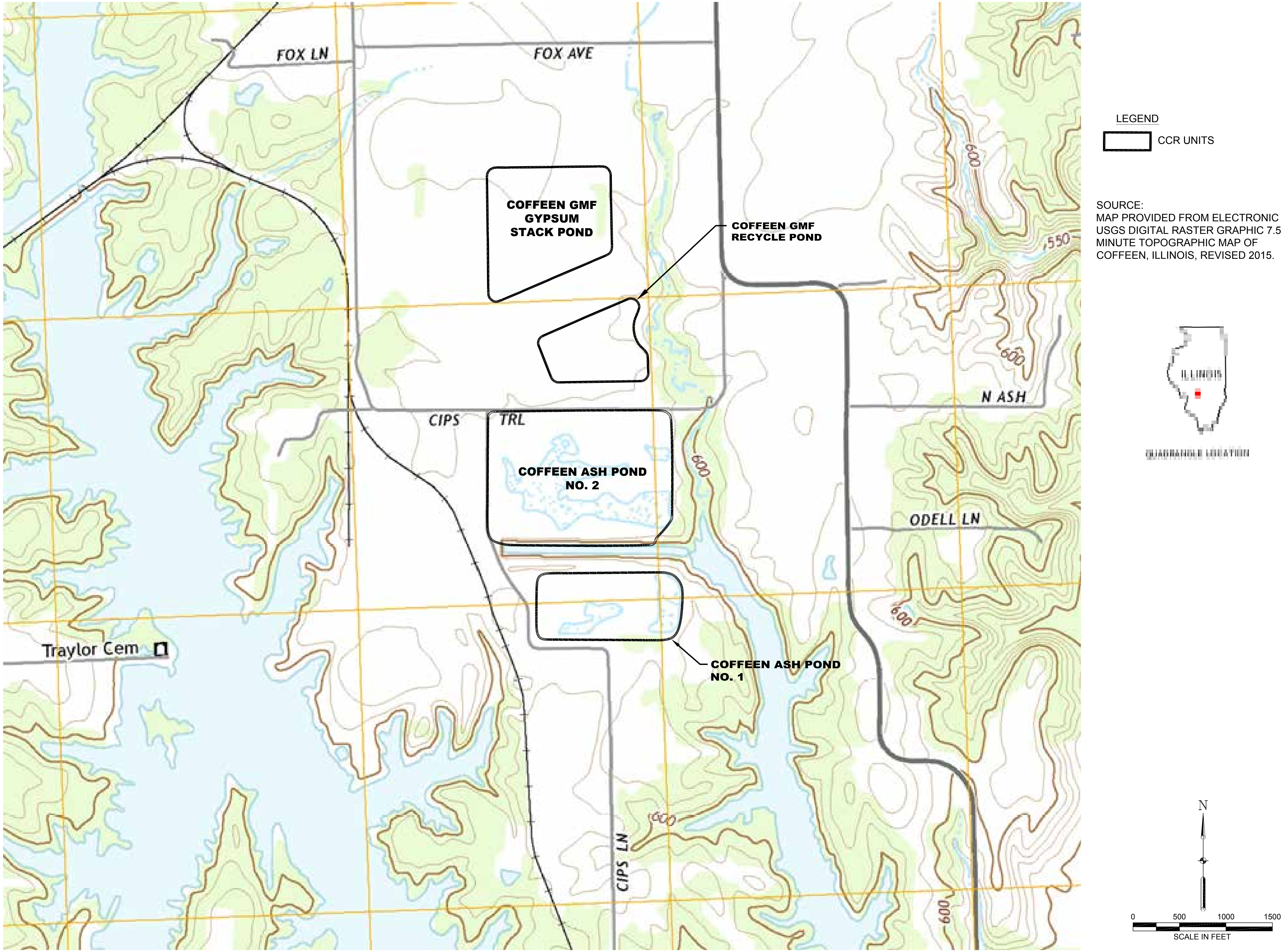
United States Geological Survey (USGS). (2016). The National Map Viewer. http://viewer.nationalmap.gov/viewer/. USGS data first accessed in March of 2016.

APPENDICES

Appendix A: History of Construction Vicinity Map
Appendix B: Coffeen Power Station Drawings
Appendix C: Coffeen Power Station Boring and Piezometer Locations
Appendix D: Project Specifications, Gypsum Stack and Recycle Pond Construction (Hanson 2008)
Appendix E: Operation & Maintenance Manual for #1 Ash Pond
Appendix F: Operation and Maintenance Manual, Gypsum Management Facility Operation (2015)
Appendix G: Photos of 2015 Sloughing Repair

AECOM

Appendix A: History of Construction Vicinity Map



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

ILLINOIS POWER GENERATING COMPANY
134 CIPS Lane
Coffeen, IL 62017

HISTORY OF CONSTRUCTION

COFFEEN POWER STATION
COFFEEN, 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" = 500'
ACAD VER:	2014

SHEET TITLE

HISTORY OF CONSTRUCTION VICINITY MAP

01

AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DynegyCCR\13_Construction History\04 Technical Production\10_Coffeen\References\Vicinity Location Map References\Figures\C-01 History of Construction Vicinity Map (Coffeen)_ZJF.dwg NANAK, MATT, 8/30/2016 10:52 AM

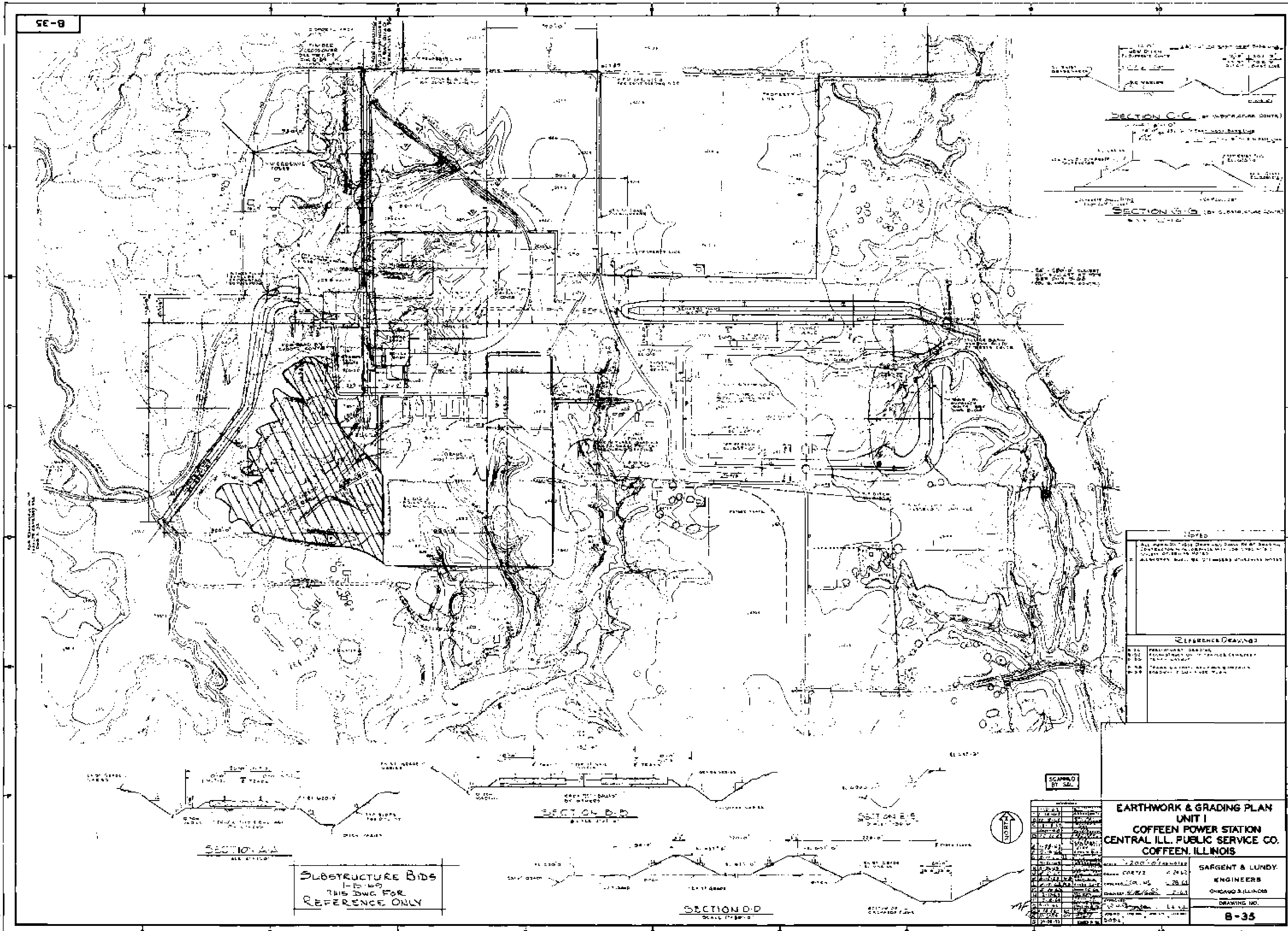
Appendix B: Coffeen Power Station Drawings

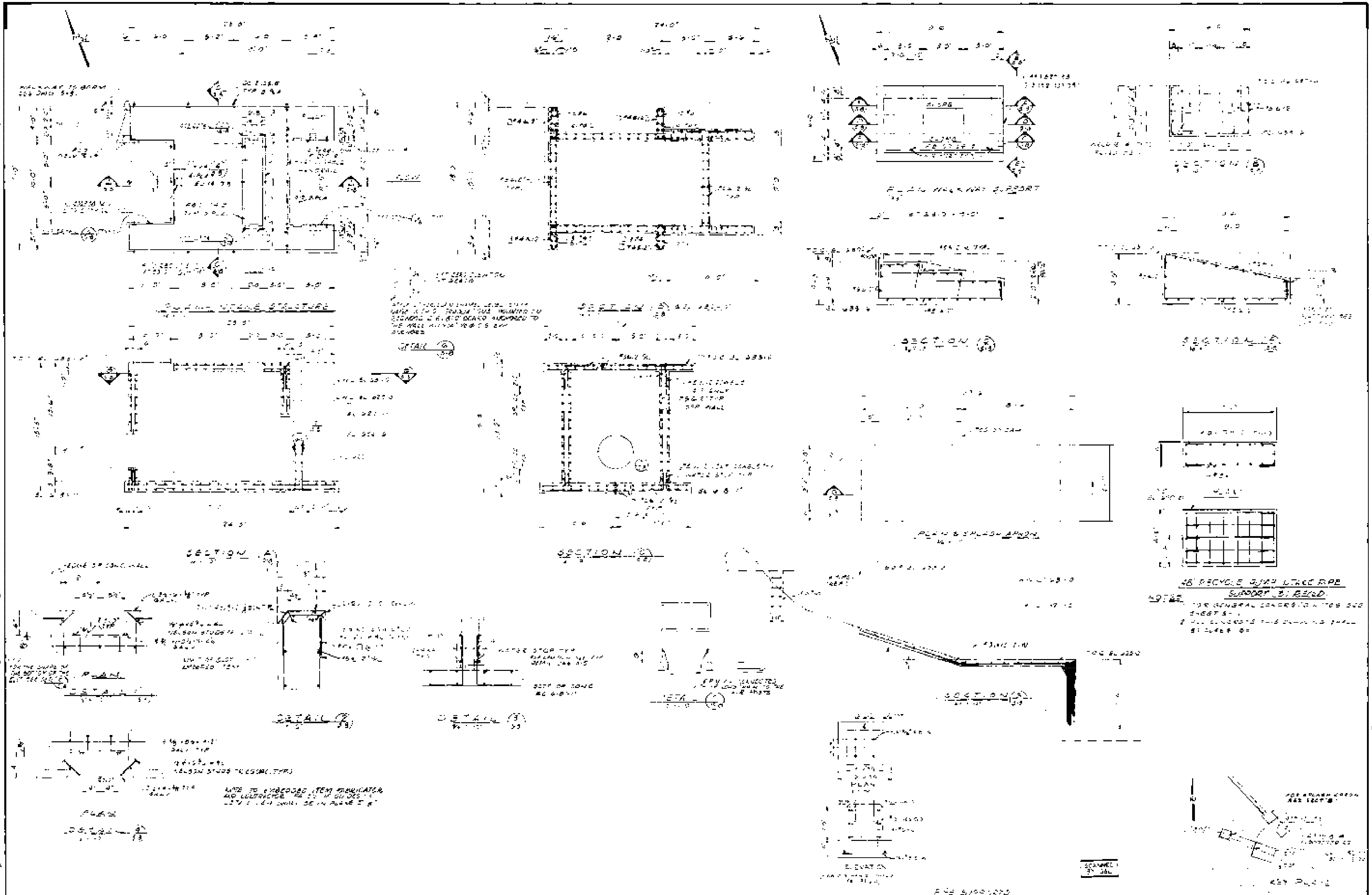
1. “Earthwork & Grading Plan”, Drawing No. B-35, Revision S, 8 September, 1995, Sargent & Lundy Engineers.
2. “Concrete Recycle Pump House – Intake Structure”, Drawing No. S-8, Revision 6, 23 February, 1996, Stearns-Roger Incorporated.
3. “Civil Layout & Grading Plan Sheet 4”, Drawing No. S-44, Revision 6, 23 February, 1996, Stearns-Roger Incorporated.
4. “Civil Layout & Grading Plan Sheet 5”, Drawing No. S-45, Revision 9, 23 February, 1996, Stearns-Roger Incorporated.
5. “Civil Miscellaneous Sections and Details, Sheet 2”, Drawing No. S-47, Revision 2, 23 February, 1996, Stearns-Roger Incorporated.
6. “Civil Ash Pond No 1 – Sections and Details”, Drawing No. S-48, Revision 2, 23 February, 1996, Stearns-Roger Incorporated.
7. “Civil Miscellaneous Sections and Details, Sheet 4”, Drawing No. S-49, Revision 4, 23 February, 1996, Stearns-Roger Incorporated.
8. “Civil Miscellaneous Sections and Details”, Drawing No. S-50, Revision 4, 23 February, 1996, Stearns-Roger Incorporated.
9. “Ash Storage Area, Plan”, Drawing No. B-560, Revision A, 9 February, 1971, Sargent & Lundy Engineers.
10. “Ash Storage Area, Sections & Details”, Drawing No. B-561, Revision A, 9 February, 1971, Sargent & Lundy Engineers.
11. “Overall Site Plan, Dewatering System, Ash Pond #2”, Drawing No. A1000 (sh. 1), Revision A, 12 October, 2009, Ameren Energy Resources Generating.
12. “Site Details, Dewatering System, Ash Pond #2”, Drawing No. A1000 (sh. 4), Revision A, 12 October, 2009, Ameren Energy Resources Generating.
13. “Proposed Site Plan, CCB Management Facility”, Drawing No. C-10206 (sh. 4), Revision 0, 5 January, 2011, Ameren Energy Generating.
14. “Groundwater Monitoring & Boring Plan, CCB Management Facility”, Drawing No. C-10206 (sh. 5), Revision 0, 5 January, 2011, Ameren Energy Generating.
15. “Anchor Trench and Liner System, CCB Management Facility”, Drawing No. C-10206 (sh. 9), Revision 0, 5 January, 2011, Ameren Energy Generating.
16. “Cell G1-Foundation Grade & Control Data, CCB Management Facility”, Drawing No. C-10206 (sh. 10), Revision 0, 5 January, 2011, Ameren Energy Generating.
17. “Cell G1-Process Water Recovery System, CCB Management Facility”, Drawing No. C-10206 (sh. 15), Revision 0, 5 January, 2011, Ameren Energy Generating.
18. “Cell G1-PWRS Drain Details, CCB Management Facility”, Drawing No. C-10206 (sh. 16), Revision 0, 5 January, 2011, Ameren Energy Generating.
19. “Recycle Pond Plan & Control Data, CCB Management Facility”, Drawing No. C-10206 (sh. 19), Revision 0, 5 January, 2011, Ameren Energy Generating.
20. “Recycle Pond – Process Water Transfer Channel Details, CCB Management Facility”, Drawing No. C-10206 (sh. 20), Revision 0, 5 January, 2011, Ameren Energy Generating.

AECOM

Appendix B: Coffeen Power Station Drawings (continued)

21. "Recycle Pond–Process Water Decant Sections & Details, CCB Management Facility", Drawing No. C-10206 (sh. 21), Revision 0, 5 January, 2011, Ameren Energy Generating.
22. "Recycle Pond – Emergency Spillway Sections & Details, CCB Management Facility", Drawing No. C-10206 (sh. 22), Revision 0, 5 January, 2011, Ameren Energy Generating.
23. "Ash Pond #2, Drainage Modifications", Drawing No. W1008 (sh. 2), Ameren Energy Generating.


B-35
SECTION C-C
SECTION B-B
NOTES
REFERENCE DRAWINGS
SECTION A-A
SECTION B-B
SECTION E-E
SECTION D-D
SUBSTRUCTURE BIDS
1-15-69
THIS DWG FOR
REFERENCE ONLY
SCANNED BY S&L
NORTH
EARTHWORK & GRADING PLAN
UNIT I
COFFEEN POWER STATION
CENTRAL ILL. PUBLIC SERVICE CO.
COFFEEN, ILLINOIS
SARGENT & LUNDY
ENGINEERS
CHICAGO, ILLINOIS
DRAWING NO.
B-35



CONCRETE
RECYCLE PUMP HOUSE INTAKE STRUCTURE
& MISCELLANEOUS FOUNDATIONS

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

Stearns-Roger

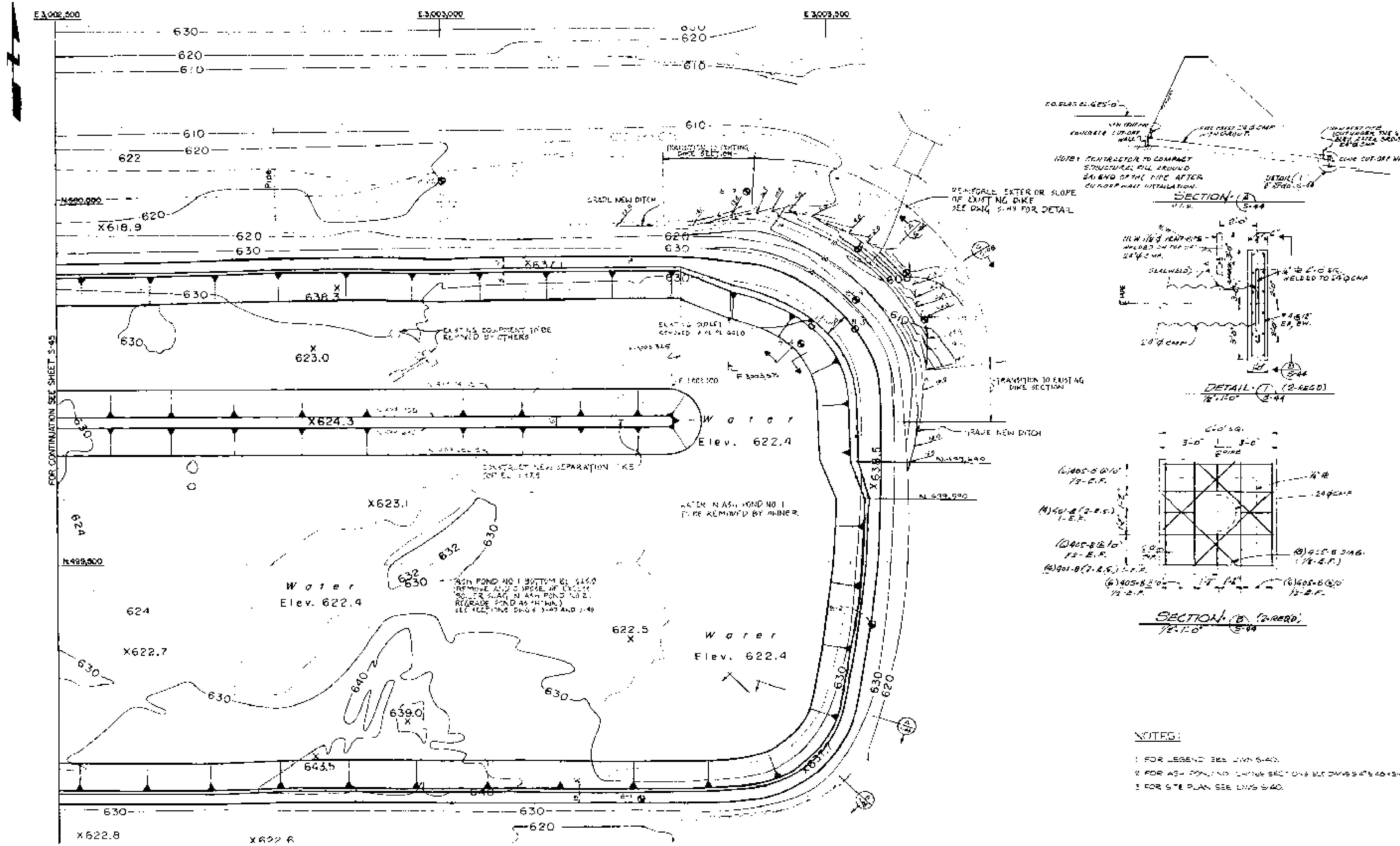
DRAWING STATUS

REVISIONS

REFERENCE DRAWINGS

PRINT RECORD

ENG. RECORD



NOTES:

1. FOR LEGEND SEE DWG S-40.
2. FOR ASH POND NO. 1 DIKE SECTIONS SEE DWGS S-47, S-48 & S-49.
3. FOR SITE PLAN SEE DWG S-40.

SCANNED BY S&L

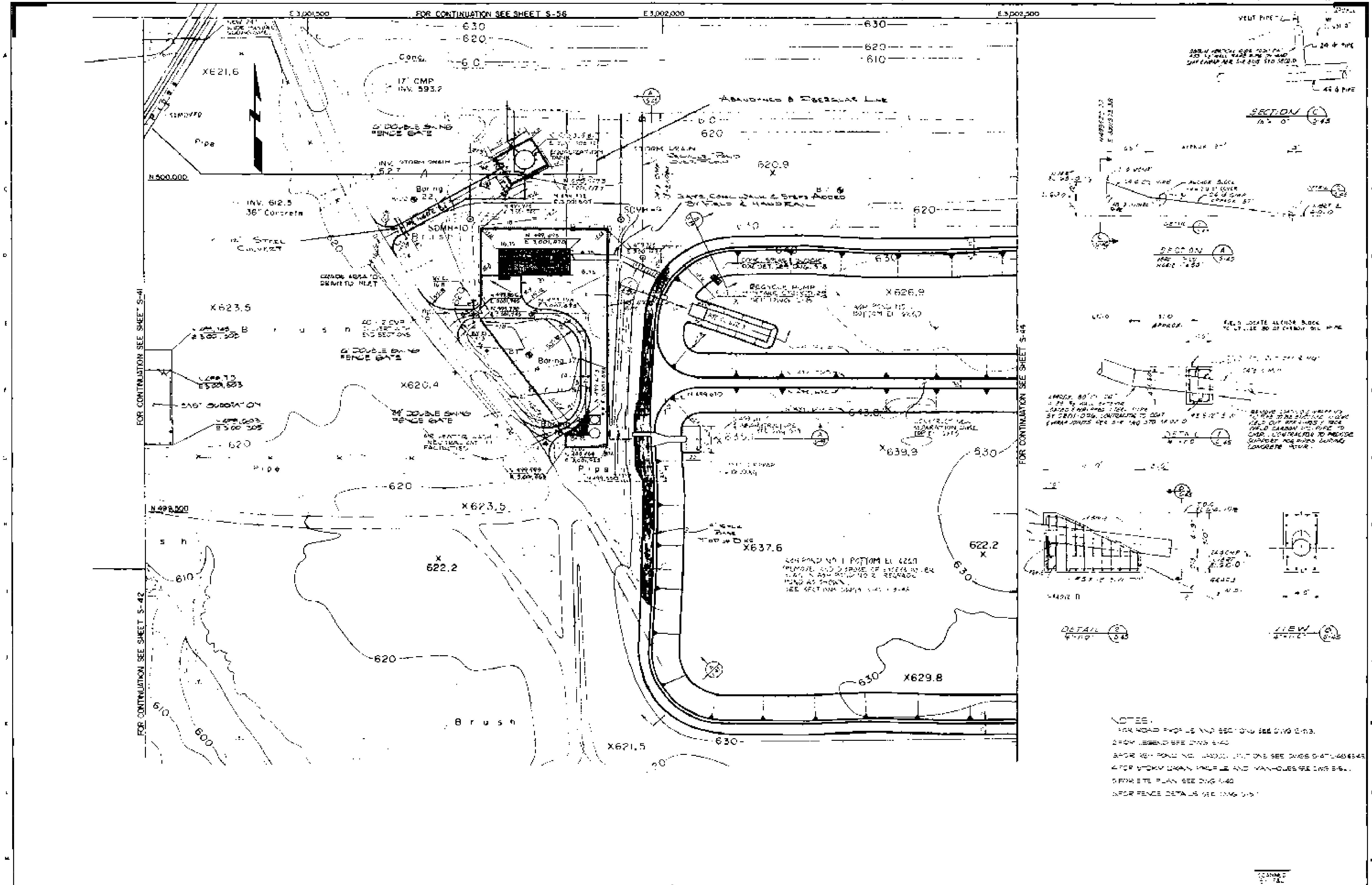
S.R. NO. Y2-4

CIVIL
LAYOUT & GRADING PLAN SHEET 4

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

Stearns-Roger

S-44



NOTES:

1. FOR ROAD PROFILES AND SECTIONS SEE DWG S-73.
2. FOR LEGEND SEE DWG S-40
3. FOR ASH POND NO. 1 MODIFICATIONS SEE DWGS S-47, S-48 & S-45
4. FOR STORM DRAIN PROFILE AND MANHOLES SEE DWG S-51
5. FOR SITE PLAN SEE DWG S-40
6. FOR FENCE DETAILS SEE DWG S-51

S.R. NO Y2-5

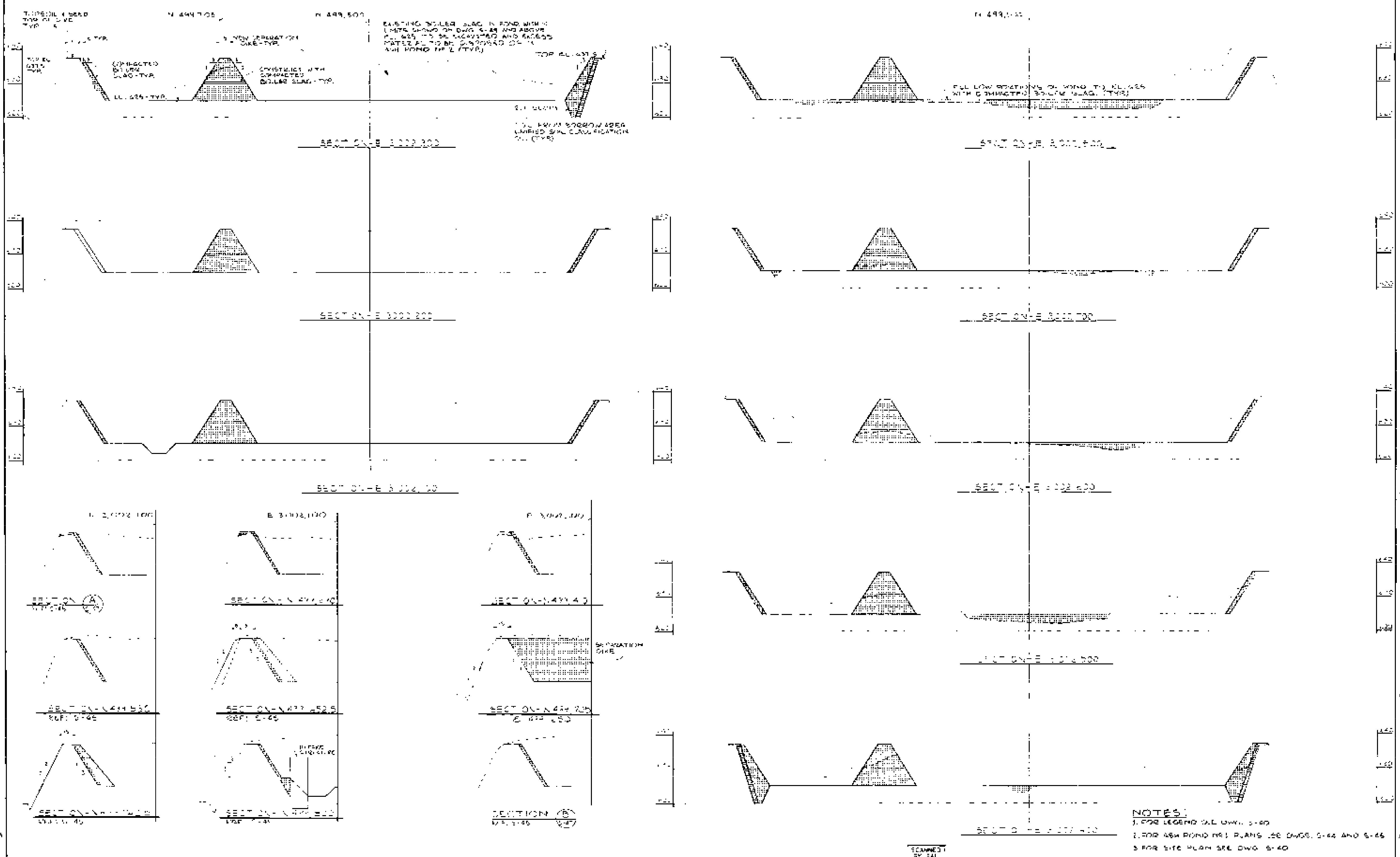
ENG RECORD	DRAWING STATUS

CIVIL
LAYOUT & GRADING PLAN SHEET 5

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

Stearns-Roger

S-45



NOTES:
1. FOR LEGEND SEE DWG. S-40
2. FOR ASH POND Nº1 PLANS SEE DWGS. S-44 AND S-45
3. FOR SITE PLAN SEE DWG. S-40

SR NO Y2-7

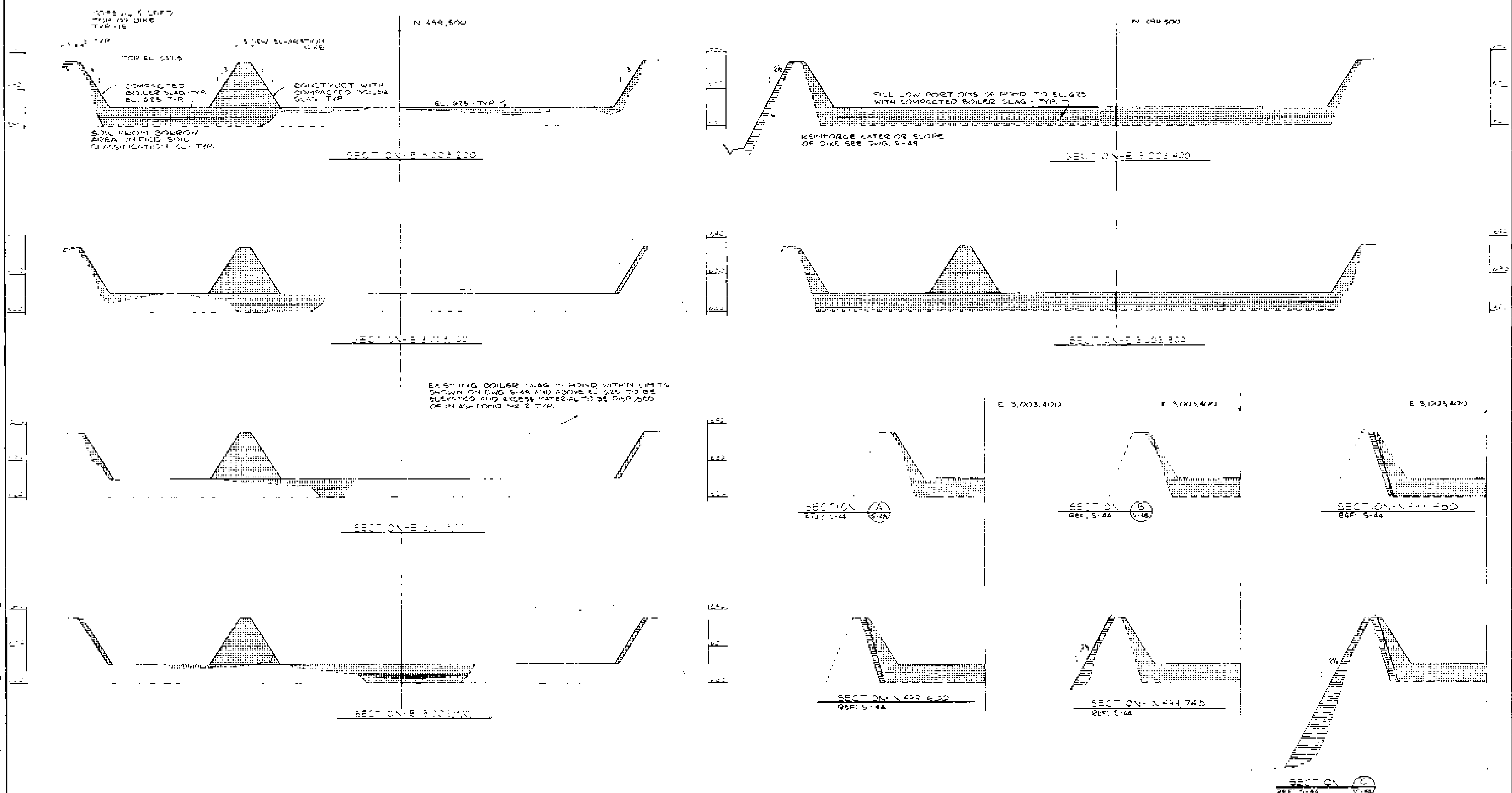
CIVIL
MISCELLANEOUS SECTIONS AND DETAILS
SHEET 2

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

HORIZ 1"=50'
VERT 1"=10'

Stearns-Roger

S-47



NOTES.

1. FOR LEGEND SEE DWG. S-40
2. FOR ASH POND (Y2) PLANS SEE DWGS. S-44 AND S-45
3. FOR SITE PLAN SEE DWG S-40

SR NO Y2-8

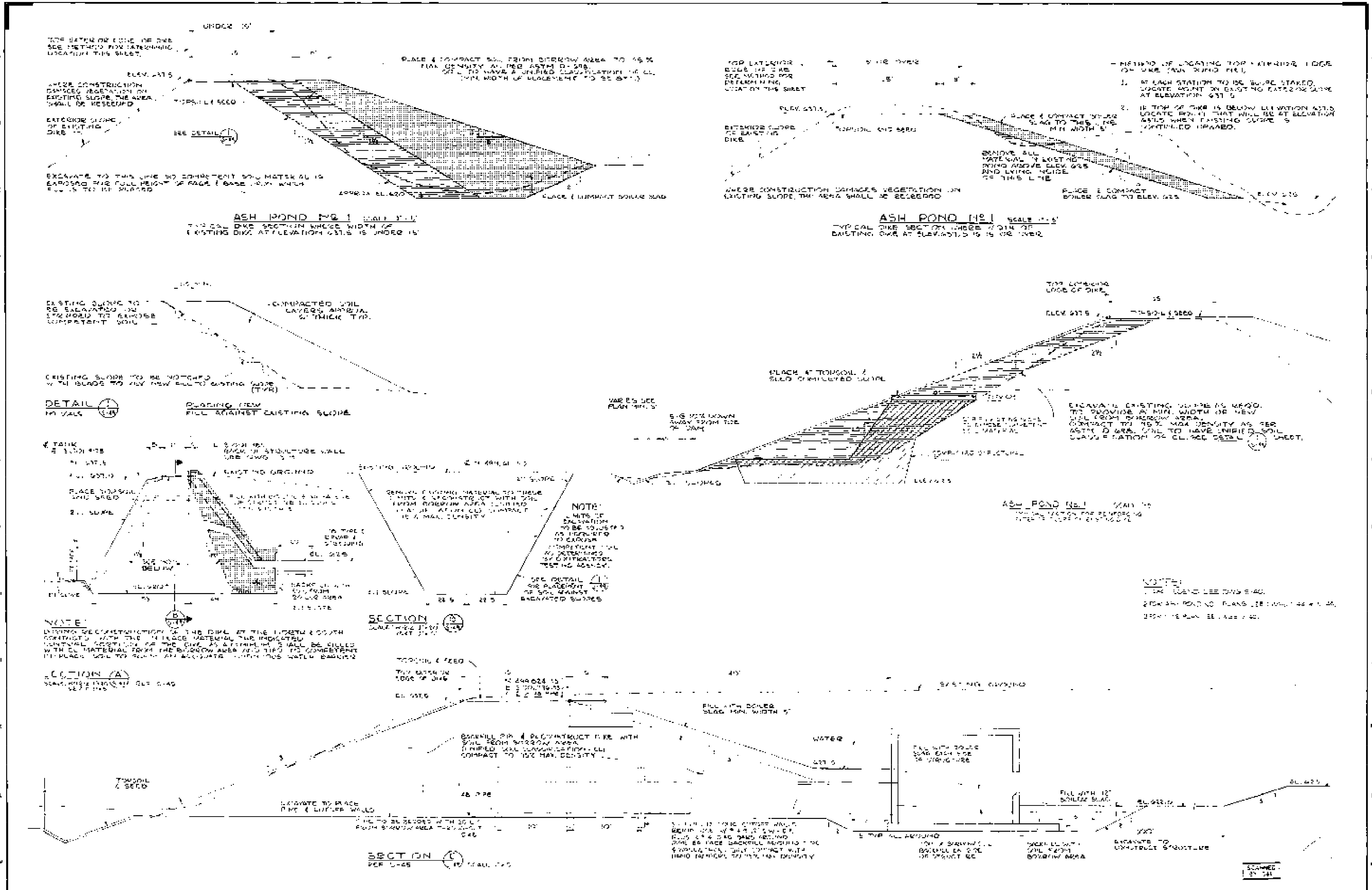
CIVIL
ASH POND NO I SECTIONS AND DETAILS

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

HORIZ 1"=50'
VERT 1"=10'

Stearns-Roger

S-48



SR NO Y2-9

ENG RECORD	DRAWING STATUS

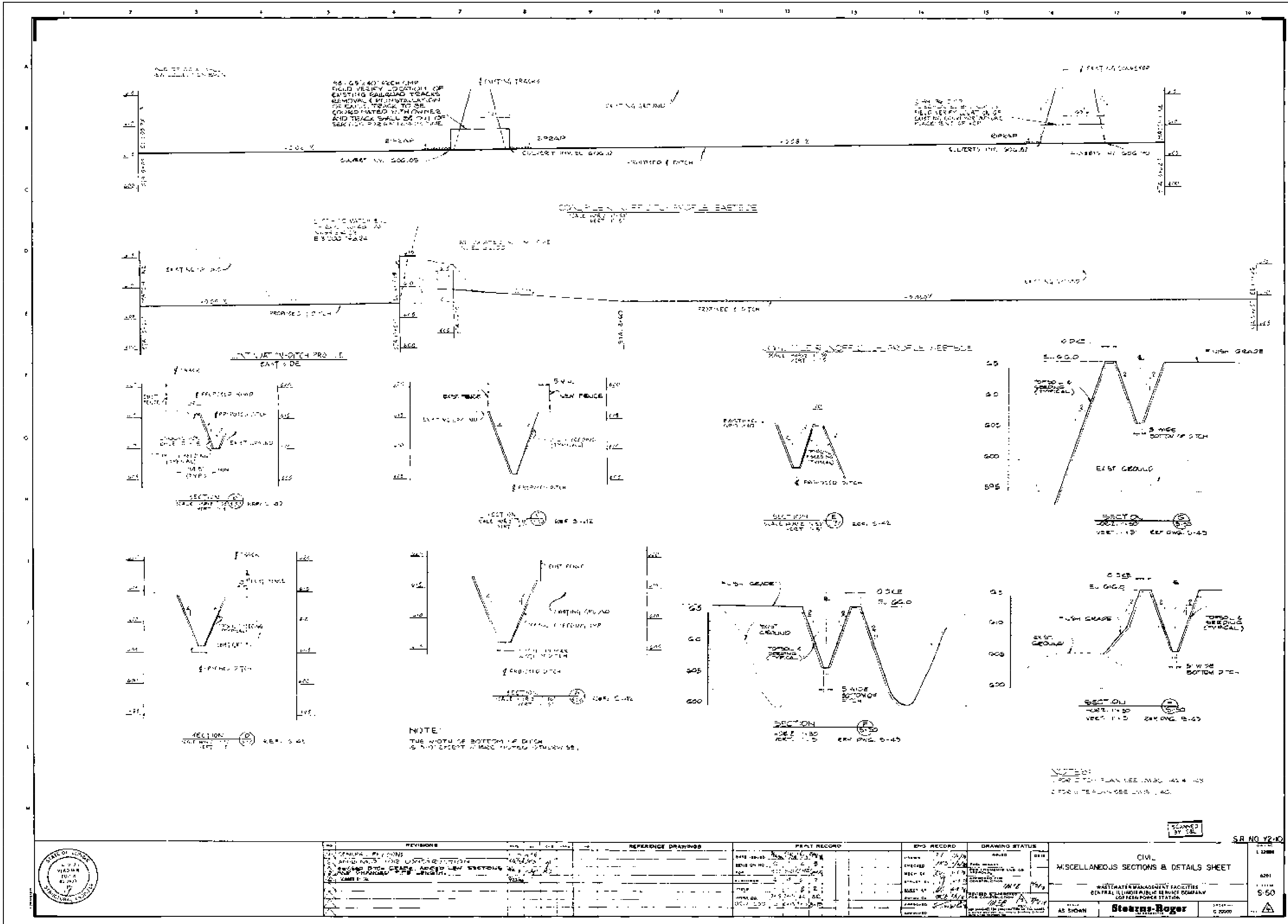
CIVIL
MISCELLANEOUS SECTIONS & DETAILS SHEET 4

WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION

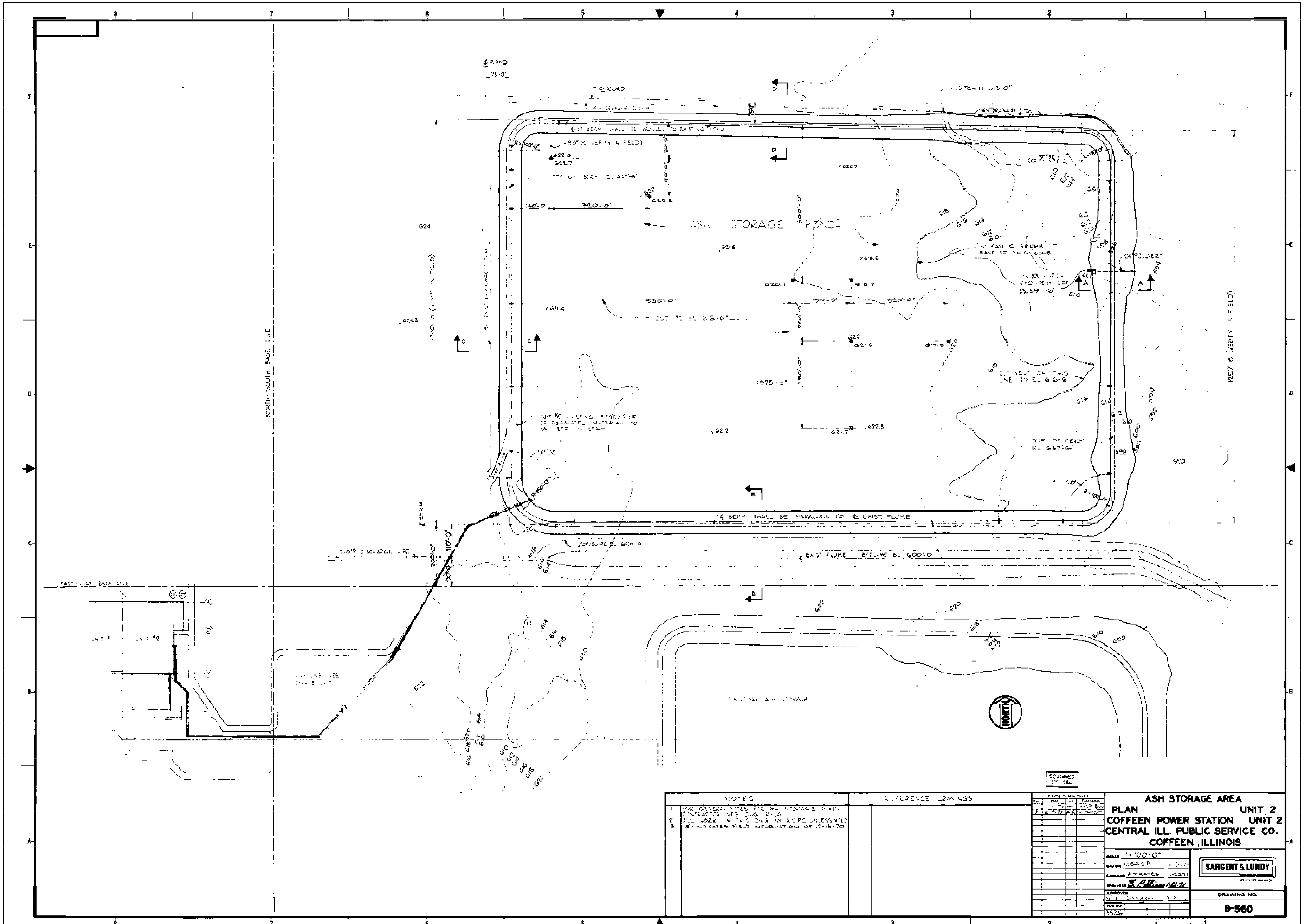
AS SHOWN

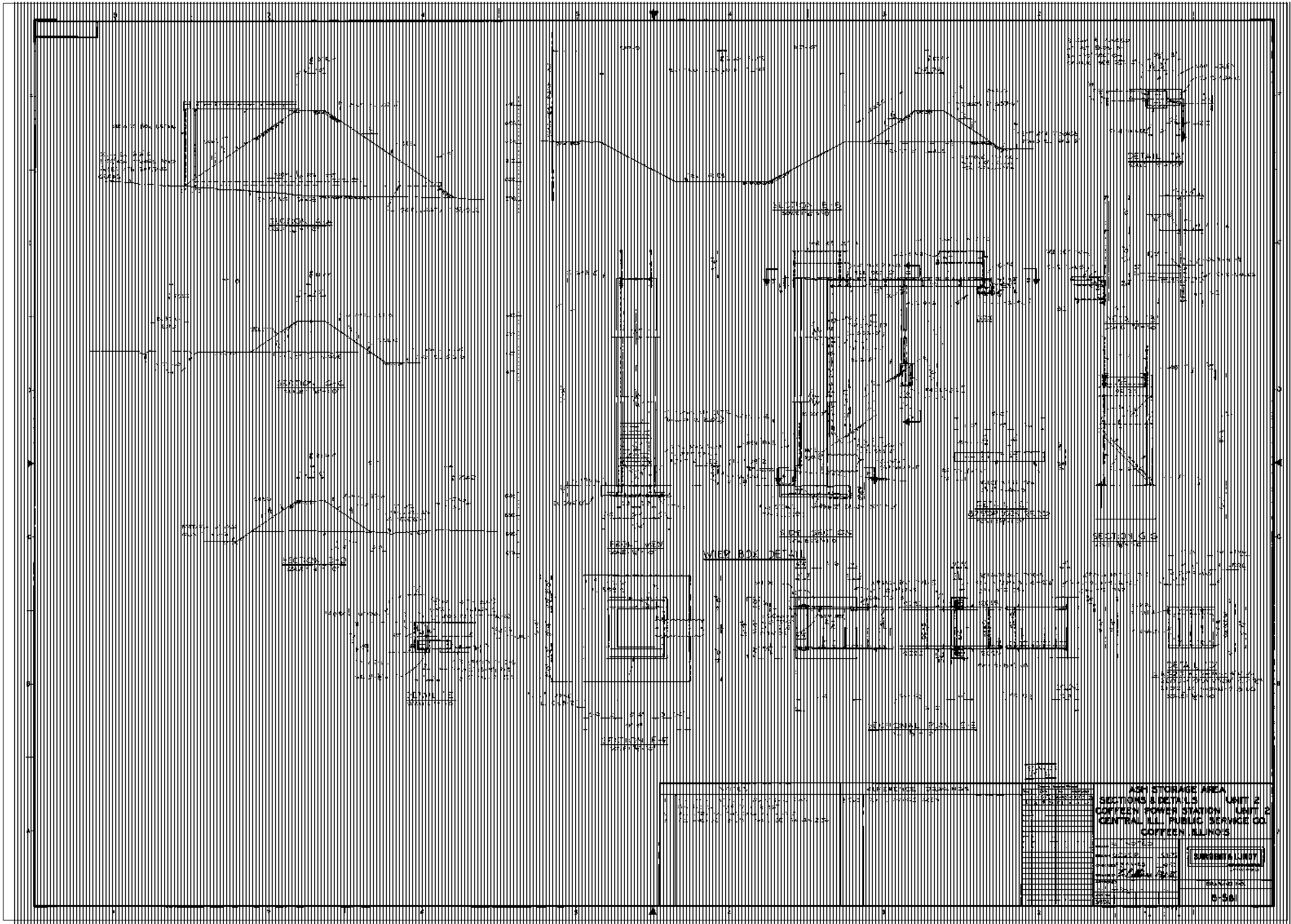
Stearns-Roger

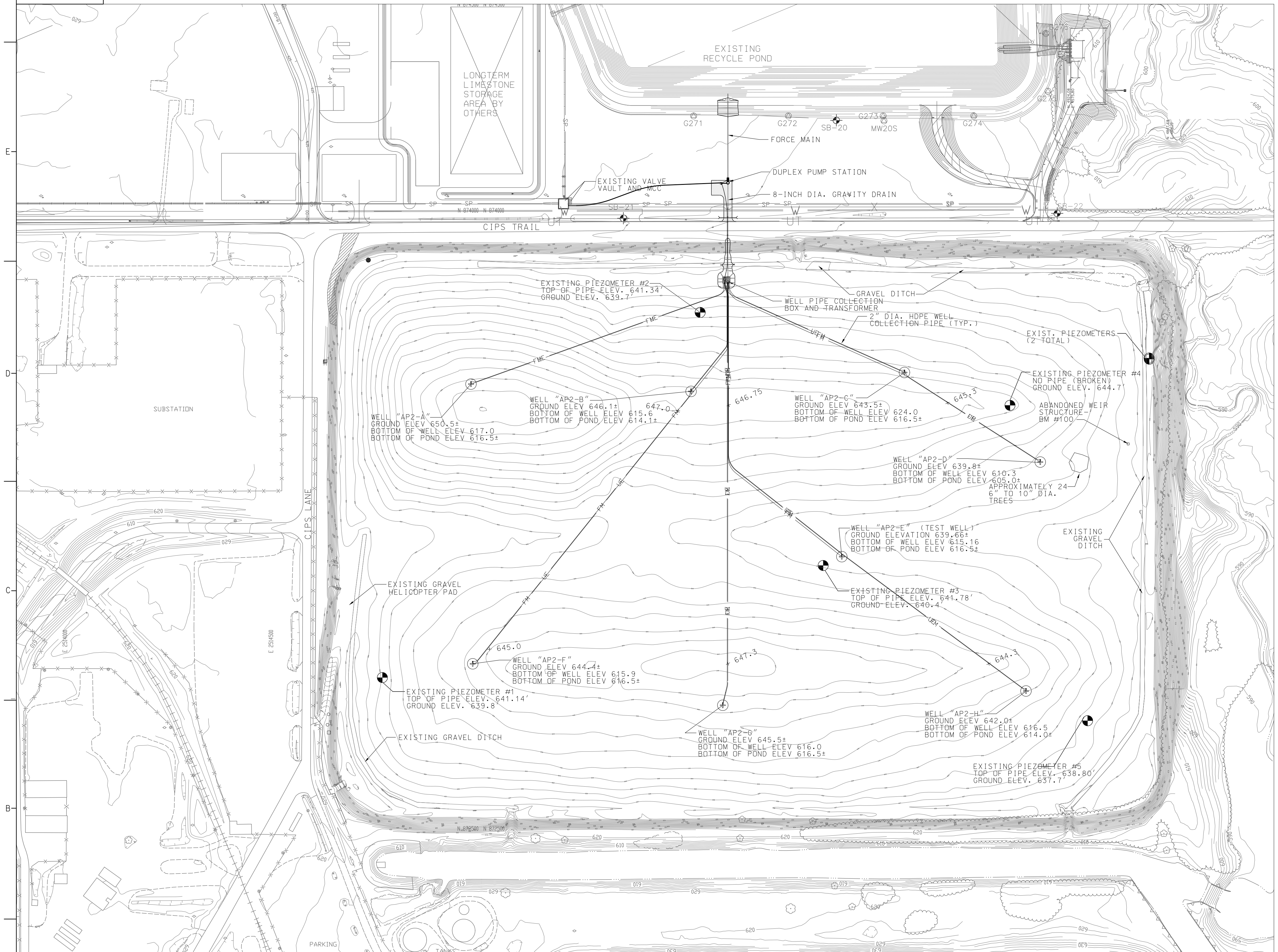
S-49



CONTINUATION DITCH PROFILE
EAST SIDE
SECTION
SECTION F S-50
SCALE: HORIZ. 1"=50' VERT. 1"=5'
SECTION G S-50
NOTE:
THE WIDTH OF BOTTOM OF DITCH IS 5'-0" EXCEPT WHERE NOTED OTHERWISE.
SCANNED BY SGL
S.R. NO. Y2-10
CIVIL
MISCELLANEOUS SECTIONS & DETAILS SHEET
WASTEWATER MANAGEMENT FACILITIES
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
COFFEEN POWER STATION
AS SHOWN
Stearns-Roger
S-50


ASH STORAGE POND
NORTH-SOUTH BASE LINE
NOTES
REFERENCE DRAWINGS
ASH STORAGE AREA
PLAN UNIT 2
COFFEEN POWER STATION UNIT 2
CENTRAL ILL. PUBLIC SERVICE CO.
COFFEEN, ILLINOIS
SARGENT & LUNDY
DRAWING NO.
B-560


WIER BOX DETAIL
ASH STORAGE AREA
SECTIONS & DETAILS UNIT 2
COFFEEN POWER STATION UNIT 2
CENTRAL ILL. PUBLIC SERVICE CO.
COFFEEN, ILLINOIS
SARGENT & LUNDY
DRAWING NO.
B-561



NOTES:

1. THE LOCATION, SIZE AND/OR TYPE OF MATERIAL OF EXISTING UNDERGROUND OR OVERHEAD UTILITIES AS MAY BE INDICATED ON THESE CONSTRUCTION PLANS IS NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. THE OWNER AND THE PROJECT ENGINEER HAVE NOT INDEPENDENTLY VERIFIED THIS INFORMATION AND DO NOT ASSUME ANY RESPONSIBILITY WHATSOEVER IN RESPECT TO THE ACCURACY, SUFFICIENCY OR COMPLETENESS OF THE INFORMATION AND GIVE NO EXPRESSED OR IMPLIED GUARANTEE THAT ANY CONDITIONS INDICATED ARE REPRESENTATIVE OF ACTUAL CONDITIONS TO BE ENCOUNTERED.

2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND AGENCIES OF HIS CONSTRUCTION PLANS AND SHALL OBTAIN FROM EACH PARTY DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF ALL UTILITIES AND THE SCHEDULE OF ANY REMOVALS AND ADJUSTMENTS REQUIRED OF THE UTILITY. THE CONTRACTOR SHALL CONTACT J.U.L.I.E. (1-800-892-0123 OR 811) TO ASSIST IN COMPLETING THIS RESPONSIBILITY.

3. THE CONTRACTOR SHALL PROTECT ANY FACILITIES TO THE SATISFACTION OF THE UTILITY OR OWNING-AGENCY WITH THE COST OF ANY REQUIRED PROTECTION TO BE INCIDENTAL TO THE CONTRACT. IN THE EVENT A UTILITY LINE OR SERVICE IS UNEXPECTEDLY ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE UTILITY COMPANY OR AGENCY OF JURISDICTION. ANY SUCH UTILITIES DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO SERVICE AT ONCE.

LEGEND

- ELECTRICAL SPLICE BOX
- TELEPHONE SPLICE BOX
- GUARDPOST
- EXISTING FENCE
- TREE AREA
- GRAVEL EDGE
- PAVED OUTLET EDGE
- FM — FORCE MAIN
- SS — SANITARY SEWER
- UE — UNDERGROUND ELECTRIC
- GRAVEL SURFACING
- PIEZOMETER
- IRON PIN

N

100' 50' 0 50' 100'
SCALE IN FEET

COORDINATE TABLE

STATE PLANE COORDINATES				DESCRIPTION	PLANT COORDINATES		
POINT	NORTH	EAST	ELEV.		NORTH	EAST	ELEV.
100	873,444.5	2,516,566.2	636.78'	BENCHMK: CHISELED "□" IN N.E. COR. OF WEIR BOX	3610.958	1357.406	616.31'
1	872,940.7900	2,513,222.5010	615.74'	CONTROL PT #1 BRASS MONUMENT NEAR N.W. ENTRANCE	3610.440	2430.490	623.44'
2	872,942.4450	2,514,295.5440	622.92'	CONTROL PT #2 BRASS MONUMENT NEAR EAST PKG AREA	4561.951	2430.945	N/A
3	873,893.9360	2,514,294.3340	624.63'	CONTROL PT #3 BRASS MONUMENT NEAR MAIN ENTRANCE			
5001	873,587.59	2,514,969.63	.	WELL AP2-A			
5002	873,569.87	2,515,503.76	.	WELL AP2-B			
5003	873,615.67	2,516,021.68	.	WELL AP2-C			
5004	873,398.41	2,516,351.29	.	WELL AP2-D			
5005	873,168.81	2,515,869.61	.	WELL AP2-E			
5006	872,908.89	2,514,973.83	.	WELL AP2-F			
5007	872,808.37	2,515,580.73	.	WELL AP2-G			
5008	872,842.91	2,516,316.70	.	WELL AP2-H			

NOTES | REFERENCE DRAWINGS

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK	DRAFTING DISUPV	ENGR APPROVAL SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
A	10-12-09	#1314	SDB	MJW	SDB	SDB	MJW	-	-	-

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. HE/SHE DOES NOT HAVE AUTHORITY OVER THE PROJECT AS A WHOLE. THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR WORK DONE UNDER SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

AS BUILT

SCALE –

LOC. NO. –

CLASS –

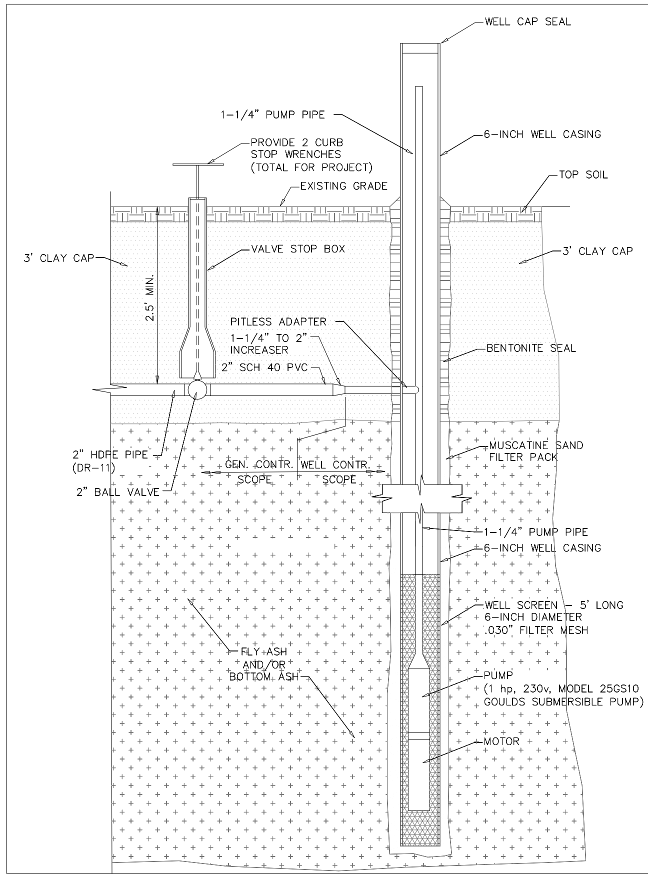
OVERALL SITE PLAN
DEWATERING SYSTEM
ASH POND #2
AMEREN COFFEEN POWER STATION

SITE: ASH POND #2

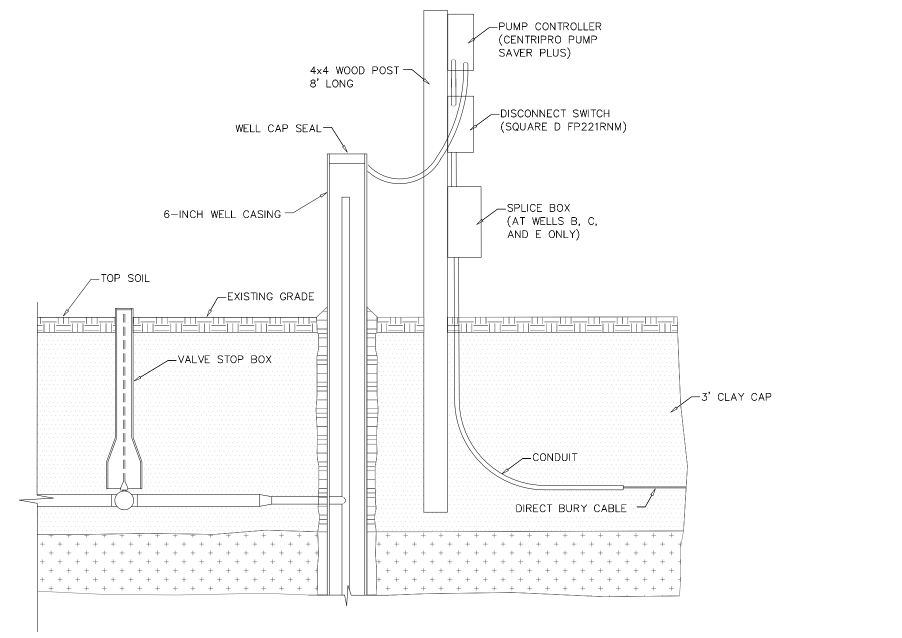
Ameren Energy Resources Generating

DRAWING NO.	REV.
A1000	0
SHEET NO. 1 OF 5	

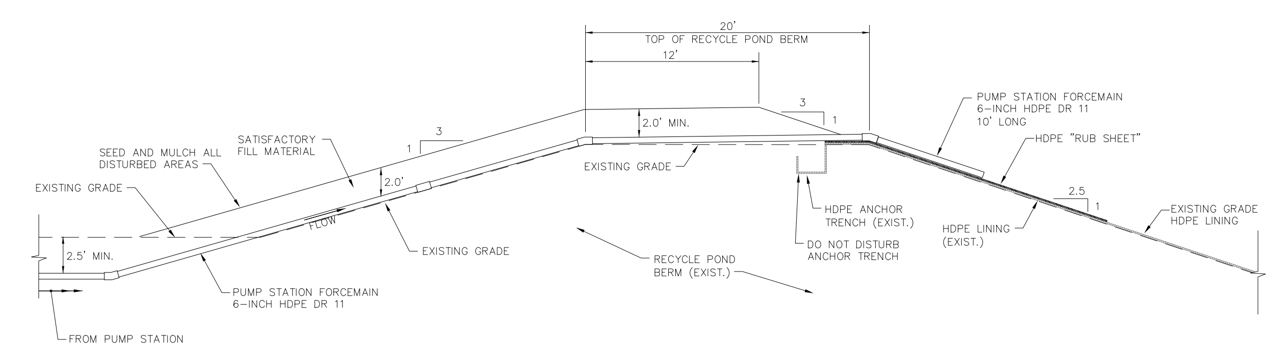
SHEET NO. ---



1 WELL PUMP PIPING DETAIL
NOT TO SCALE



2 WELL PUMP CONTROLLER/DISCONNECT DETAIL
NOT TO SCALE



3 FORCE MAIN OUTLET DETAIL
NOT TO SCALE

N

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. HE/SHE DOES NOT HAVE AUTHORITY OVER THE PROJECT AS A WHOLE. THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR WORK DONE UNDER SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

10' 5' 0 5' 10'
SCALE IN FEET

AS BUILT

NOTES

REFERENCE DRAWINGS

DRAWING RECORD

REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
A	10-12-09	W1314	SDB	MJW	SDB	SDB	MJW	–	-

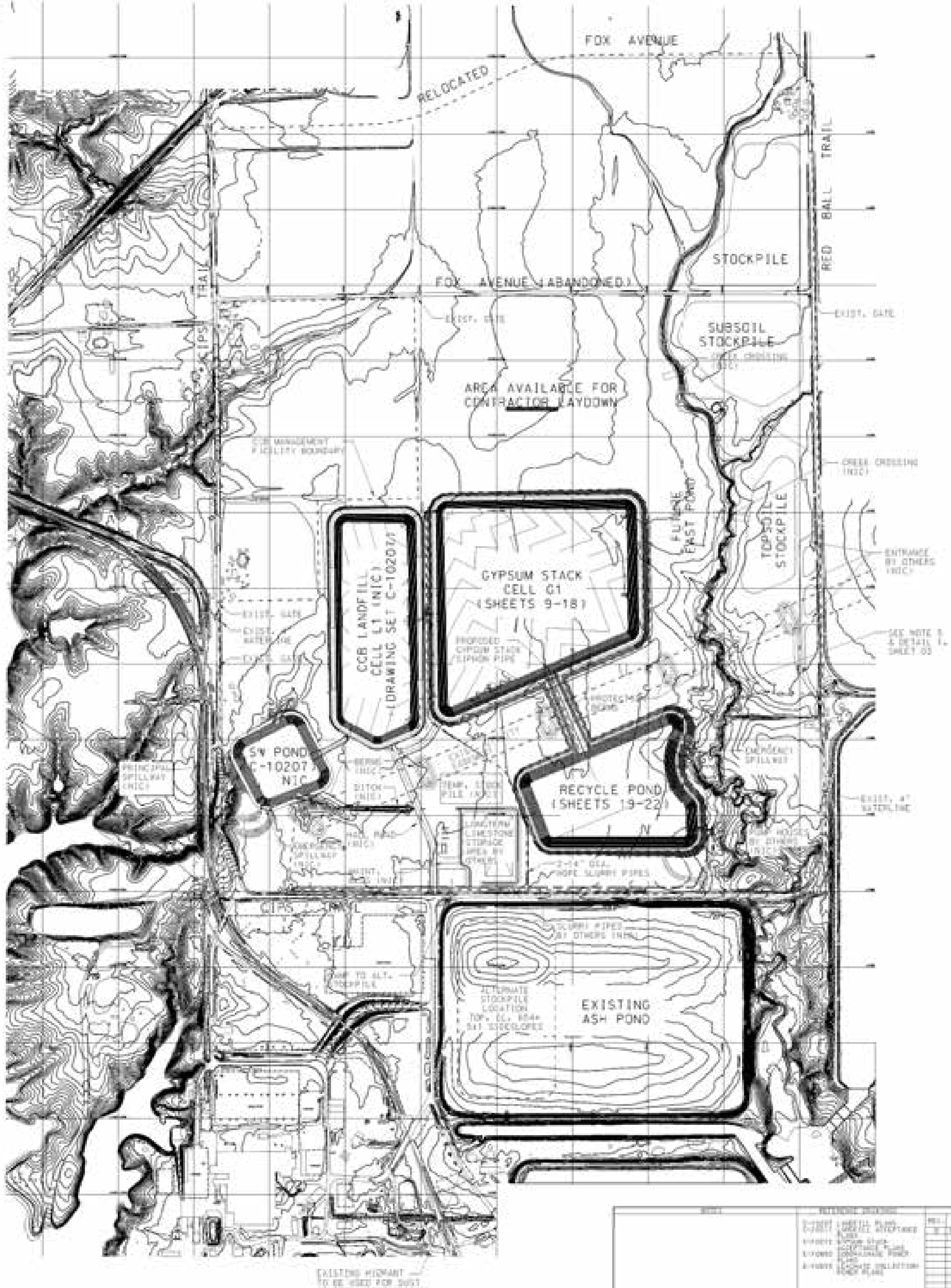
SCALE: –
LOC. NO.: –
CLASS: –

SITE DETAILS
DEWATERING SYSTEM
ASH POND #2
AMEREN COFFEEN POWER STATION

SITE: ASH POND #2

Ameren Energy Generating Resources

DRAWING NO. A1000
REV. 0
SHEET NO. 4 OF 5



STANDARD LEGEND

(ALL SYMBOLS MAY NOT BE USED ON EACH PLAN)

- ORIGINAL CONTOURS
- FENCELINE
- TRANSMISSION TOWERS
- OVERHEAD ELECTRIC
- WATER MAIN
- TELEPHONE LINE
- LIMITS OF VEGETATION
- GRAVEL ROAD
- RAILROAD
- CP-1000 CONTROL POINT - HORIZ. & VERT.
- A — A' GEOLOGICAL CROSS SECTION LINE
- LANDFILL CONTOURS
- SB-55 BORING
- GXXX PREVIOUSLY INSTALLED GROUNDWATER MONITORING WELL
- GXXX GROUNDWATER MONITORING WELL
- MW135 WELLS - NOT PART OF MONITORING PLAN

NOTES:

1. SEE NOTES ON SHEET 2 REGARDING THE RESPONSIBILITY FOR EXISTING UTILITIES.
2. (NIC) INDICATES SITE FEATURES WHICH ARE NOT PART OF THIS CONTRACT. THEY ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. HORIZONTAL AND VERTICAL CONTROL ARE BASED ON NAD 83, ILLINOIS STATE PLANE COORDINATE SYSTEM WEST ZONE, NAVD 88, US SURVEY FEET AND THE FOLLOWING PROJECT CONTROL POINTS WERE ESTABLISHED BY HANSON PROFESSIONAL SERVICES:

HORIZONTAL CONTROL

POINT	NORTHING	EASTING	ELEV.	DESCRIPTION
CP-1000	873598.37	2515534.17	620.81	#8 REBAR IN 6" DIA. CONCRETE MONUMENT
CP-1001	873965.17	2513180.64	621.96	#8 REBAR IN 6" DIA. CONCRETE MONUMENT
CP-1002	877937.14	2514535.34	625.15	#8 REBAR IN 6" DIA. CONCRETE MONUMENT
CP-1003	877949.63	2514985.49	622.10	#8 REBAR IN 6" DIA. CONCRETE MONUMENT

0' 300' 600'

SCALE: 1" = 300'

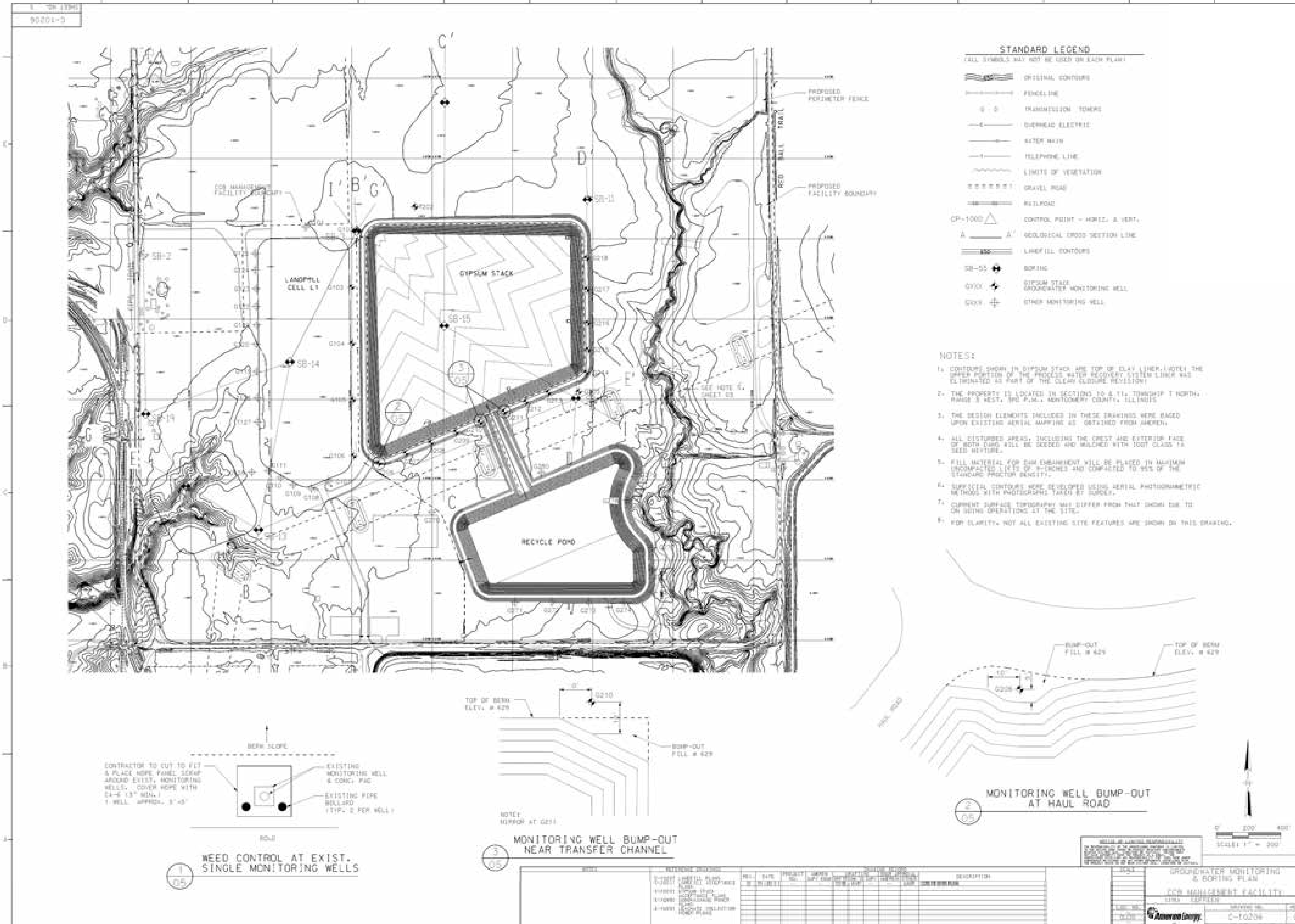
PROPOSED SITE PLAN

CCB MANAGEMENT FACILITY

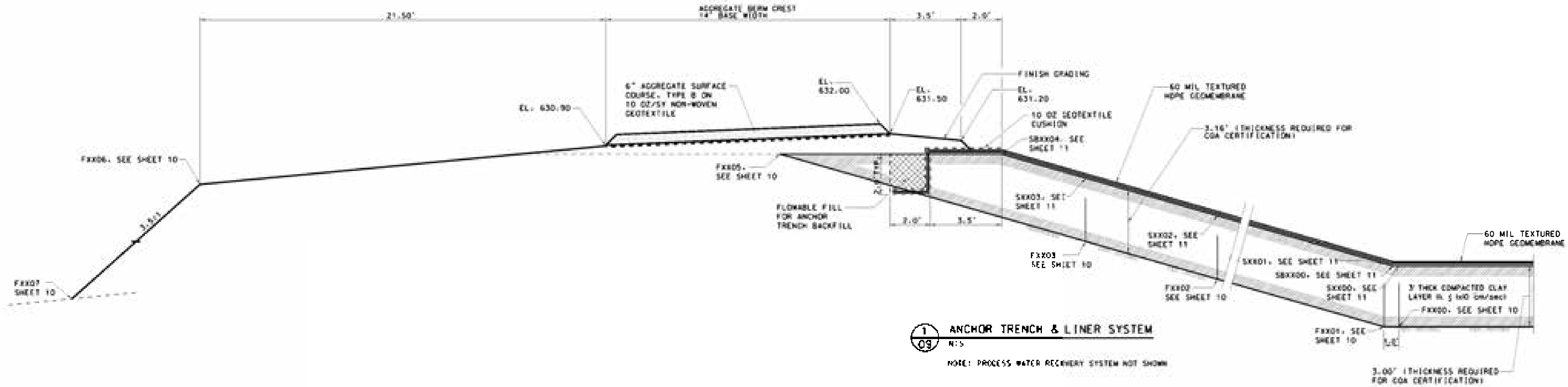
SITE: COFFEEN

DRAWING NO. C-10206 REV. 0

SHEET NO. 04


C-10206
STANDARD LEGEND
(ALL SYMBOLS MAY NOT BE USED ON EACH PLAN)
ORIGINAL CONTOURS
FENCELINE
TRANSMISSION TOWERS
OVERHEAD ELECTRIC
WATER MAIN
TELEPHONE LINE
LIMITS OF VEGETATION
GRAVEL ROAD
RAILROAD
CP-1000
CONTROL POINT - HORIZ. & VERT.
GEOLOGICAL CROSS SECTION LINE
LANDFILL CONTOURS
SB-55
BORING
GYXX
GYPSUM STACK GROUNDWATER MONITORING WELL
GXXX
OTHER MONITORING WELL
NOTES:
1. CONTOURS SHOWN IN GYPSUM STACK ARE TOP OF CLAY LINER. (NOTE: THE UPPER PORTION OF THE PROCESS WATER RECOVERY SYSTEM LINER WAS ELIMINATED AS PART OF THE CLEAN CLOSURE REVISION)
2. THE PROPERTY IS LOCATED IN SECTIONS 10 & 11, TOWNSHIP 7 NORTH, RANGE 3 WEST, 3RD P.M., MONTGOMERY COUNTY, ILLINOIS
3. THE DESIGN ELEMENTS INCLUDED IN THESE DRAWINGS WERE BASED UPON EXISTING AERIAL MAPPING AS OBTAINED FROM AMEREN.
4. ALL DISTURBED AREAS, INCLUDING THE CREST AND EXTERIOR FACE OF BOTH DAMS WILL BE SEEDED AND MULCHED WITH IDOT CLASS 1A SEED MIXTURE.
5. FILL MATERIAL FOR DAM EMBANKMENT WILL BE PLACED IN MAXIMUM UNCOMPACTED LIFTS OF 8-INCHES AND COMPACTED TO 95% OF THE STANDARD PROCTOR DENSITY.
6. SURFICIAL CONTOURS WERE DEVELOPED USING AERIAL PHOTOGRAMMETRIC METHODS WITH PHOTOGRAPHS TAKEN BY SURDEX.
7. CURRENT SURFACE TOPOGRAPHY MAY DIFFER FROM THAT SHOWN DUE TO ON GOING OPERATIONS AT THE SITE.
8. FOR CLARITY, NOT ALL EXISTING SITE FEATURES ARE SHOWN ON THIS DRAWING.
PROPOSED PERIMETER FENCE
PROPOSED FACILITY BOUNDARY
RED BALL TRAIL
CCB MANAGEMENT FACILITY BOUNDARY
LANDFILL CELL L1
GYPSUM STACK
RECYCLE POND
SB-2
SB-11
SB-13
SB-14
SB-15
SB-19
SEE NOTE 6, SHEET 03
TOP OF BERM ELEV. = 629
BUMP-OUT FILL = 629
G210
G226
HAUL ROAD
NOTE: MIRROR AT G211
BERM SLOPE
CONTRACTOR TO CUT TO FIT & PLACE HDPE PANEL SCRAP AROUND EXIST. MONITORING WELLS. COVER HDPE WITH CA-6 (3" MIN.) 1 WELL APPROX. 3'x3'
EXISTING MONITORING WELL & CONC. PAD
EXISTING PIPE BOLLARD (TYP. 2 PER WELL)
ROAD
WEED CONTROL AT EXIST. SINGLE MONITORING WELLS
1 / 05
MONITORING WELL BUMP-OUT NEAR TRANSFER CHANNEL
3 / 05
MONITORING WELL BUMP-OUT AT HAUL ROAD
2 / 05
0' 200' 400'
SCALE: 1" = 200'
REFERENCE DRAWINGS
REV.
DATE
DESCRIPTION
GROUNDWATER MONITORING & BORING PLAN
CCB MANAGEMENT FACILITY
COFFEEN
Ameren Energy Generating
DRAWING NO.
C-10206
0

C-10206



ANCHOR TRENCH & LINER SYSTEM (1/09)

N.T.S.

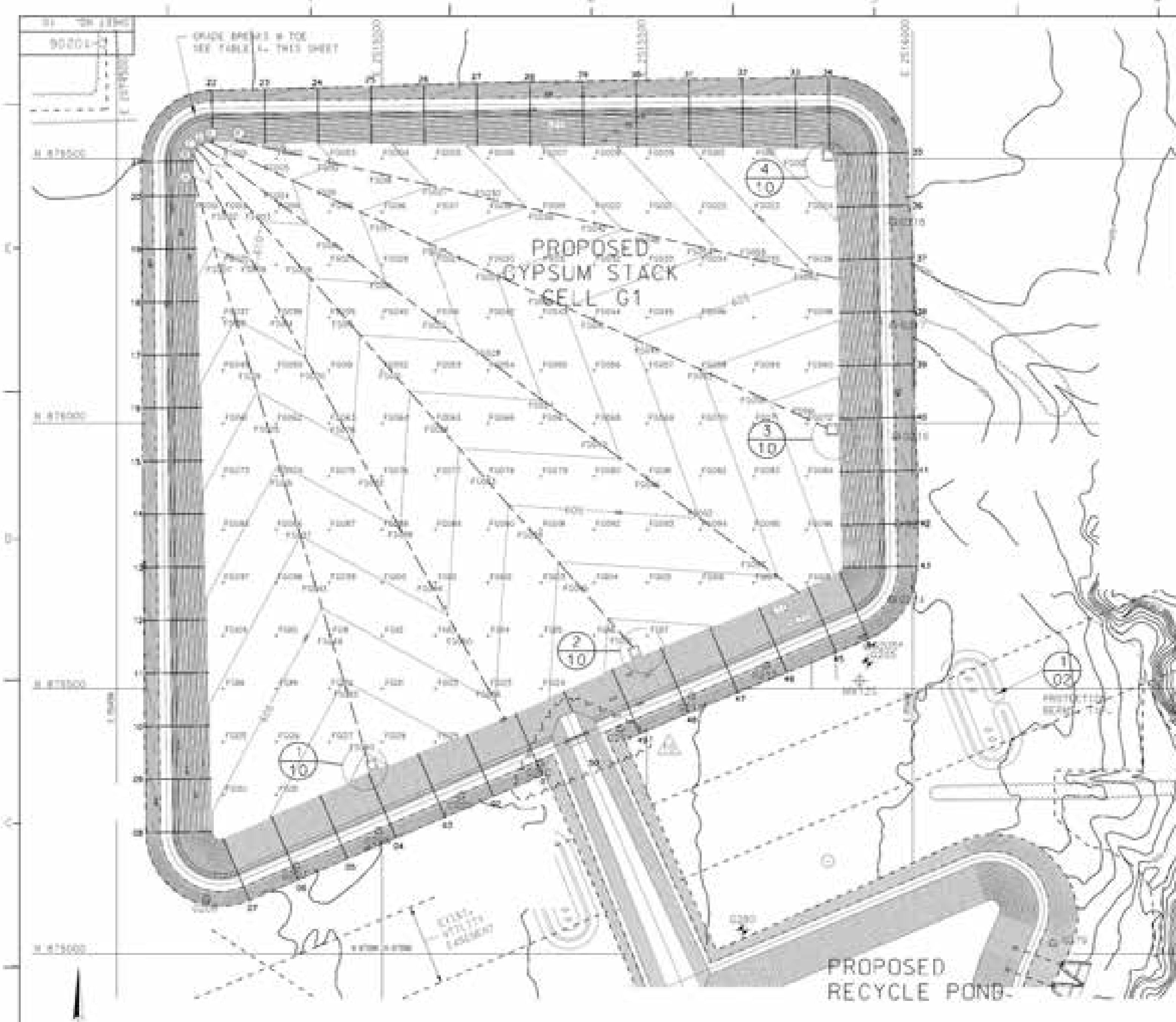
NOTE: PROCESS WATER RECOVERY SYSTEM NOT SHOWN

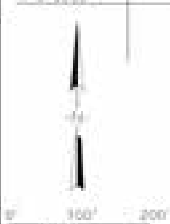
ANCHOR TRENCH AND LINER SYSTEM

CCR MANAGEMENT FACILITY

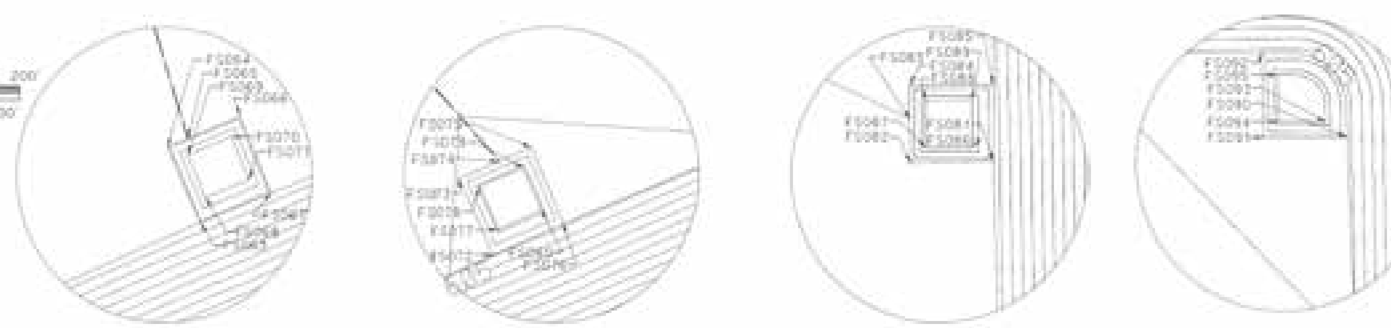
Ameren Energy Generating

DRAWING NO. C-10206 REV. 0





SCALE: 1" = 100'



1/10 SUMP DETAIL

2/10 SUMP DETAIL

3/10 SUMP DETAIL

4/10 SUMP DETAIL

NOTE: SEE OTHER PLAN SHEETS FOR LEGEND

TYPICAL POINT NUMBER LOCATION

FB 00
GRID POINT NUMBER
FOUNDATION GRADE (BREAK POINT)

FS 00
GRID POINT NUMBER
FOUNDATION GRADE (SUMP GRADING)

FG 00
GRID POINT NUMBER
FOUNDATION GRADE

F 00 00
POINT NUMBER (SEE POINT NUMBERING DETAIL)
CONTROL LINE NUMBER
FOUNDATION GRADE

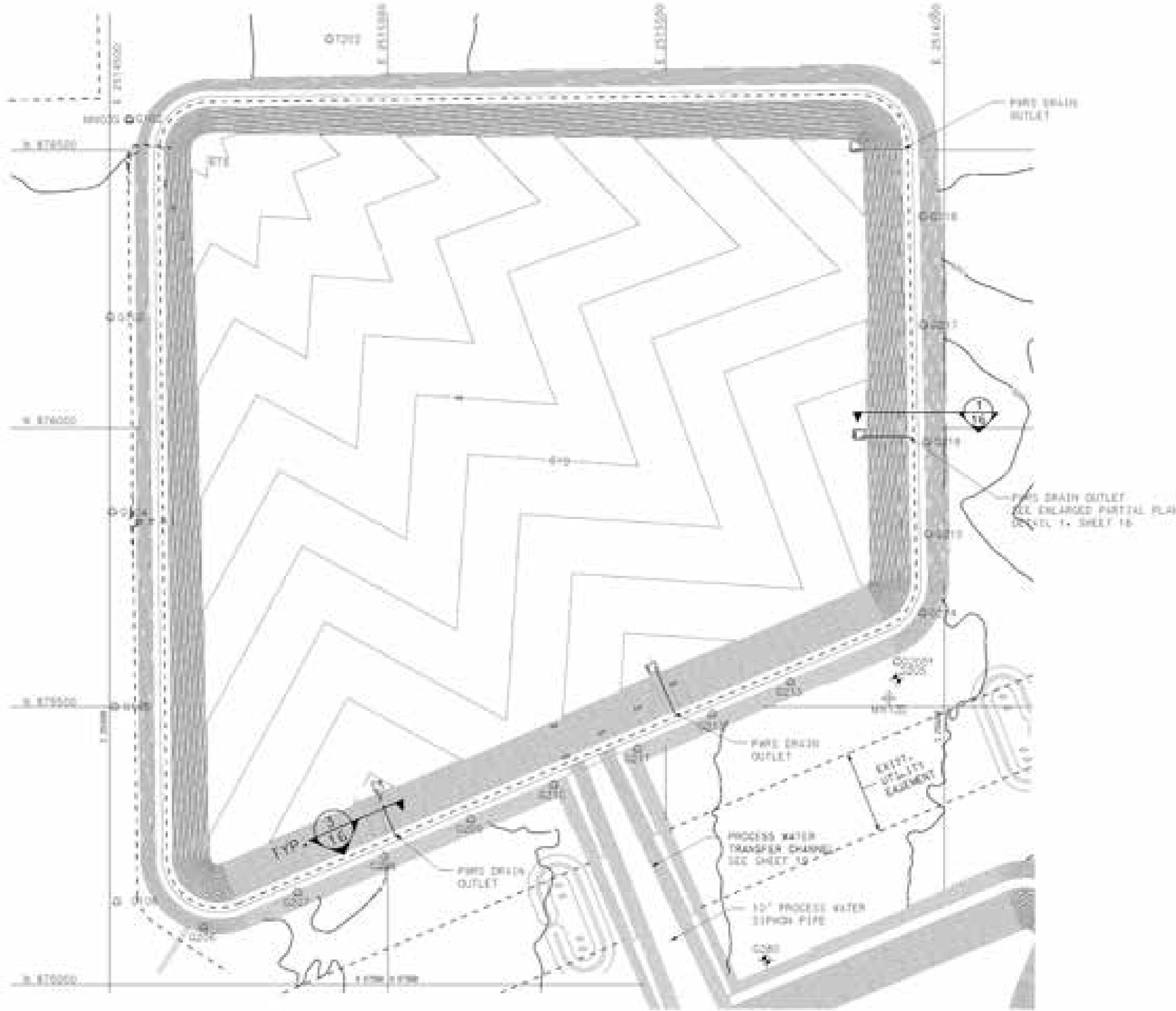
CELL G1-FOUNDATION GRADE
& CONTROL DATA

CCR MANAGEMENT FACILITY

Ameren Energy
Generating

DRAWING NO. C-10206

REV. 0



SCALE: 1" = 100'

0' 100' 200'

NOTES	REFERENCE DRAWINGS
	C-10207 LANDFILL PLANS; C-10211 LANDFILL ACCEPTANCE PLANS; C-10213 SIPHON STACK ACCEPTANCE PLANS; E-F0850 SUBGRADE POWER PLANS; E-F0855 LEACHATE COLLECTION POWER PLANS

CELL U1-PROCESS WATER RECOVERY SYSTEM

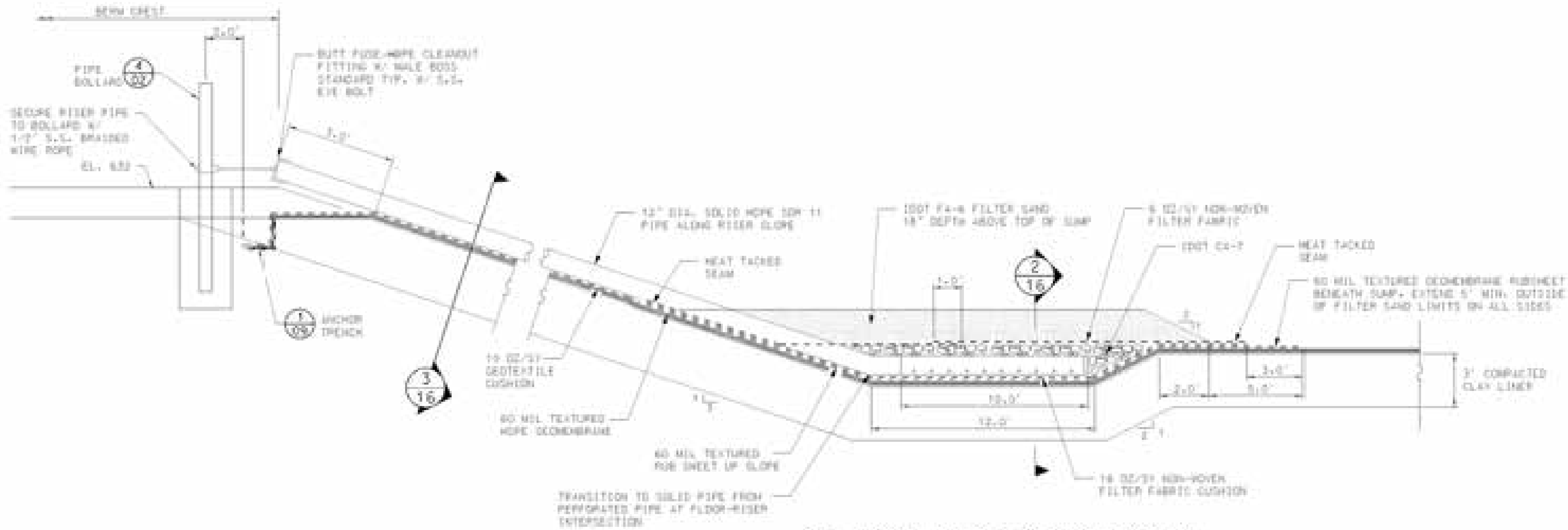
CCR MANAGEMENT FACILITY

Ameren Energy Generating

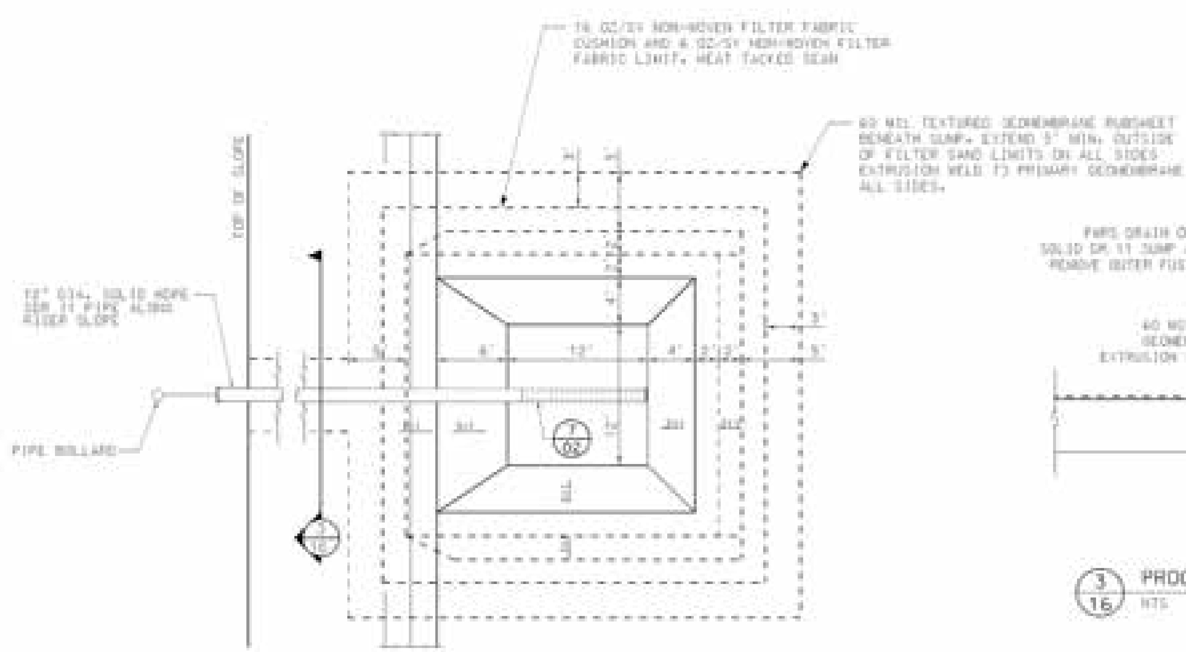
DRAWING NO. C-10206

REV. 0

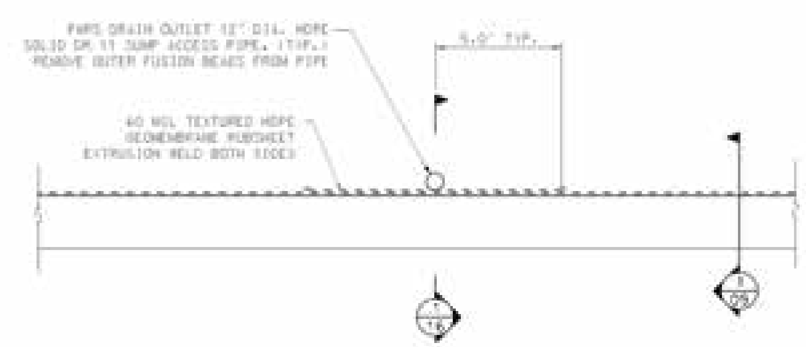
SHEET NO. 15



1/16 TYPICAL PROCESS WATER SUMP SECTION
NTS



2/16 PWRS SUMP PLAN
NTS



3/16 PROCESS WATER RECOVERY PIPE UP SIDESLOPE
NTS

NOTE:
ALL SIDE SLOPE PIPES
TO BE SOLID WALL

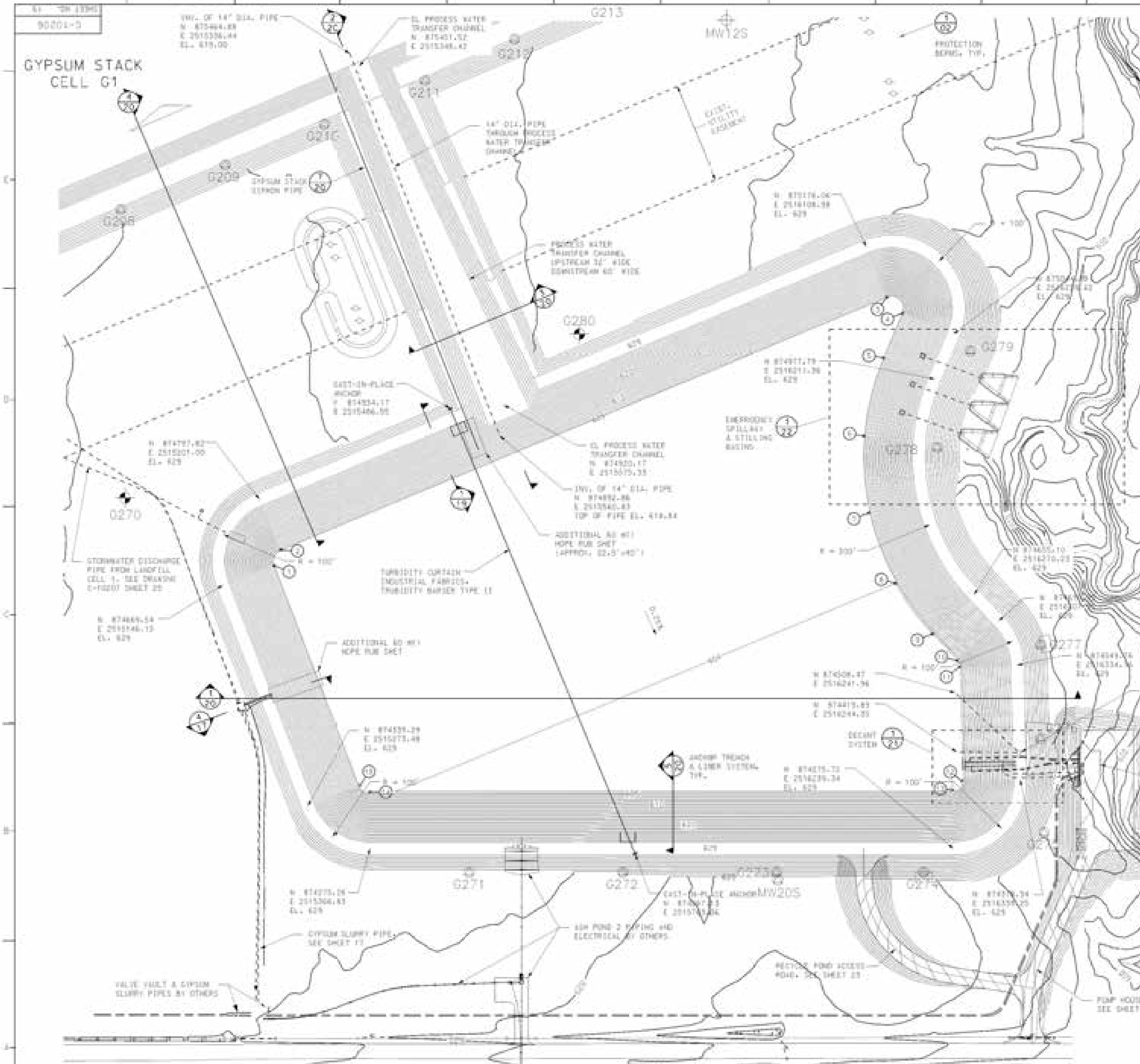
CELL G1-PWRS DRAIN DETAILS

CCR MANAGEMENT FACILITY

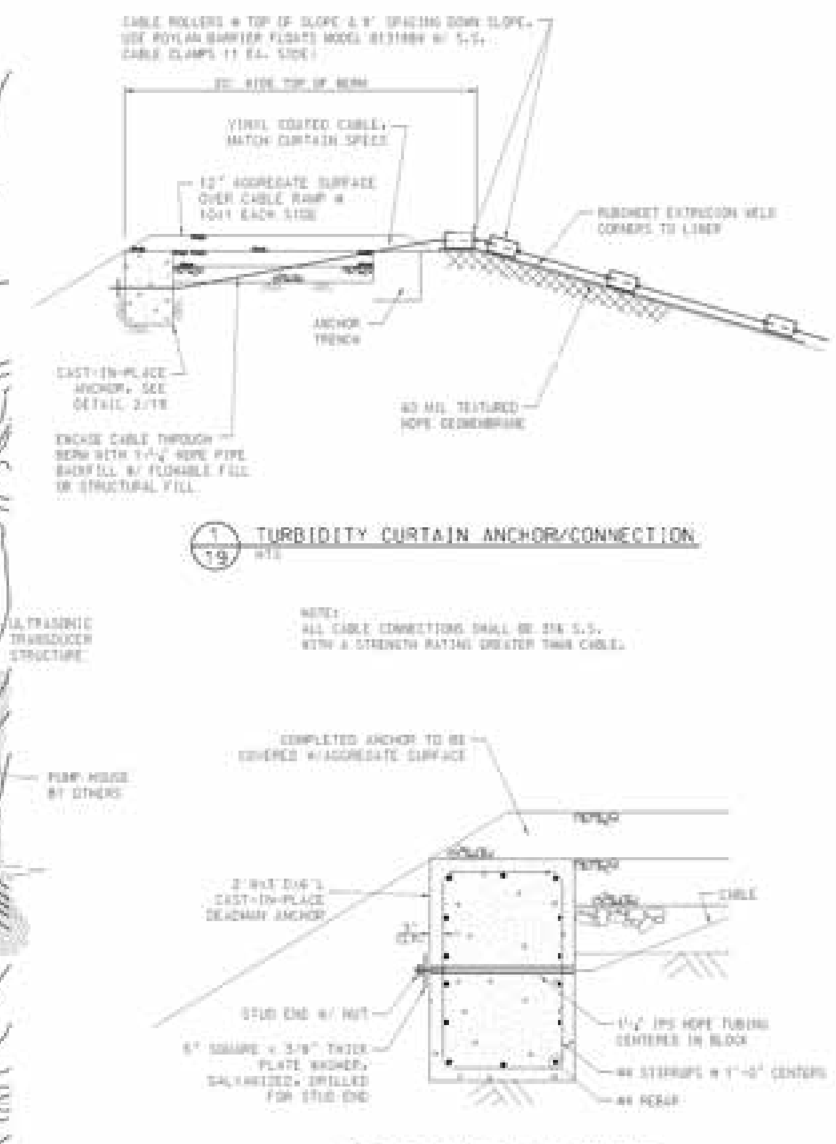
Ameren Energy Generating

DRAWING NO.	REV.
C-10206	0

SHEET NO. 16



RECYCLE POND - INTERIOR TOE			
POINT	N	E	ELEV.
1	874706.91	2515227.14	603.24
2	874723.71	2515241.70	603.02
3	875055.81	2516132.21	603.00
4	875069.31	2516155.88	604.92
5	875005.91	2516132.91	604.93
6	874909.21	2516101.54	604.91
7	874811.81	2516106.37	604.93
8	874717.51	2516125.35	604.29
9	874633.41	2516175.61	604.17
10	874550.34	2516246.12	604.22
11	874548.61	2516249.01	604.07
12	874377.99	2516248.77	602.44
13	874363.11	2516237.06	604.00
14	874359.91	2515366.65	604.25
15	874372.61	2515351.72	604.49



1/19 TURBIDITY CURTAIN ANCHOR/CONNECTION
NTS

NOTE:
ALL CABLE CONNECTIONS SHALL BE 316 S.S. WITH A STRENGTH RATING GREATER THAN CABLE.

2/19 CAST-IN-PLACE ANCHOR
NTS

RECYCLE POND PLAN & CONTROL DATA

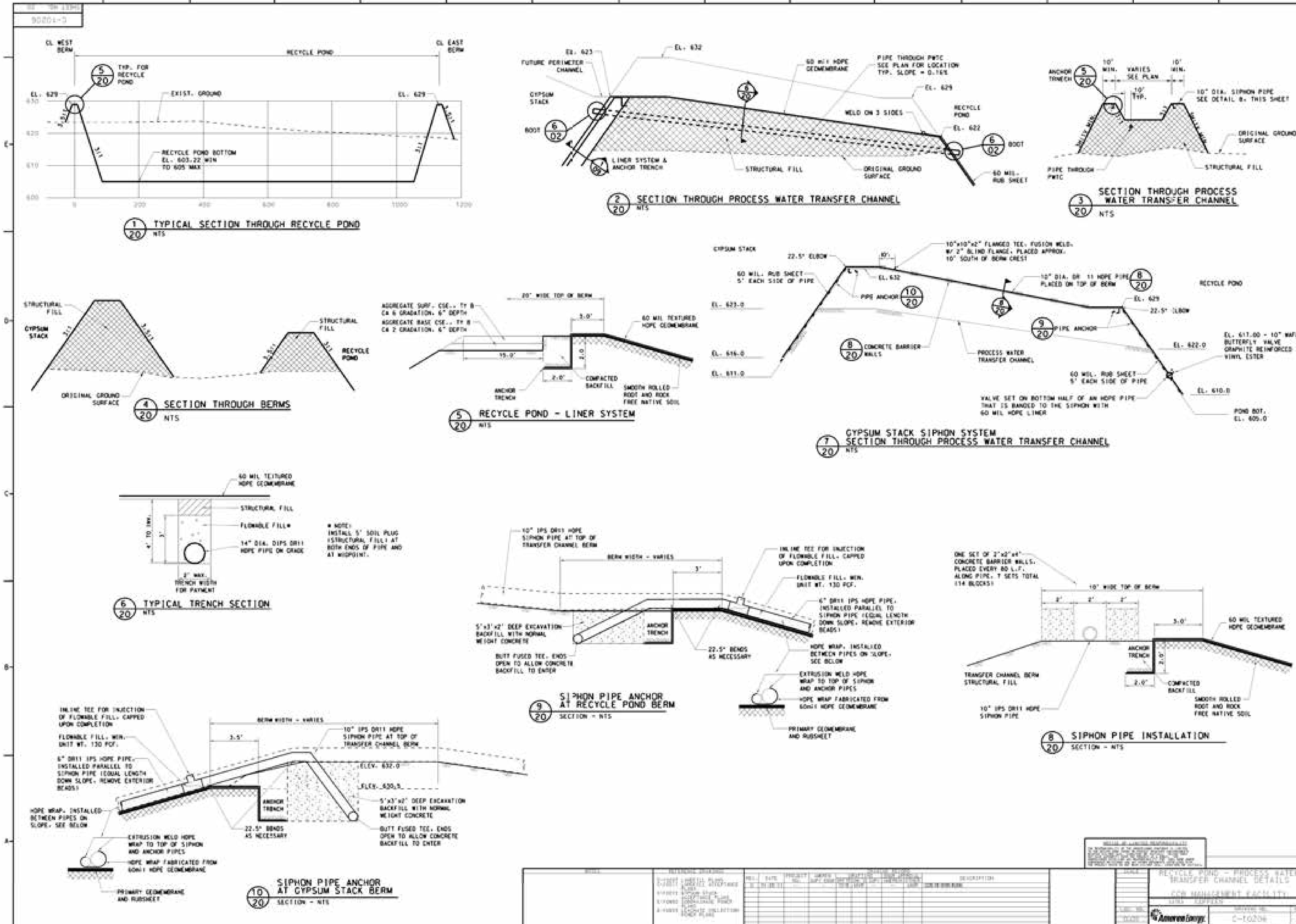
CCR MANAGEMENT FACILITY

SITES: COFFEEN

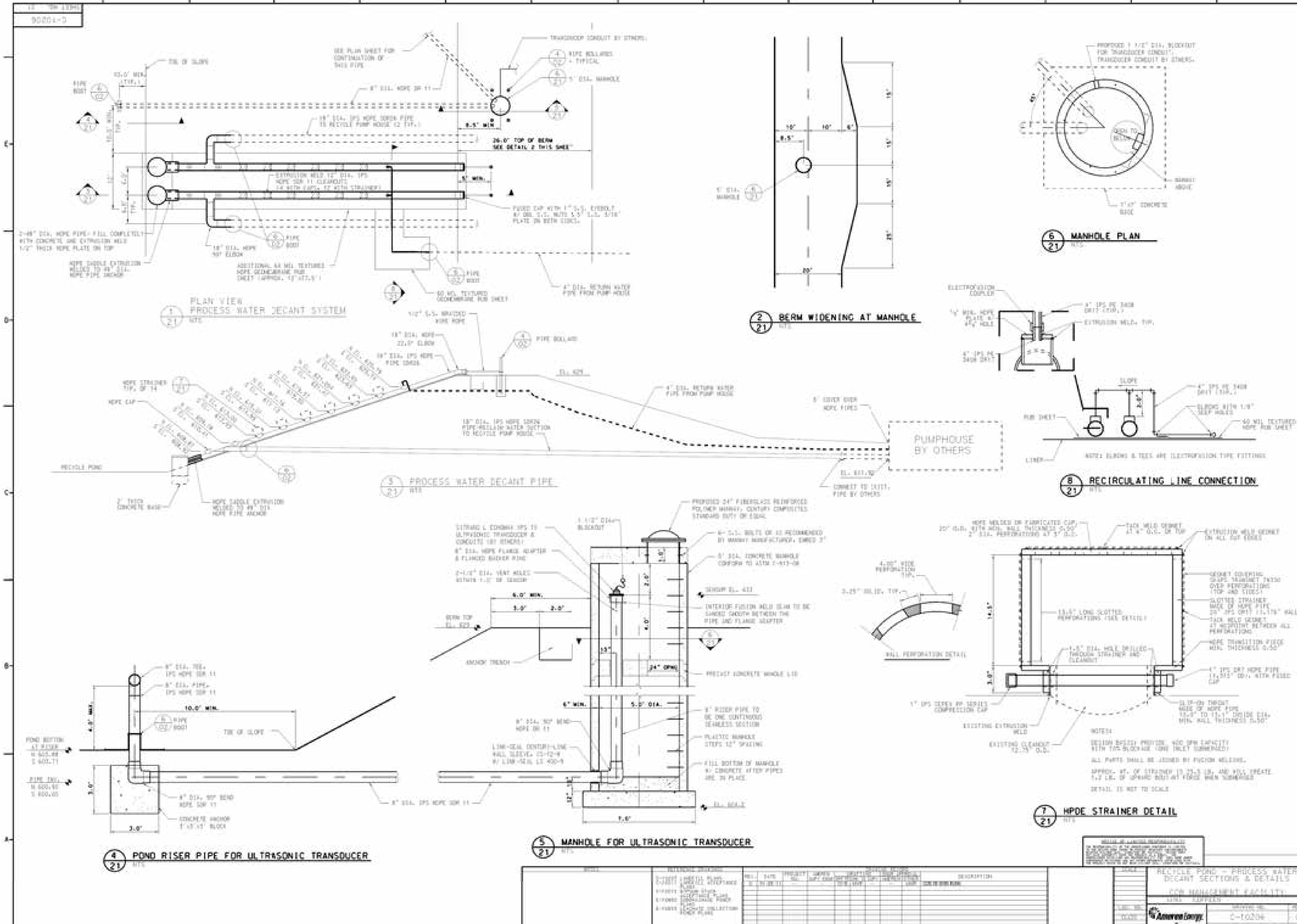
Ameren Energy Generating

DRAWING NO. C-10206 REV. 0

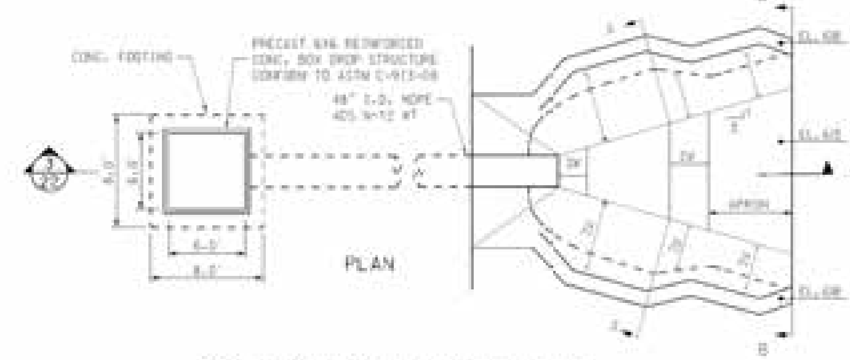
SHEET NO. 19



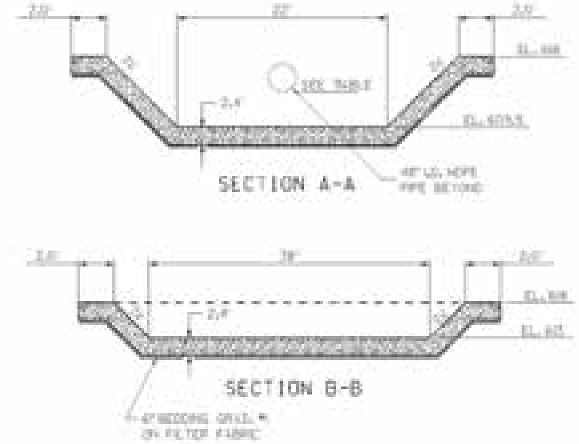
C-10206
CL WEST BERM
RECYCLE POND
CL EAST BERM
TYP. FOR RECYCLE POND
EL. 629
EXIST. GROUND
RECYCLE POND BOTTOM EL. 603.22 MIN TO 605 MAX
3:1
TYPICAL SECTION THROUGH RECYCLE POND
NTS
EL. 623
EL. 632
FUTURE PERIMETER CHANNEL
GYPSUM STACK
BOOT
60 mil HDPE GEOMEMBRANE
PIPE THROUGH PWTC SEE PLAN FOR LOCATION TYP. SLOPE = 0.16%
WELD ON 3 SIDES
RECYCLE POND
EL. 622
LINER SYSTEM & ANCHOR TRENCH
STRUCTURAL FILL
ORIGINAL GROUND SURFACE
60 MIL RUB SHEET
SECTION THROUGH PROCESS WATER TRANSFER CHANNEL
NTS
ANCHOR TRENCH
10' MIN.
VARIES SEE PLAN
10' TYP.
10" DIA. SIPHON PIPE SEE DETAIL 8, THIS SHEET
ORIGINAL GROUND SURFACE
PIPE THROUGH PWTC
STRUCTURAL FILL
SECTION THROUGH PROCESS WATER TRANSFER CHANNEL
NTS
STRUCTURAL FILL
GYPSUM STACK
RECYCLE POND
ORIGINAL GROUND SURFACE
SECTION THROUGH BERMS
NTS
20' WIDE TOP OF BERM
AGGREGATE SURF. CSE., TY B CA 6 GRADATION, 6" DEPTH
AGGREGATE BASE CSE., TY B CA 2 GRADATION, 6" DEPTH
3.0'
15.0'
2.0'
60 MIL TEXTURED HDPE GEOMEMBRANE
ANCHOR TRENCH
COMPACTED BACKFILL
SMOOTH ROLLED ROOT AND ROCK FREE NATIVE SOIL
RECYCLE POND - LINER SYSTEM
NTS
GYPSUM STACK
22.5° ELBOW
10"x10"x2" FLANGED TEE, FUSION WELD, W/ 2" BLIND FLANGE, PLACED APPROX. 10' SOUTH OF BERM CREST
60 MIL. RUB SHEET 5' EACH SIDE OF PIPE
EL. 632
10" DIA. DR 11 HDPE PIPE PLACED ON TOP OF BERM
RECYCLE POND
PIPE ANCHOR
EL. 623.0
EL. 629
22.5° ELBOW
PIPE ANCHOR
EL. 616.0
EL. 611.0
CONCRETE BARRIER WALLS
PROCESS WATER TRANSFER CHANNEL
EL. 622.0
EL. 617.00 - 10" WAFER BUTTERFLY VALVE GRAPHITE REINFORCED VINYL ESTER
60 MIL. RUB SHEET 5' EACH SIDE OF PIPE
VALVE SET ON BOTTOM HALF OF AN HDPE PIPE THAT IS BANDED TO THE SIPHON WITH 60 MIL HDPE LINER
EL. 610.0
POND BOT. EL. 605.0
GYPSUM STACK SIPHON SYSTEM SECTION THROUGH PROCESS WATER TRANSFER CHANNEL
NTS
60 MIL TEXTURED HDPE GEOMEMBRANE
STRUCTURAL FILL
FLOWABLE FILL*
4' TO 8max.
14" DIA. DIPS DR11 HDPE PIPE ON GRADE
2' MAX. TRENCH WIDTH FOR PAYMENT
* NOTE: INSTALL 5' SOIL PLUG (STRUCTURAL FILL) AT BOTH ENDS OF PIPE AND AT MIDPOINT.
TYPICAL TRENCH SECTION
NTS
10" IPS DR11 HDPE SIPHON PIPE AT TOP OF TRANSFER CHANNEL BERM
BERM WIDTH - VARIES
3'
INLINE TEE FOR INJECTION OF FLOWABLE FILL, CAPPED UPON COMPLETION
FLOWABLE FILL, MIN. UNIT WT. 130 PCF.
6" DR11 IPS HDPE PIPE, INSTALLED PARALLEL TO SIPHON PIPE (EQUAL LENGTH DOWN SLOPE, REMOVE EXTERIOR BEADS)
5'x3'x2' DEEP EXCAVATION BACKFILL WITH NORMAL WEIGHT CONCRETE
ANCHOR TRENCH
BUTT FUSED TEE, ENDS OPEN TO ALLOW CONCRETE BACKFILL TO ENTER
22.5° BENDS AS NECESSARY
HDPE WRAP, INSTALLED BETWEEN PIPES ON SLOPE, SEE BELOW
EXTRUSION WELD HDPE WRAP TO TOP OF SIPHON AND ANCHOR PIPES
HDPE WRAP FABRICATED FROM 60mil HDPE GEOMEMBRANE
PRIMARY GEOMEMBRANE AND RUBSHEET
SIPHON PIPE ANCHOR AT RECYCLE POND BERM
SECTION - NTS
ONE SET OF 2'x2'x4' CONCRETE BARRIER WALLS, PLACED EVERY 80 L.F. ALONG PIPE, 7 SETS TOTAL (14 BLOCKS)
10' WIDE TOP OF BERM
2'
3.0'
60 MIL TEXTURED HDPE GEOMEMBRANE
ANCHOR TRENCH
TRANSFER CHANNEL BERM STRUCTURAL FILL
2.0'
COMPACTED BACKFILL
SMOOTH ROLLED ROOT AND ROCK FREE NATIVE SOIL
10" IPS DR11 HDPE SIPHON PIPE
SIPHON PIPE INSTALLATION
SECTION - NTS
INLINE TEE FOR INJECTION OF FLOWABLE FILL, CAPPED UPON COMPLETION
FLOWABLE FILL, MIN. UNIT WT. 130 PCF.
6" DR11 IPS HDPE PIPE, INSTALLED PARALLEL TO SIPHON PIPE (EQUAL LENGTH DOWN SLOPE, REMOVE EXTERIOR BEADS)
BERM WIDTH - VARIES
3.5'
10" IPS DR11 HDPE SIPHON PIPE AT TOP OF TRANSFER CHANNEL BERM
ELEV. 632.0
ELEV. 630.5
HDPE WRAP, INSTALLED BETWEEN PIPES ON SLOPE, SEE BELOW
ANCHOR TRENCH
5'x3'x2' DEEP EXCAVATION BACKFILL WITH NORMAL WEIGHT CONCRETE
22.5° BENDS AS NECESSARY
BUTT FUSED TEE, ENDS OPEN TO ALLOW CONCRETE BACKFILL TO ENTER
EXTRUSION WELD HDPE WRAP TO TOP OF SIPHON AND ANCHOR PIPES
HDPE WRAP FABRICATED FROM 60mil HDPE GEOMEMBRANE
PRIMARY GEOMEMBRANE AND RUBSHEET
SIPHON PIPE ANCHOR AT GYPSUM STACK BERM
SECTION - NTS
NOTES
REFERENCE DRAWINGS
DESCRIPTION
RECYCLE POND - PROCESS WATER TRANSFER CHANNEL DETAILS
CCR MANAGEMENT FACILITY
Ameren Energy Generating
C-10206
0


PLAN VIEW
PROCESS WATER DECANT SYSTEM
BERM WIDENING AT MANHOLE
MANHOLE PLAN
PROCESS WATER DECANT PIPE
PUMPHOUSE BY OTHERS
RECIRCULATING LINE CONNECTION
POND RISER PIPE FOR ULTRASONIC TRANSDUCER
MANHOLE FOR ULTRASONIC TRANSDUCER
HPDE STRAINER DETAIL
NOTES:
DETAIL IS NOT TO SCALE
RECYCLE POND - PROCESS WATER
DECANT SECTIONS & DETAILS
CCR MANAGEMENT FACILITY
Ameren Energy Generating
C-10206
0

1/22 STILLING BASIN PLAN AT EMERGENCY SPILLWAY
NTS

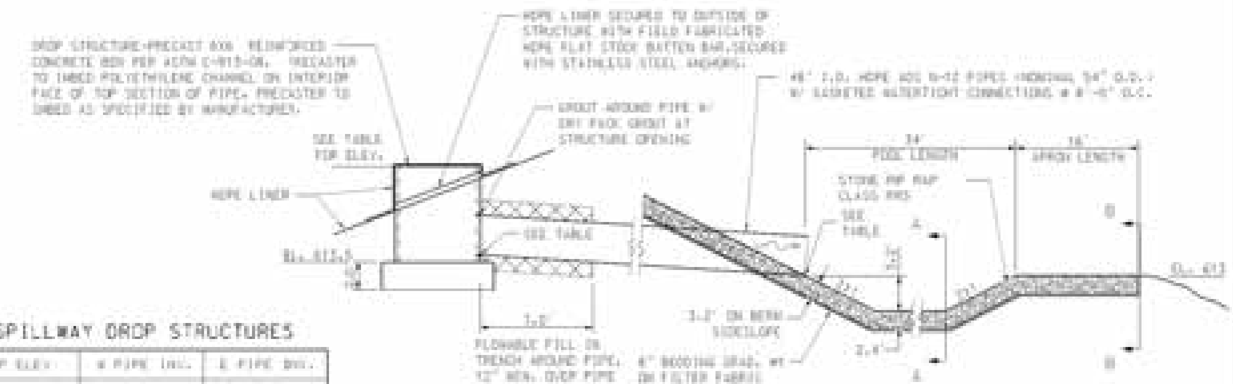


2/22 RIPRAP STILLING BASIN PLAN
NTS

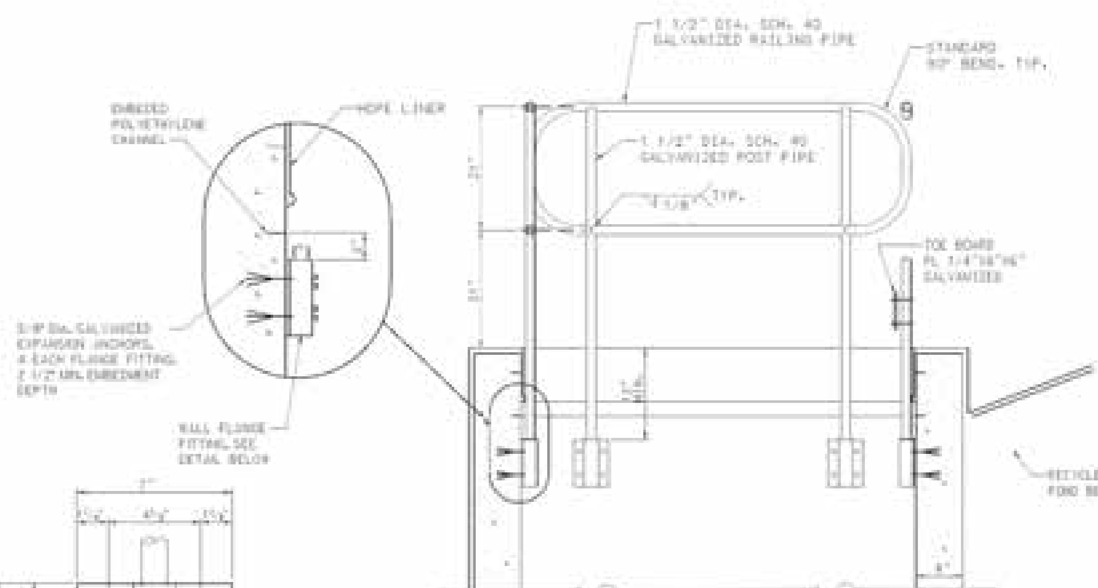


EMERGENCY SPILLWAY DROP STRUCTURES

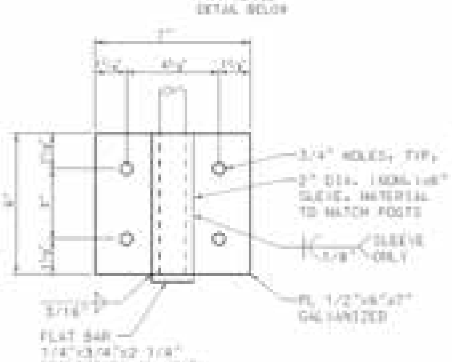
STRUCTURE	TOP ELEV.	W PIPE INV.	E PIPE INV.
NORTH	624.13	614.93	612.94
MIDDLE	624.15	614.95	613.00
SOUTH	624.17	614.03	613.06



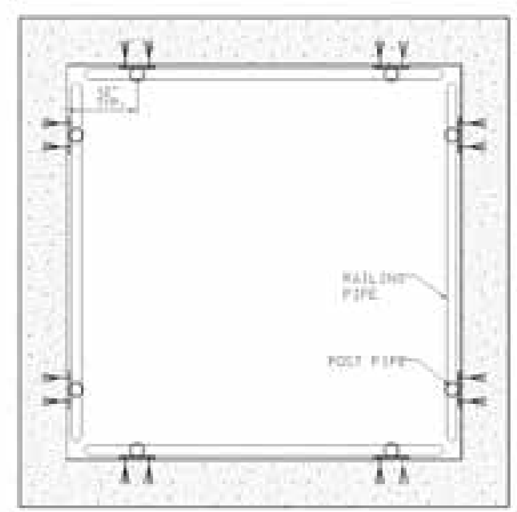
3/22 RIPRAP STILLING BASIN SECTION
NTS



4/22 DROP INLET HANDRAIL DETAIL
NTS



WALL FLANGE FITTING
NTS



5/22 DROP INLET HANDRAIL PLAN
NTS

HANDRAIL NOTES

GT-1 COPE ALL INTERSECTIONS OF RAILS AND POSTS. WELD JOINTS, AND GRIND SMOOTH TO A PLEASING APPEARANCE, TAKING CARE TO NOT REMOVE EXCESSIVE AMOUNT OF WELDED MATERIALS.

GT-2 BUTT WELD END-TO-END JOINTS, OR USE WELDING CONNECTIONS.

GT-3 CLEAN WELDED AREAS USING A WIRE BRUSH TO REMOVE SLAG AND LOOSE PARTICULATE. WIPE AWAY DUST WITH A CLEAN DRY RAG AND CLEAN THE WELDED SURFACE IN ACCORDANCE WITH SSPC-SP 1.

GT-4 TREAT ALL WELD ZONES WITH TWO COATS OF COLD GALVANIZING COMPOUND.

GT-5 COAT THE WELDED HANDRAIL ASSEMBLY PER THE FOLLOWING:
1 – 4 MIL COAT OF KRYLON INDUSTRIAL GALVANIZED METAL PRIMER
2 – 3 MIL COATS OF KRYLON INDUSTRIAL RUST TOUGH DTM ALKYD ENAMEL – COLOR: OSHA SAFETY YELLOW

NOTICE OF LIMITED RESPONSIBILITY

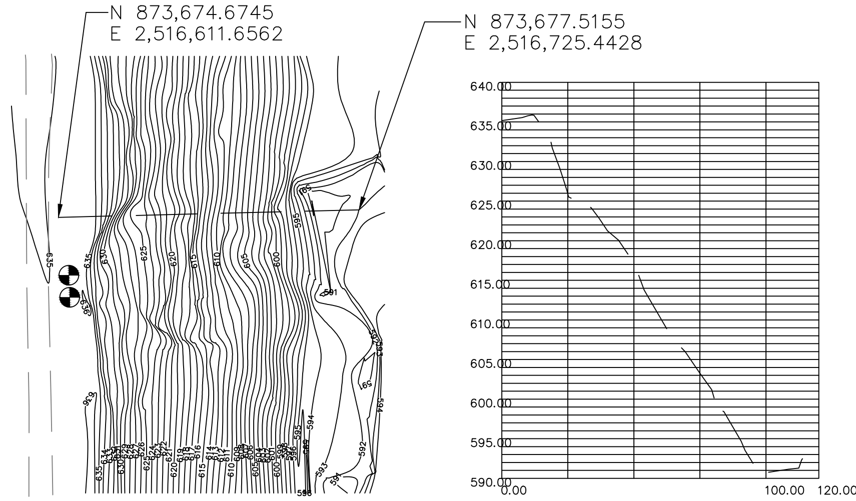
RECYCLE POND – EMERGENCY SPILLWAY SECTIONS & DETAILS
CCR MANAGEMENT FACILITY
SIOUX ENERGY CENTER

Ameren Energy Generating

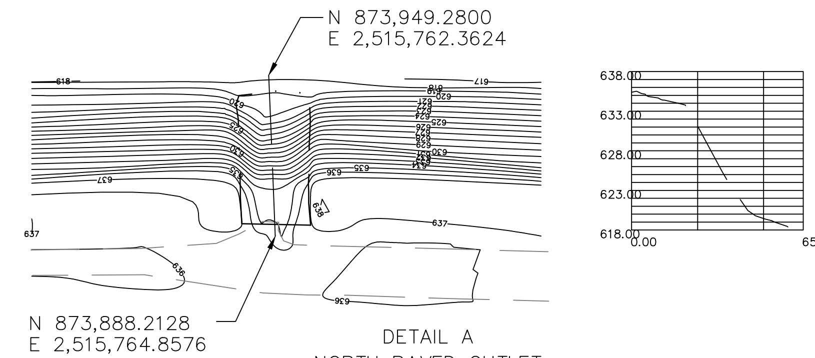
DRAWING NO.	REV.
C-10206	0

SHEET NO. 22

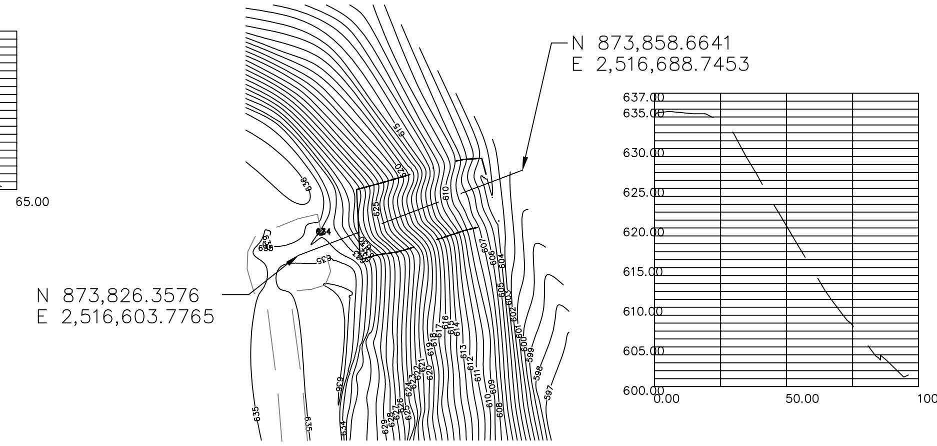
COFFEEN POWER STATION CLOSED ASH POND TOPO SURVEY



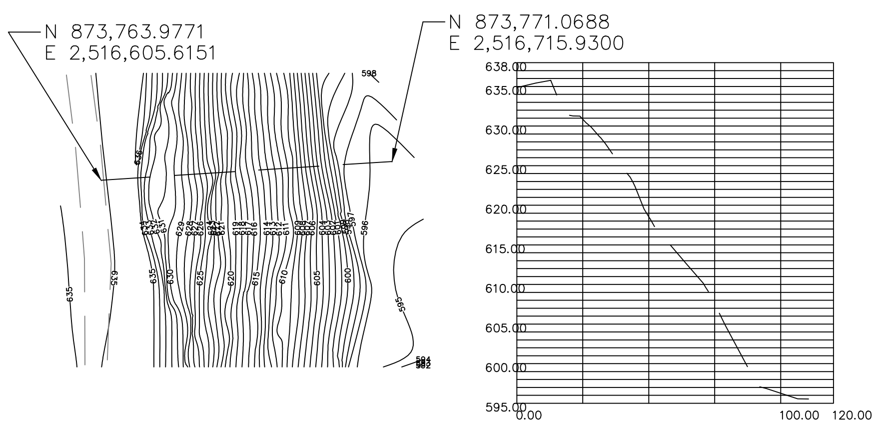
DETAIL G
EAST ERODED SLIDE AREA



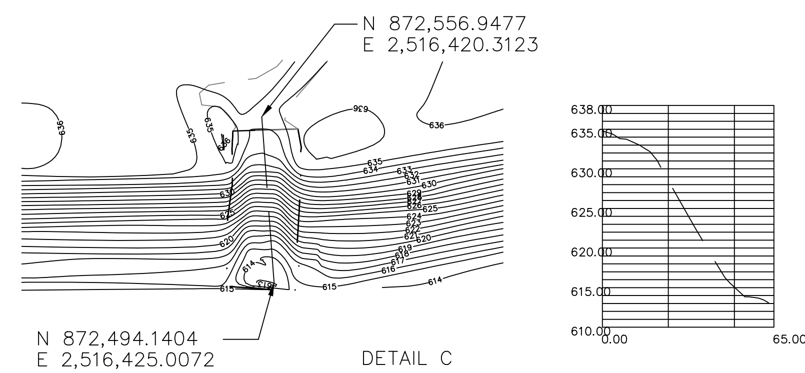
DETAIL A
NORTH PAVED OUTLET



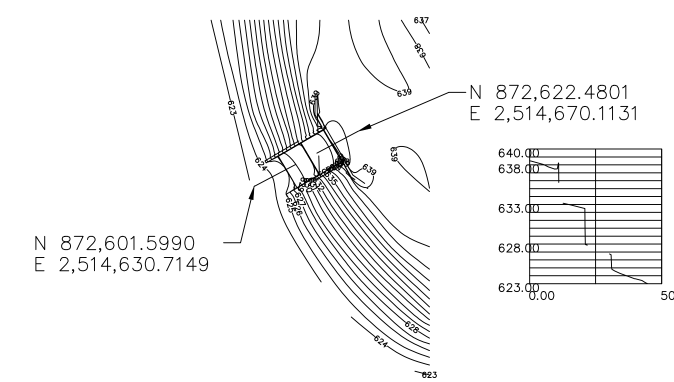
DETAIL B
NORTHEAST PAVED OUTLET



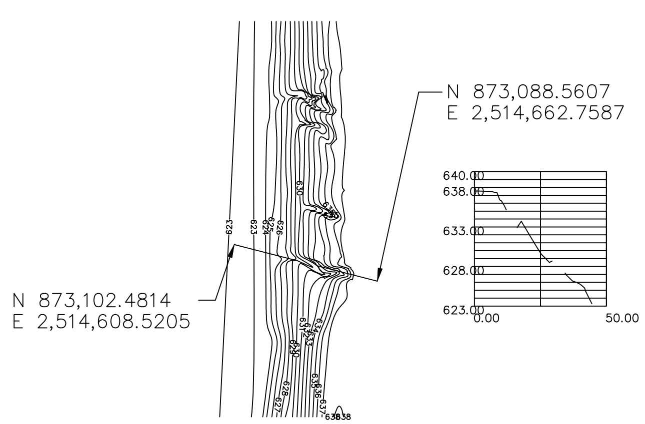
DETAIL H
NEW ERODED SLIDE AREA



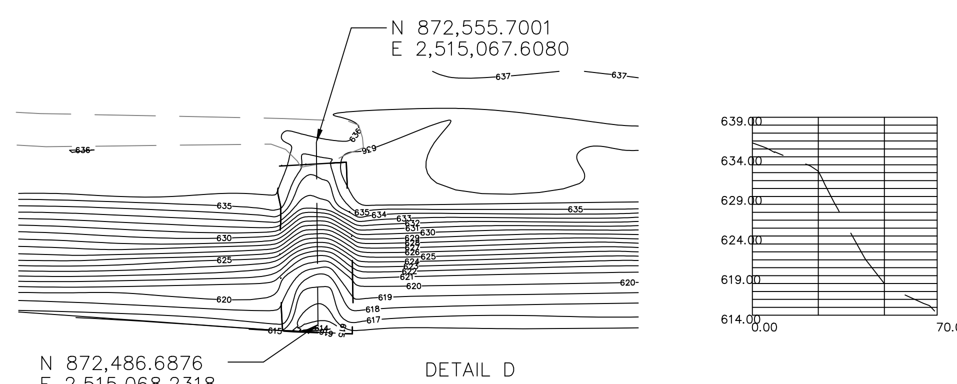
DETAIL C
SOUTHEAST PAVED OUTLET



DETAIL E **
CONCRETE DAM



DETAIL F
WEST ERODED SLIDE AREA



DETAIL D
SOUTHWEST PAVED OUTLET

LEGEND

GRAVEL DITCH EDGE
PAVED OUTLET EDGE
CROSS SECTION LINE
PIEZOMETER

N

30' 15' 0 15' 30'
SCALE IN FEET

BASIS OF BEARINGS –
BEARINGS ARE BASED ON THE IL. STATE PLANE COORDINATE SYSTEM. NAD 1983 WEST ZONE.

McDonough–Whitlow, P.C.
Consulting Engineers & Land Surveyors
138 East Wood Street
Hillsboro, IL 62049
Phone: 217.532.9233
Fax: 217.532.6300
PROFESSIONAL DESIGN No. 184–002754

TONY HARD
2953
PROFESSIONAL LAND SURVEYOR
STATE OF ILLINOIS
HILLSBORO, ILLINOIS

(License Expires: 11/30/06)

THIS IS TO CERTIFY TO AMEREN ENERGEY THAT A TOPOGRAPHIC SURVEY SHOWN HEREON HAS BEEN PERFORMED BY ME OR UNDER MY SUPERVISION AND THIS PLAT IS A REPRESENTATION OF MY PROFESSIONAL OPINION OF SAID SURVEY.

ILLINOIS PROFESSIONAL LAND SURVEYOR NO. 035–2953 DATE

FIELD WORK FOR THIS SURVEY WAS COMPLETED ON MAY 28, 2009

NOTES	REFERENCE DRAWINGS	REV.	DATE	PROJECT NO.	AMEREN SUPV ENGR	DRAFTING DRFTR	DRAFTING CHK'D	DRAFTING SUPV	ENGR APPROVAL AMEREN	ENGR APPROVAL OTHER	DESCRIPTION
		–	–	–	–	–	–	–	–	–	–

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. HE/SHE DOES NOT HAVE AUTHORITY OVER THE PROJECT AS A WHOLE. THE UNDERSIGNED DISCLAIMS ANY RESPONSIBILITY FOR WORK DONE UNDER SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

AS BUILT

SCALE
1" = 30'

COFFEEN POWER STATION
ASH POND #2
DRAINAGE MODIFICATIONS

SITE: AMEREN CLOSED ASH POND

LOC. NO. –
CLASS –

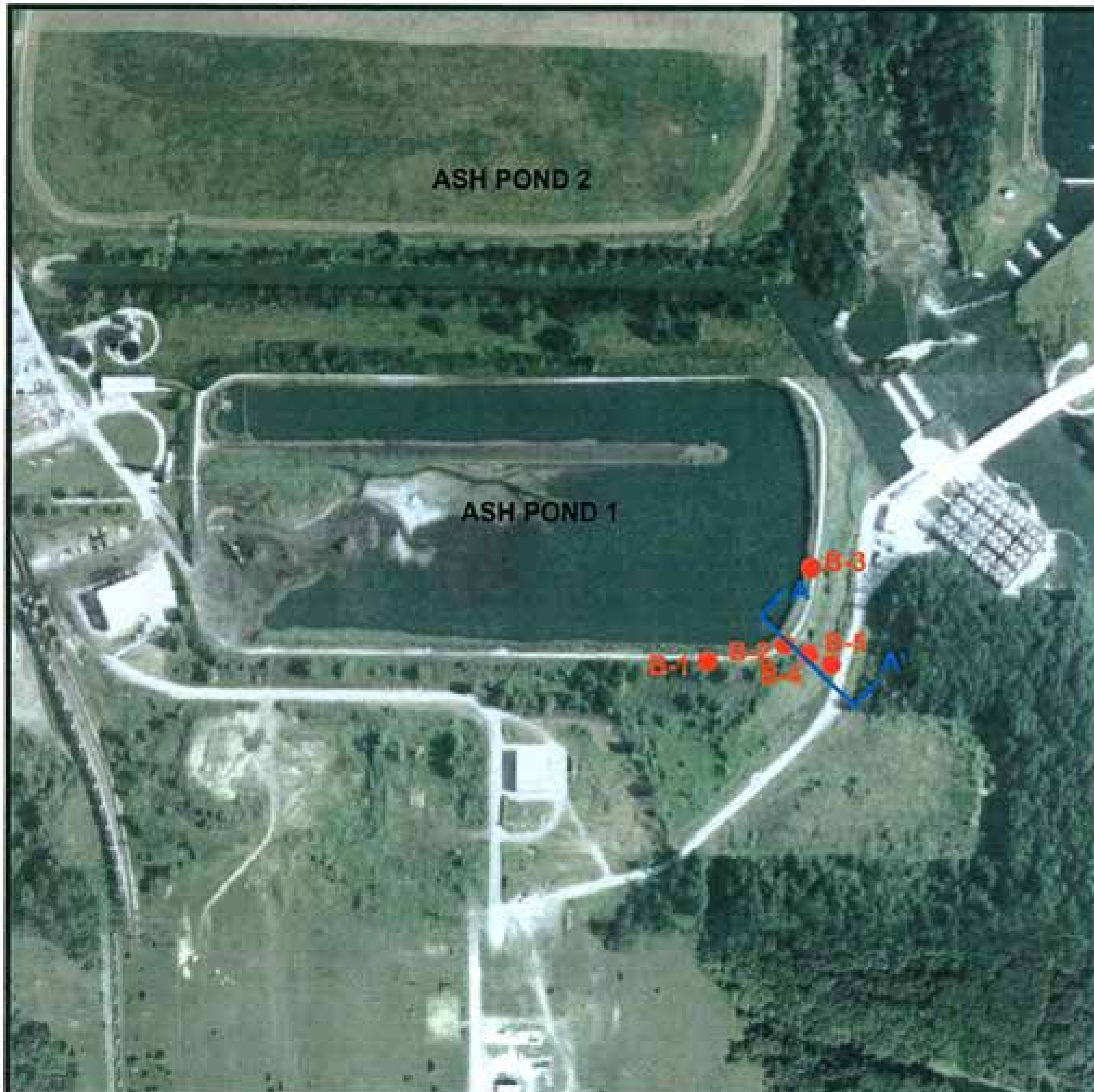
AmerenEnergy. Generating

DRAWING NO.	REV.
W1008	--

SHEET NO. 2 OF 2

AECOM

Appendix C: Coffeen Power Station Boring and Piezometer Locations



NOTES

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

LEGEND

● Boring Location

— Slope Stability Cross Section

0 200 400 800

SCALE IN FEET

N

Drawn By: SLC	Ck'd By: SLC	App'vd By:
Date: 11-04-10	Date: 12/21/10	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Coffeen Power Station
Coffeen, 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

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

0 200
APPROXIMATE SCALE FEET

N

Illinois Power Generating Company		PROJECT NO. 60440742
AECOM		
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Coffeen Ash Pond No.1 Piezometer Locations	FIG. NO. 2A

LEGEND

AECOM PIEZOMETER LOCATION

HISTORICAL PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 200

APPROXIMATE SCALE FEET

N

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

Illinois Power Generating Company	PROJECT NO. 60440742
AECOM	
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Coffeen Ash Pond No.2 Piezometer Locations
FIG. NO. 2B	

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 (COFFEEN).DWG Last edited: NOV. 04, 15 @ 3:03 p.m. by: david_deguire

Appendix D: Project Specifications, Gypsum Stack and Recycle Pond Construction (Hanson 2008)

PROJECT SPECIFICATIONS
GYPSUM STACK AND RECYCLE POND CONSTRUCTION
GYPSUM MANAGEMENT FACILITY
COFFEEN POWER STATION
MONTGOMERY COUNTY, ILLINOIS

Prepared For:

AMEREN ENERGY GENERATING COMPANY

Prepared By:

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January 2008

GYPSUM STACK AND RECYCLE POND CONSTRUCTION
GYPSUM MANAGEMENT FACILITY
COFFEEN POWER STATION
MONTGOMERY COUNTY, ILLINOIS

TABLE OF CONTENTS

	Sheet No.
Division 1 – General Requirements	
01356 - Storm Water Pollution Prevention Measures	01356-1 to 01356-3
Division 2 – Site Work	
02100 - Site Preparation	02100-2
02200 - Earthwork	02200-1 to 02200-12
02275 - Riprap	02275-1 to 02275-2
02315 - Granular Drainage Materials	02315-1 to 02315-8
02373 - Geotextiles	02373-1 to 02373-8
02376 - Geosynthetic Clay Liner	02376-1 to 02376-9
Attachment 1 – Bentomat® Certified Properties	End of Section
02640 - HDPE Piping	02640-1 to 02640-4
02800 - HDPE Geomembrane	02800-1 to 02800-12
02936 – Topsoil Seeding and Mulching	02936-1 to 02936-3
03100 – Concrete Formwork	03100-1 to 03100-5
03200 – Concrete Reinforcement	03200-1 to 03200-3
03300 – Cast-In-Place Concrete	03300-1 to 03300-6
03400 – Concrete Embedment Liner	03400-1 to 03400-4

PART 1. GENERAL

1.01 DESCRIPTION

A. This section pertains to the construction and maintenance of temporary erosion control systems to control erosion and sediment damage to adjacent properties and water resources, and the removal of erosion control devices when they are no longer required.

1.02 RELATED SECTIONS

The following sections contain items which are related to the work in this section:

02936 - Topsoil, Seeding, and Mulching.

1.03 REFERENCES

The following reference, or cited portions thereof, governs the work:

Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007.

1.04 SUBMITTALS

A. Submittals shall follow the provisions of Section 01010.

B. Preconstruction Submittals: A storm water best management practices (BMP) plan shall be submitted that includes the following items:

1. Site drawing showing anticipated locations of structural erosion controls, areas of disturbed soils, and drainage patterns;
2. Inspection and record-keeping procedures; and
3. Maintenance procedures for erosion controls.

PART 2. PRODUCTS

2.01 EROSION CONTROL SYSTEMS

Materials for erosion control systems shall be in accordance with Article 280.02 of the IDOT Standard Specifications.

PART 3. EXECUTION

3.01 EXAMINATION

The site shall be examined to determine the extent of work required.

3.02 PRECONSTRUCTION JOBSITE INSPECTION

A. The person who shall be at the jobsite during construction and who shall be responsible for insuring that erosion control work is completed in a timely manner shall be identified at the preconstruction meeting.

B. A jobsite inspection shall be conducted with the Owner's Representative to review and designate the locations and types of erosion protection to be placed. The inspection shall be scheduled at the preconstruction conference and carried out on the job site before beginning any work that will disturb existing drainage or potentially create erodible conditions.

3.03 CONSTRUCTION

A. Temporary erosion control systems shall be constructed in accordance with IDOT Standard 280001 and Article 280.04 of the Standard Specifications and as directed by the Owner's Representative. Erosion control devices shall be in place and approved by the Owner's Representative prior to beginning other work.

B. Incorporate permanent erosion control features into the project at the earliest practicable time to minimize the need for temporary erosion controls.

3.04 MAINTENANCE

A. Temporary erosion control systems shall be maintained in accordance with Article 280.05 of the Standard Specifications, except that measurement and payment provisions shall not apply.

B. Temporary erosion control systems for unprotected disturbed areas shall be cleaned of trapped sediment and repaired immediately prior to project close out.

C. Temporary seeding shall be applied to all disturbed areas except the gypsum stack excavation and the future fill and topsoil stockpiles.

3.05 REMOVAL AND DISPOSAL

When the Owner's Representative deems that temporary erosion control systems are no longer needed, they shall be removed and properly disposed, and silt deposits shall be removed or regarded as directed by the Owner's Representative, and the area seeded. Non-biodegradable temporary erosion control materials shall be disposed of off site. Biodegradable erosion control devices may be disposed of in spoil areas designated by the Owner's Representative. All laws and regulations in disposing of the materials shall be obeyed.

END OF SECTION 01356

PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to stripping of topsoil and vegetation from areas of the site that are to be excavated.

1.02 RELATED SECTIONS

No related sections.

PART 2. PRODUCTS

No products used.

PART 3. EXECUTION

3.01 EXAMINATION

The Contractor shall examine the site to determine the extent of work required.

3.02 SITE PREPARATION - STRIPPING

A. All vegetation and topsoil encountered within the Gypsum Stack grading limits shall be stripped. Topsoil shall be kept clean and free of all foreign material, and stored in separate stockpiles from vegetation and common excavations. Stockpiles shall be located as indicated on the drawings or as directed by the Owner's Representative.

B. Payment for stripping shall be based upon removal of 24 inches of topsoil in areas that require stripping.

3.03 DISPOSAL

All materials resulting from site preparation operations shall be stockpiled in the designated spoil area. Contractor shall obey all laws and regulations when disposing of the materials.

END OF SECTION 02100

PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to excavation, fill, and backfill required for foundation preparation, construction of low-permeability soil layer, anchor trench construction, miscellaneous site grading and berm construction.

1.02 RELATED SECTIONS

A. The following sections contain items which are related to the work in this section:

1. 01356 – Storm Water Pollution Prevention Measures
2. 02100 - Site Preparation
3. 02373 – Geotextiles
4. 02936 - Topsoil, Seeding, and Mulching

1.03 REFERENCES

The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007
2. Department of Sustainable Natural Resources, Soil Survey Standard Test Method, Unified Soil Classification System: Field Method (USCS).

1.04 MEASUREMENT AND PAYMENT

A. The Contractor shall be responsible for estimating the extent of excavation and fill required to complete the work, including, but not limited to, excavation to required elevations; loading, transporting, placing, and compacting low permeability soil; excavation and backfill of anchor trench; and miscellaneous site grading and berm construction. The Contractor shall include the dollar amount associated with all earthwork in his Lump Sum Bid amount.

B. Removal and replacement of unsuitable foundation material and subgrade stabilization measures directed by the Owner's Representative will be paid for on a time and material basis.

1.06 COORDINATION

Existing utilities or other plant facilities shall not be interrupted, except when permitted in writing by the Owner's Representative and then only after acceptable temporary services have been provided. A minimum 48-hour notice shall be provided prior to proceeding with an approved temporary interruption.

1.08 SUBMITTALS

A. Materials Handling Plan.

A materials handling plan shall be submitted for construction and protection of the low permeability soil liner. The plan shall describe the following:

1. Processing and placement of the low permeability soil type, model number, weight, and critical dimensions of equipment to be used for soil processing, compaction, scarification, and smooth rolling;
2. Method of protecting low permeability soil from changes in moisture content and freezing after placement.

B. Construction Access Ramp Layout.

Layout drawings shall be submitted showing alignment, profile, and typical section of the construction access ramps from the haul road into the bottom of the Gypsum Management Facility excavation. The minimum width of the ramp shall be 50 ft., and the longitudinal grade shall not exceed 8 percent.

PART 2. PRODUCTS

2.01 MATERIALS

A. Earth Fill Material

Earth Fill Material shall consist of a mixture of clay, silt, sand, and gravel-sized particles obtained from previously constructed subsoil stockpiles. These materials can be used separately or mixed as required for best results. When placed, Embankment Material shall have a USCS classification of SM, ML, or CL and shall be uniform. This material shall be free of ice, snow, organic matter, rubbish, and debris. Coarse-grained particles shall be well dispersed to prevent the development of segregated pockets or zones with insufficient fine material to fill the interstices.

B. Soil Liners

The Soil Liner for the Gypsum Management Facility is considered a Clay Liner, and shall be soil classification CL, CL-ML, or CH. The material shall be free of roots, debris, organic or frozen material, and shall have a maximum clod size no greater than the length of the compactor foot for the compaction equipment proposed by the Contractor. When compacted, the material shall have a hydraulic conductivity of less than 1 x 10^{-4} cm/sec.

C. Soil Stabilizers and Moisture Conditioning Agents

Additives to accelerate drying or to improve stability and workability of soil shall not be permitted unless approved in writing by the Owner's Representative.

2.02 EQUIPMENT

A. Compaction Equipment

1. Tamping foot rollers

Compaction equipment shall consist of tamping foot rollers which have a minimum weight of 40,000 pounds. At least one tamping foot shall be provided for each 110 square in. of drum surface. The length of each tamping foot, measured from the outside surface of the drum, shall be at least 1 in. longer than the loose lift thickness.

2. Steel-Wheeled Rollers

Equipment used to produce a smooth compacted surface shall be a smooth, non-vibratory steel wheeled roller weighing not less than 1,000 lb. per lineal ft.

B. Scarification Equipment

Discs, rotor tillers, or other equipment used to scarify the surface shall be capable of uniformly disturbing the upper 6 in. of surface to provide good bonding between lifts.

C. Mixing and Spreading Equipment

Discs, harrows, and motor graders or other similar equipment shall be available at the site for use in spreading, mixing, and drying Compacted Subsoil Stockpile Material.

PART 3. EXECUTION

3.01 PREPARATION

A. Control of Work

Benchmarks, monuments, and other reference points shall be maintained throughout the work area.

B. Utility Location

Before starting excavation, the location and extent of underground utilities in the work area shall be established.

3.02 EXCAVATION

A. General

Excavation consists of removal and redistribution of material encountered when establishing required grade and subgrade elevations. The Contractor shall be responsible for dewatering, protection, shoring, and disposal of excavated materials as necessary to complete the excavation.

B. Procedures

Excavation may be accomplished by any method and by use of any equipment that is suitable to the work, except that blasting will not be permitted. Based on previous construction experience at the site, it is recommended that excavation to the foundation grade be completed as far in advance of low permeability soil placement as possible to allow the foundation surface to dry and form a "crust" capable of sustaining compactive effort.

C. Overexcavation

All excavation shall be performed to the lines and grades indicated on the plans. Any overexcavation or excess excavation not requested by the Owner's Representative shall be at the expense of the Contractor.

D. Disposal of Excavated Materials

Contractor shall utilize excavated material as stockpile materials for future use as specified in paragraph E.

E. Stockpile Requirements

1. Excavated clay and silty clay materials are to be stockpiled in the short-term subsoil stockpile area.
2. Excess excavated materials are to be stockpile in the areas designated on the drawings.
3. Materials not suitable for use as fill or backfill shall be disposed of onsite in the locations specified by the Owner's Representative.
4. Spread fill material for use by others, topsoil, and low permeability soil are to be stockpiled in layers not to exceed 1 ft loose thickness.
5. Tops of stockpiles are to be graded to ensure positive drainage. Side slopes for stockpiles shall be no steeper than 3H:1V.
6. Perimeter ditches are to be excavated to intercept runoff flowing toward stockpile areas and to route it to outlet locations approved by the Owner's Representative.

3.03 SUBGRADE PREPARATION

A. Areas to receive fill shall be proof rolled under the observation of the Owner's Representative. Soft, loose, weak, or wet materials shall be removed and replaced with compacted fill or stabilized with geotechnical fabric or geogrid as directed by the Owner's Representative. Joints, fractures, and moisture seeps shall be repaired, and local sand deposits, if present at foundation grade, shall be removed and backfilled with compacted fill material as directed by the Owner's Representative.

B. The Owner's Representative may recommend additional drying time for soft, wet subgrade that has not been exposed long enough to permit "crust" formation. If approved by the Owner's Representative, the Contractor may install, at his own expense, geotechnical fabric or geogrid to stabilize the wet subgrade and expedite construction.

C. No fill shall be placed until the subgrade has been examined and approved.

3.04 GENERAL FILL

A. Placement

1. Unless otherwise indicated on the plans, all fill shall be composed of Earth Fill Material.
2. Fill materials used in embankment construction shall normally be placed in lanes parallel to the embankment axis and shall be placed in conformance with the lines, grades, and slopes as indicated on the plans. Placement of fill materials in lanes which are not parallel to the embankment will be allowed only where working room is too restricted for normal placement as determined by the Owner's Representative.
3. Fill shall be spread in approximately flat layers in such a manner as to obtain lifts of relatively uniform thickness without spaces between successively deposited loads. Segregation shall be prevented during placing and spreading. Hauling equipment shall be routed across the fill in such a way as to promote uniform compaction and to prevent the formation of ruts.
4. The maximum compacted thickness of each lift shall not exceed 8 in. where heavy compaction equipment will be used. The maximum compacted thickness shall not exceed 3 in. where power tampers or similar smaller equipment will be used. It may be necessary to reduce the thickness of lifts in order to obtain the required minimum density.
5. Where compacted earth fill is to be placed against existing slopes, each lift shall be keyed into existing slope by removing existing slope material in steps as each new lift is placed.
6. The surface of the fill shall be kept reasonably smooth. The fill surface shall be sloped transverse to the axis of the embankments to allow drainage. If the compacted surface is, in the opinion of the Owner's Representative, too smooth or too dry to bond properly with the

succeeding lift, it shall be roughened by scarifying, light discing, or other acceptable means, and it shall be sprinkled before the succeeding lift is placed thereon. If the surface becomes rutted or uneven subsequent to compaction, it shall be flattened and leveled before placing the next lift. This extra work shall be at the Contractor's expense.

7. Fill operations shall be suspended during periods of extended wet weather. Upon resuming operations, all fill materials that are excessively wet or soft shall be reprocessed in place or removed and stockpiled for reprocessing. The removal of soft material shall be carried to such depth as is necessary to expose firm materials. Fill shall not be placed on frozen surfaces.
8. When filling operations at any section will be suspended for any period in excess of 12 hours or in wet weather, the surface of the fill shall be rolled smooth to seal it against excessive absorption of moisture and to facilitate runoff. Prior to resuming fill placement and compaction, the fill surface shall be scarified and/or disced and moisture conditioned as required.
9. The Contractor will receive no additional compensation for any removal, reprocessing, stockpiling, recompaction, wasting, or similar operation related to suspensions or conditions due to weather or other causes unless caused by the Owner.
10. Earth fill access ramps shall not be constructed within the limits of the compacted embankments without prior approval. When such ramps are approved, they shall be constructed of low permeability soil (in-board of the perimeter berm) or compacted fill (out-board of the perimeter berm).

B. Compaction -

1. Fill materials shall be compacted to a dry density equal to or greater than the following:

   a. The Gypsum Management Facility: 95 percent of the maximum dry density obtained from the Standard Proctor Test, ASTM D698.

   In order to insure uniform coverage and to facilitate construction inspection and control, the compaction of each layer shall proceed in a systematic, orderly, and continuous manner. Rolling shall be parallel to the embankment axis, except where there is insufficient working room for such operations.

2. The moisture content of all earth fill materials shall be as uniform as practicable throughout each lift. Fill shall be compacted at a moisture content that is no more than 2 percent below and no more than 2 percent above optimum moisture content.
3. Moisture conditioning of fill materials shall be performed by discing, harrowing, plowing, blading, or other suitable means prior to excavation. Moisture conditioning where the fill is placed shall be limited to minor adjustments prior to compaction. Addition of moisture shall be by using a

pressure spray bar mounted in front of or to one side of a water tanker so that water will not collect in the tracks of the truck.

4. Compaction of fill materials shall not commence if the moisture content is not within the specified limits. Any materials that are placed but not compacted prior to drying out or becoming too wet shall be removed and replaced or reprocessed at the Contractor's expense.
5. No admixtures as drying agents or to improve the workability of the soil will be allowed.

3.05 SOIL LINERS

A. Sources

The Soil Liners for the Gypsum Management Facility shall be constructed from Soil Liner Material as described in paragraph 2.01(B) above.

B. Test Liner

A compacted low permeability soil test liner of the actual full scale liner shall be constructed in accordance with the following requirements:

1. Test liner will be constructed from the same soil material sources, to the same design specifications, and with similar equipment and procedures as are proposed for the full scale liner.
2. Test liner will be at least four times the width of the widest piece of equipment to be used.
3. Test liner will be no less than 100 ft long to allow equipment to reach normal operating speed before reaching a central 40-ft test area.
4. Test liner will be constructed with maximum 8-in. compacted lifts for a total liner thickness of 3 ft.
5. Test liner will be tested by the Owner's Testing Consultant as described below for each of the following physical properties:

   a. Multiple two-stage Boutwell permeameter tests will be used on the test liner to determine the hydraulic conductivity. The two-stage field hydraulic conductivity test is a falling head infiltration test conducted in a cased borehole, typically 4 in. in diameter. The test is cited in the U.S. EPA Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, September 1993 (EPA/600/R-93/182).
   b. Undisturbed samples (Shelby tubes) will be tested in the laboratory for hydraulic conductivity to determine if there is a statistical correlation to the field testing results.
   c. Other engineering parameters including, but not limited to, particle size analysis, liquid limits, plasticity, water content, and in-place density that are needed to evaluate the full scale liner will be determined.

6. Additional test fills will be constructed for each new soil type or for each change in equipment or procedures.

C. Full Scale Liner Construction:

1. Full scale liner construction shall not be commenced until the results of the in-place compaction testing and Boutwell permeameter tests on the test liner confirm that the construction procedures and specified compaction requirements produce a in-situ hydraulic conductivities as specified in Section 2.01(B) above.
2. The liner shall be constructed according to the placement and compaction requirements for general fill, except the material shall be compacted to a density of no less than 95 percent of maximum dry density at a moisture content between 100 percent and 105 percent of optimum. The same compaction procedures, such as number of passes, speed, and compaction equipment used on construction of the test liner shall be used. Grade stakes shall not be driven into the clay liner.
3. The completed liner shall be smooth rolled to limit moisture loss and promote run-off of surface water. Moisture content shall be maintained within the specified range and erosion or other damage that occurs in the soil liner shall be repaired as directed by the Owner's Representative until the geosynthetic liner is placed.
4. Repair of any rutting or other damage caused by the installation of the geosynthetic liner will be paid for on a time and material basis.
5. Voids created in the clay barrier layer during construction (including, but not limited to, penetrations for test samples, and other penetrations necessary for construction) shall be repaired by removing material that does not meet the requirements for low permeability soil, placing low permeability soil backfill, granular or pelletized bentonite, or a mixture of bentonite and low permeability soil in lifts no thicker than 2 in. and tamping each lift with a steel rod. Each lift shall be tamped a minimum of 25 times altering the location of the rod within the void for each blow. Other ruts and depressions in the surface of the lifts shall be scarified, filled, and then compacted to grade.

3.06 CUSHION DIRT

Cushion Dirt to be placed beneath the upper High Density Polyethylene (HDPE) Geomembrane is to be placed to the specifications for General Fill in Section 3.04 above, except fill materials for Cushion Dirt shall be compacted to a dry density equal to or greater than 90 percent of the maximum dry density obtained from the Standard Proctor Test, ASTM D698.

3.07 ANCHOR TRENCH CONSTRUCTION

A. Gypsum Management Facility

1. A ledge at the bottom of the anchor trench elevation shall be excavated. Low permeability soil shall be placed and compacted on the ledge as shown on the anchor trench details in the plans.

2. The anchor trench shall be excavated to the depth and width shown on the anchor trench details. The front edge of the trench shall be rounded to eliminate any sharp corners that could cause excessive stress to the geosynthetic liners. Loose soil shall be removed or compacted into the floor of the trench.

3. Subsequent to Geosynthetic Clay Liner (GCL), Bottom HDPE Geomembrane and Geotextile Cushion installation, it shall be verified that the liners cover the entire trench floor, but do not extend up the back of the trench wall. After the liner installation in the trench has been inspected and approved by the Owner's Representative, the trench shall be backfilled with 1 ft. of low permeability soil. The backfill shall be deposited and compacted according to the requirements for general fill in such a manner as to prevent damage to the GCL and liner materials.

4. Subsequent to installation of separation geotextile on top of drainage layer, it shall be verified that the fabric extends across the top of the initial 1 ft layer of trench backfill, but does not extend up the back of the trench wall. After the fabric installation in the trench has been inspected and approved by the Owner's Representative, the trench shall be backfilled with 1 ft of low permeability soil. The backfill shall be deposited and compacted according to the requirements for general fill in such a manner as to prevent damage to the geotextile fabric.

5. Subsequent to installation of the upper HDPE Geomembrane, verify that the liner extends across the top of the initial 1 ft layer of trench backfill, but does not extend up the back of the trench wall. After the liner installation in the trench has been inspected and approved by the Owner's Representative, backfill the remainder of the trench to the top of the low permeability soil layer. Deposit and compact the backfill according to the requirements for general fill in such a manner as to prevent damage to the HDPE Geomembrane.

3.08 TESTING

A. Construction Quality Assurance (CQA) compaction and permeability tests will be made by the Owner's Testing Consultant during the progress of the work as indicated in Appendix 2. The Contractor shall cooperate with the Testing Consultant and allow such tests to be performed.

B. If tests indicate that an area of fill or low permeability soil liner does not meet the specified requirements, additional tests shall be performed to determine the extent of non-compliance. The Contractor shall moisture condition and recompact that area until a passing test result is obtained.

3.08 FINISH GRADING

All excavated and filled areas shall be fine graded and leveled to provide a smooth finish free of debris, foreign matter, objectionable stones, clods, lumps, pockets, or high spots, properly drained and true to indicated elevations. Finish grading shall be only near completion of work or when requested. Any portions of the berm damaged by construction shall be restored. The berm ditch shall be finished to design grade, and the ditch side slopes shaped and trimmed to provide a uniform ditch cross section.

3.09 CONSTRUCTION TOLERANCES

A. The foundation grade and finished earthwork grades shall be no more than 0.4 ft below and not above plan grade.

B. The minimum thickness of low permeability soil layer shall be 3 ft.

END OF SECTION 02200

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PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to the placement of riprap for erosion control.

1.02 RELATED SECTIONS

The following section contains items which are related to the work in this section:

02200 - Earthwork

1.03 REFERENCES

Specified references or cited portions thereof, current at date of bidding documents unless otherwise specified, govern the work.

A. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007.

1.04 SUBMITTALS

Product Data: Provide quarry name and material type prior to delivery.

PART 2. PRODUCTS

2.01 MATERIALS

A. Stone Riprap and Bedding materials according to Article 1005.01 of the Illinois Standard Specifications for Road and Bridge Construction.

B. Filter Fabric material for Stone Riprap according to Article 1080.03, with an AOS (Apparent Opening Size) as indicated on the plans.

C. Supplier shall be listed on the current IDOT Approved Aggregate Source List.

D. Gradation as indicated in the drawings. Quality shall be Class A.

PART 3. EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Stone Riprap and Bedding shall be installed in accordance with Section 281 of the Illinois Standard Specifications for Road and Bridge Construction for the placement of Stone Riprap. Measurement and payment provisions of Section 281 shall not apply.

B. Filter Fabric for Stone Riprap shall be installed in accordance with Section 282 of the Illinois Standard Specifications for Road and Bridge Construction.

C. The Owner's Representative shall be allowed to visually inspect Riprap for compliance with specifications prior to placement.

END OF SECTION 02275

PART 1. GENERAL

1.01 DESCRIPTION

A. Gypsum Management Facility

This section pertains to the following:

1. Furnishing and placing granular drainage materials for the drainage layer and leachate collection system.
2. Furnishing and placing coarse aggregate for encasement of the ring drain collection piping.
3. Furnishing and installing materials for roadbed construction related to the Gypsum Management Facility access roads and the McKinley Road relocation.
4. Recycle Pond Drain.

1.02 RELATED SECTIONS

The following sections contain items which are related to the work in this section:

1. 02300 - Earthwork
2. 02373 – Geotextiles
3. 02640 - HDPE Piping

1.03 REFERENCES

The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007.
2. American Society for Testing and Materials (ASTM):

    a. ASTM D 75 (2003) Practice for Sampling Aggregates.
    b. ASTM D 422 (1963; R 2002) Test Method for Particle-Size Analysis of Soils.
    c. ASTM D 2434 (1968, R 2000) Test Method for Permeability of Granular Soils (Constant Head).
    d. ASTM D 3042 (2003) Test Method for Insoluble Residue in Carbonate Aggregates.
    e. ASTM C 1260 (2005) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).

3. American Geological Institute (AGI). Geoscience Handbook AGI Data Sheets, 4th Edition.

1.04 MEASUREMENT AND PAYMENT

The Contractor shall be responsible for estimating the extent of granular materials required to complete the work including, but not limited to, construction of drainage layer, encasement of leachate collection piping, and road-bed construction. The Contractor shall include the dollar amount associated with furnishing and placing all granular materials in his Lump Sum Bid amount.

1.05 COORDINATION

A. The geosynthetic liner shall be covered with granular materials as soon as practicable after a section of liner has been approved by the Owner's Representative.

1.06 SUBMITTALS

A. Product Data:

1. Aggregate source list: Submit a list of proposed aggregate sources.

2. Shipping Tickets: Submit shipping tickets for the granular materials delivered to the site. Shipping tickets shall be according to paragraph 1004.01f of the IDOT Standard Specifications.

B. Test Reports.

1. Submit results of grain size analysis (ASTM D422) and hydraulic conductivity testing (ASTM D2434) for gradations established by the Contractor that provide the specified hydraulic conductivity. Test results are required for each proposed source and gradation. Submit test results for each source demonstrating compliance with reactivity, soundness, and abrasion requirements specified herein.

C. Samples:

1. Submit one sample per source for each gradation proposed for use on the project. Samples shall be at least one pound and shall be obtained and shipped according to ASTM D75. Submit samples at least 15 days prior to starting construction of the drainage layer and coarse aggregate encasement for leachate piping.

1.07 STORAGE AND HANDLING

A. Storage and handling of granular materials shall be according to paragraph 1004.01e of the IDOT Standard Specifications.

1.01

PART 2. PRODUCTS

2.01 MATERIALS

A. General

1. Unless otherwise approved by the Owner's Representative, granular materials shall be obtained from sources listed on the current IDOT Approved Aggregate Source List (www.dot.il.gov\materials\approvedaggregatesources.pdf).
2. Coarse Granular materials shall be meet the Description of Gravel, as described in Section 1004.01(a)(1) of the IDOT Standard Specifications, and shwll be spherical to sub-discoidal, sub-rounded to well rounded particles as defined by AGI Data Sheet, 4^{th} Edition, Sheet 8.4 – Comparison Charts for Estimating Roundness and Sphericity.
3. Granular materials shall experience no more than 15 percent carbonate loss per ASTM D3042.
4. Granular materials shall be free of deleterious material, and shall meet the Na_2SO_4 soundness and Los Angeles Abrasion Specifications for Class B quality aggregate per paragraph 1004.01 of the IDOT Standard Specifications.
5. All material shall pass the 2 in. sieve, and no greater than 5 percent shall be retained on the No. 200 sieve.
6. Granular materials shall be innocuous to alkali-silica reactivity, and shall exhibit internal expansions of less than 0.10 percent at 16 days after casting as determined by ASTM C 1260.

B. Gypsum Management Facility Granular Materials

1. Granular Materials for Drainage Layer

   Gradation for granular material for drainage layer shall be as required to provide a minimum hydraulic conductivity (ASTM D2434) of 1 x 10^{-3} cm/sec.

2. Coarse Aggregate around Ring Drain Collection Piping

   Coarse Aggregate used to encase the ring drain collection piping shall be IDOT Gradation CA 7 material as outlined in Article 1004.01 of the IDOT Standard Specifications for Road and Bridge Construction.

3. Filter Sand

   Filter Sand used for protective cover over the ring drain collection system shall be IDOT Gradation FA 1, Class B or better according to Article 1003 of the IDOT Standard Specifications for Road and Bridge Construction.

4. Aggregate Base Course, Type B

   Aggregate Base Course, Type B used for base material for all new access roads and shall be IDOT Gradation CA 2, in accordance with Section 1004.04 of the IDOT Standard Specifications for Road and Bridge Construction. The material shall originate from an IDOT approved source. The Na_2SO_4 soundness and Los Angeles Abrasion Specifications for Class B quality aggregate per paragraph 1004.01 of the IDOT Standard Specifications shall not apply.

5. Aggregate Surface Course, Type B

   Aggregate Surface Course, Type B used for surface material for all new access roads and the McKinley Road relocation shall be IDOT Gradation CA 6, in accordance with Section 1004.04 of the IDOT Standard Specifications for Road and Bridge Construction. The material shall originate from an IDOT approved source. The Na_2SO_4 soundness and Los Angeles Abrasion Specifications for Class B quality aggregate per paragraph 1004.01 of the IDOT Standard Specifications shall not apply.

2.02 EQUIPMENT

Equipment for spreading and compacting granular materials shall be low ground pressure equipment to prevent damage to the underlying geosynthetic liners.

PART 3. EXECUTION

3.01 PROTECTION OF GEOSYNTHETICS

A. Protection of the geosynthetic liners is critically important. Approved geosynthetic liner shall be covered by granular material as soon as practicable. Granular material shall be placed to a minimum thickness of 1 ft before any heavy equipment or loaded trucks are allowed on the lined area.

B. No equipment will be permitted directly on the geosynthetic liner.

C. Any damage to the geosynthetic liner system shall be repaired, as directed by the Owner's Representative, at the expense of the Contractor.

3.02 GRANULAR DRAINAGE LAYER (GYPSUM MANAGEMENT FACILITY)

A. Placement on Cell Floor

1. The granular material shall be back-dumped on the geotextile cushion fabric in a sequence of operations beginning at the perimeter of the liner on the cell floor.
2. Placement of material on the fabric shall be accomplished by spreading dumped material off of previously placed material with a bulldozer blade or endloader, in such a manner as to prevent tearing or shoving of the cloth. Dumping of material directly on the fabric will only be permitted to establish an initial working platform. No vehicles or construction equipment shall be allowed on the fabric prior to placement of the granular blanket to a minimum thickness of 1 ft.

B. Placement on Cell Side Slopes

1. Placement of granular material on cell side slopes shall be accomplished using methods and equipment similar to that specified for placement of material on cell floor.
2. The Contractor may place gypsum underlain with separation geotextile fabric to buttress the granular material on the slope:

   a. The Construction Quality Assurance (CQA) survey to certify thickness of drainage material shall be completed within the footprint of the gypsum stack before gypsum placement.

b. Separation geotextile fabric shall extend beyond the toe of gypsum buttress a sufficient distance to prevent contamination of the granular drainage layer. See Sections 02373 and 02320 for construction of separation geotextile fabric and gypsum, respectively.

3.04 COARSE AGGREGATE FOR ENCASEMENT OF RING DRAIN COLLECTION PIPING (GYPSUM MANAGEMENT FACILITY)

A. The geotextile filter fabric for encasement of leachate collection piping shall be placed on the approved cushion geotextile fabric according to Section 02373 – Geotextiles.

B. The coarse aggregate shall be placed on the encasement fabric to the width shown on the plans to the level of the bottom of the ring drain collection piping.

C. Course aggregate shall be placed and tamped along the pipe during pipe installation. The coarse aggregate shall be placed longitudinally along the pipe in lifts not to exceed 8 in. thick to a height of at least the center of the pipe. The aggregate shall be maintained at equal elevation on each side of the pipe, and the first lift of material shall be mechanically tamped to ensure that the space under the pipe is completely filled. The top of pipe shall not be covered until the CQA survey certifies leachate piping grade has been completed.

C. After the CQA survey has been completed, coarse aggregate material shall continue to be placed in lifts not to exceed 8 in. thick, as specified in the previous paragraph until the minimum cover height shown in the plans is attained.

D. The running of trucks or heavy equipment over leachate piping shall be avoided until there is at least a 12 in. cover of Filter Sand over the completed geotextile envelop. Temporary ramps no steeper than 10H:1V transverse to the piping shall be provided for temporary equipment crossings until the first lift of gypsum is placed.

3.03 ROADWAY CONSTRUCTION

A. Prepare the roadway subgrade as shown on the plans, in accordance with Section 02200 – Earthwork.

B. Furnish Geotechnical Fabric for Ground Stabilization in accordance with Section 02373 – Geotextiles.

C. Furnish Aggregate Base Course, Type B in accordance with Article 351 of the IDOT Standard Specifications for Road and Bridge Construction.

D. Furnish Aggregate Surface Course, Type B in accordance with Article 402 of the IDOT Standard Specifications for Road and Bridge Construction.

3.04 TESTING

A. CQA gradation and permeability tests will be made by the Owner's Testing Consultant during the progress of the work as indicated in Appendix 2. The Contractor shall cooperate with the Testing Consultant and allow such tests to be performed.

B. If tests indicate that an area of granular material or coarse aggregate does not meet the specified requirements, then the Contractor shall remove the material and replace it with suitable material.

3.05 FINISH GRADING

The granular drainage layer shall be fine graded to provide a smooth finish before a CQA survey of the completed portion of the drainage layer is requested. Ruts or erosion damage shall be repaired before placement of the separation geotextile fabric.

3.06 CONSTRUCTION TOLERANCES

The minimum thickness of drainage layer shall be 1 ft.

END OF SECTION 02315

PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to furnishing and installing geotextile fabrics on prepared surfaces.

1.02 RELATED SECTIONS

The following sections contain items which are related to the work in this section:

1. 02300 - Earthwork
2. 02315 - Granular Materials
3. 02800 – HDPE Geomembrane

1.03 REFERENCES

The following references, or cited portions thereof, govern the work:

1. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007.
2. American Society for Testing and Materials (ASTM):

   a. ASTM 3776 (1996; R 2002) Standard Test Method for Mass per Unit Area (Weight) of Fabric;
   b. ASTM D 3786 (2001) Test Method for Hydraulic Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method;
   c. ASTM D 4533 (2004) Test Method for Trapezoid Tearing Strength of Geotextiles;
   d. ASTM D 4632 (1991; R 2003) Test Method for Grab Breaking Load and Elongation of Geotextiles;
   e. ASTM D 4751 (2004) Test Method for Determining Apparent Opening Size of Geotextile;
   f. ASTM D 4833 (2000) Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products;
   g. ASTM D 4873 (2002) Guide for Identification, Storage, and Handling of Geosynthetic Rolls;
   h. ASTM D 4884 (1996; R 2003) Test Method for Strength of Sewn or Thermally Bonded Seams of Geotextiles;
   i. ASTM D5261-92(2003) Standard Test Method for Measuring Mass per Unit Area of Geotextiles

j. ASTM D6241-04 Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.04 MEASUREMENT AND PAYMENT

A. The Contractor shall be responsible for estimating the extent of geotextile fabric required to complete the work including fabric for laps, anchorage, repairs, and samples for Construction Quality Assurance (CQA) testing. The Contractor shall include the dollar amount associated with all geotextile construction in his Lump Sum Bid amount, except as specified in paragraph B.

B. Geotextile fabric for ground stabilization, when directed by the Owner's Representative, will be paid for on a time and materials basis.

C. No additional payment will be made for geotextile fabric for ground stabilization installed at the Contractor's discretion.

1.05 SUBMITTALS

A. Product Data

1. The manufacturer's list of guaranteed properties for each geotextile fabric or geogrid proposed for use on the project shall be submitted.
2. The manufacturer's installation guidelines shall be submitted.

B. Samples

Samples of geotextile fabrics shall be submitted for CQA prequalification testing. Sample size and sampling frequency are specified in Appendix 2.

C. Inventory

A copy of the roll inventory that identifies, as a minimum, manufacturer or supplier, product or style number, roll number, width, and length of roll as identified on the roll label shall be submitted.

1.06 STORAGE AND HANDLING

Geotextiles shall be stored and handled according to ASTM D4873.

PART 2. PRODUCTS

2.01 MATERIALS

A. Geotextile Fabric for Liner System

Geotextile fabrics for use in the cell liner system shall consist of non-woven filaments of polypropylene, polyester, or polyethylene. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Non-woven fabric may be needle-punched, heat-bonded, or a combination thereof. The filaments shall be dimensionally stable (i.e., filaments shall maintain their relative position with respect to each other) and resistant to delamination. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile. The filaments shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

Fabric shall have the following physical properties:

Physical Properties[1]	**4 oz. (Separation)**	**6 oz. (PWRS)**	**16 oz. (CA Envelope)**
Mass/Unit Area (oz./yd^2) ASTM D5261	4.0	6.0	16.0
Grab Tensile Strength (lb.) ASTM D4632	115	160	380
Grab Elongation (%) ASTM D4632	50	50	50
Puncture Strength (lb.) ASTM D4833	65	85	240
Puncture (CBR) Strength (lb.) ASTM D6241	310	410	1025
Mullen Burst Strength (psi) ASTM D3786	210	280	750
Trapezoidal Tear Strength (lb.) ASTM D4533	50	60	150
Width (ft.)	15	15	15
Apparent Opening Size (AOS) Max. US Std. Sieve No. ASTM D4751	70	70	100
UV Resistance[2] (%) ASTM D4355	70	70	70
Roll Width (ft.)	15	15	15

Notes:

(1) All Values listed are Minimum Average Roll Values (MARV) unless otherwise noted, calculated as the typical minus two standard deviations.

(2) UV Resistance is a minimum value and not a MARV. Evaluation to be on 2.0 inch strip tensile specimens after 500 hours exposure.

A. Cushion Geotextile Fabric.

Cushion geotextile fabric shall consist of non-woven filaments of polypropylene, polyester, or polyethylene. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Non-woven fabric may be needle-punched, heat-bonded, or a combination thereof. The filaments shall be dimensionally stable (i.e., filaments shall maintain their relative position with respect to each other) and resistant to delamination. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile. The filaments shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

Fabric shall have the following physical properties:

Physical Properties(1)	**10 oz. (Cushion)**
Mass per unit area (oz/yd^2) ASTM D5261	10
Grab Tensile Strength (lb.) ASTM D4632	230
Grab Tensile Elongation (%) ASTM D4632	50
Trapezoidal Tear Strength (lb.) ASTM D4533	95
Puncture (CBR) Strength (lb.) ASTM D6241	700
Puncture (CBR) Elongation (in.) ASTM D6241	1.5
UV Resistance(2) (%) ASTM D4355	70
Apparent Opening Size (Max.) (AOS) Sieve No. - ASTM D4751	---
Roll Width (ft.)	15

Notes:

(1) All Values listed are Minimum Average Roll Values (MARV) unless otherwise noted, calculated as the typical minus two standard deviations..

(2) UV Resistance is a minimum value and not a MARV. Evaluation to be on 2.0 inch strip tensile specimens after 500 hours exposure.

B. Geotechnical Fabric for Ground Stabilization

Geotechnical fabric for ground stabilization shall conform to Article 1080.02 of the IDOT Standard Specifications for Road and Bridge Construction.

C. Thread for Seams

High strength thread should be used such that seam test should conform to ASTM D4884. The thread shall meet the chemical, ultraviolet, and physical requirements of the geotextile, and the color shall be different from that of the geotextile.

D. Securing Devices

Pins, staples, and other devices that project through the geotextile fabric are not permitted for fabrics installed above the geomembrane. Sandbags, stone, or other appropriate means approved by the Owner's Representative shall be used to prevent movement of the geotextile.

2.02 EQUIPMENT

A. Equipment for spreading and compacting granular materials shall be low ground pressure equipment to prevent damage to the underlying geosynthetic liners.

PART 3. EXECUTION

3.01 SAMPLES FOR CQA TESTING

A. Geotextile fabric samples shall be obtained, identified and packaged from rolls designated by the Owner's Representative according to ASTM D4873.

B. Samples shall be 3 ft. wide by the full roll width.

3.02 BASE PREPARATION

A. Surface on which the geotextile will be placed shall be prepared to a relatively smooth surface condition, and shall be free from obstruction, debris, depressions, erosion features, or any irregularities that would prevent continuous, intimate contact of the geotextile with the entire surface. Rills, gullies, and ruts must be graded out of the surface before geotextile placement. Areas on which geotextile are to be placed shall be graded and/or dressed in accordance with Section 02200 – Earthwork and Section 02315 – Granular Drainage Materials. Immediately prior to placing the geotextile, the prepared base will be inspected by the Owner's Representative, and no material shall be placed thereon until that area has been approved.

B. Geotextile cushion fabric will be installed directly on the geosynthetic liner. Jointly inspect the liner with the Owner's Representative before commencing fabric installation each day. Notify the Owner's Representative promptly of any damage or defects observed in the liner as fabric installation progresses. Do not place fabric in the damaged or defective area until the liner has been repaired and approved by the Owner's Representative. Submit a daily inspection report identifying the area of fabric placement and certifying that there were no visible defects in the area of fabric placement.

C. Do not run heavy vehicle traffic directly on the geosynthetic liner or cushion geotextile. Use vehicles and equipment as specified in paragraph 2.02 to transport and deploy fabric on the liner. Operate the equipment with care, and place protective cover over the geomembrane, if necessary, to avoid damaging the liner. Route traffic and personnel over installed cushion fabric and use the installed fabric as a working platform to the greatest extent possible.

3.03 INSTALLATION

A. General Requirements:

1. Geotextile fabric shall be unrolled and laid out following these requirements to the greatest extent practical:

a. Orient panels with the longest dimension parallel to the slope.
b. Minimize the number of seams in corners and odd-shaped areas.
c. Extend panels on slopes a minimum of 5 ft onto a horizontal surface.

Geotextile panels shall be unrolled using methods that will not damage the fabric and will protect underlying surface from damage. While unrolling, the geotextile fabric shall be visually inspected for imperfections and faulty or suspect areas marked. Ballast shall be placed on fabric to prevent wind uplift. Expansion and contraction should be allowed for by leaving slack.

Heavy vehicle traffic shall not be run directly on geotextile fabric. Fabric in areas of heavy traffic shall be protected with protective cover over the fabric.

2. Laps

Individual panels of geotextile fabric shall be lapped according to manufacturer's instructions and as specified herein. Provide a minimum overlap of 3 in. unless otherwise specified herein or in the plans. Shingle overlaps so that water or other material cannot run down the slope between the two layers of fabric.

3. Field Seams

Continuously sew all laps on slopes steeper than 10H:1V. This requirement does not apply to the heavy geotextile fabric for envelopment of coarse aggregate around leachate piping.

4. Defects and Repairs

Examine the installed geotextile fabric for defects, holes discontinuous seams, puckered or separated laps, etc. Repair defective laps and seams. Patch holes and defects according to manufacturer's recommendations and as directed by the Owner's Representative. Do not cover suspect or patched areas until they have been inspected and approved by the Owner's Representative.

B. Geotextile Fabric for Separation

1. Use low ground pressure equipment to avoid rutting the granular material.
2. Horizontal seams (parallel to top of slope) will be permitted on cell side slopes to facilitate staged construction of the drainage layer on the side slope.
3. Extend separation geotextile fabric into and across the bottom of the anchor trench and complete backfill of the trench according to Section 02200.

C. Geotextile Fabric for Coarse Aggregate Envelope

1. Geotextile for coarse aggregate envelope will be installed directly on the cushion fabric. Remove any foreign materials from the cushion fabric within the footprint of the coarse aggregate leachate piping encasement before installing the geotextile envelope. Place sufficient width to completely envelop the coarse aggregate and provide a longitudinal lap of at least 6 in.
2. After the coarse aggregate encasement has been completed, according to Section 02315, wrap the geotextile around the mounded aggregate, and cover the lap with at least 6 in. of material before permitting vehicle or equipment on the fabric.
3. Any ballast material other than coarse aggregate, according to Section 02315, that is placed within the envelope will require removal during coarse aggregate construction.

D. Geotechnical Fabric for Ground Stabilization

1. Install Geotechnical Fabric for Ground Stabilization in accordance with Section 210 of the IDOT Standard Specifications for Road and Bridge Construction.

2. If approved by the Owner's Representative, the Contractor may, at his own expense, install geotextile or geogrid for ground stabilization outside the limits designated by the Owner's Representative.
3. Submit as-built drawings that clearly delineate limits and type of ground stabilization.

3.04 PROTECTION

A. Protect installed fabric until it is covered by at least 1 ft. of overlying material.

B. Any damage to the geotextile during its installation or during placement of overlying materials shall be replaced by the Contractor at no cost to the Owner. Unless otherwise noted, the work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 14 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of overlying materials. Before placement of overlying materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile.

3.05 TESTING AND INSPECTION

A. Prequalification Testing

Geotextiles are subject to CQA testing by the Owner's Testing Consultant to verify conformance with the manufacturer's list of guaranteed properties according to Appendix 2. The Contractor shall provide samples as specified herein. If tests indicate nonconformance to the list of guaranteed properties, provide additional samples as directed by the Owner's Representative to determine the extent of the non-conformance. Any fabric that does not conform to the list of guaranteed properties shall be removed from the site.

B. Installed fabric shall be inspected by the Owner's Representative. No material shall be placed on the fabric, other than ballast, until the installation has been approved by the Owner's Representative. Ballast shall not obscure seams or significant length of unseamed laps. The Owner's Representative may require removal of ballast to inspect suspect areas.

C. If the Owner's Representative suspects that completed work has been damaged by construction methods that do not conform to the specifications, he may require removal of completed work to verify the integrity of the underlying materials. The Contractor shall bear the cost of removal and subsequent repair as directed by the Owner's Representative.

END OF SECTION 02373

PART 1. GENERAL

1.01 DESCRIPTION

A. This section covers furnishing and installation of a reinforced needlepunched Geosynthetic Clay Liner (GCL) at the Gypsum Management Facility and the CCB Management Facility.

B. The work includes furnishing all equipment and materials, providing all labor, supervision, administration and management necessary to perform the work as specified herein and as shown on the plans.

1.02 RELATED SECTIONS

None.

1.03 REFERENCES

The following references, or cited portions thereof, govern the work

1. American Society for Testing and Materials (ASTM):

    a. ASTM D 4632 (1991; R 2003), Standard Test Method for Grab Breaking Load and Elongation of Geotextiles;
    b. ASTM D 4643 (2000), Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method;
    c. ASTM D 5084 (2003), Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter;
    d. ASTM D 5261 (1992; R 2003), Test Method for Measuring Mass Per Unit Area of Geotextiles;
    e. ASTM D 5321 (2002), Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method;
    f. ASTM D 5887 (2004), Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter;
    g. ASTM D 5888 (1995; R 2002), Practice for Storage and Handling of Geosynthetic Clay Liners;
    h. ASTM D 5889 (1997; R 2003), Practice for Quality Control of Geosynthetic Clay Liners;

i. ASTM D 5890 (2002), Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners;

j. ASTM D 5891 (2002), Test Method for Fluid Loss of Clay Component of Geosynthetic Clay Liners.

1.04 SUBMITTALS

A. With the bid, the Contractor shall furnish the following information:

1. Conceptual description of the proposed plan for placement of the GCL panels over the areas of installation.
2. GCL Manufacturer's Quality Control (MQC) Plan for documenting compliance with Sections 2.01 and 2.02 of these specifications.
3. GCL manufacturer's historical data for reinforced GCL of a) 10,000-hour creep shear testing per Section 2.01 D, and b) seam flow data at 2 psi confining pressure per Section 2.01 E.
4. A copy of GCL manufacturer's International Standards Organization (ISO) Quality Certificate of Registration.
5. Statement of experience from the proposed GCL supplier.
6. Statement of experience from the proposed GCL installer.

B. At the Owner Representative's or Owner's request, the Contractor shall furnish:

1. A representative sample of the GCLs.
2. A project reference list for the GCL(s) consisting of the principal details of at least ten projects totaling at least 10 million sq. ft (100,000 sq. meters) in size.

C. Upon shipment, the Contractor shall furnish:

1. The GCL manufacturer's Quality Assurance/Quality Control (QA/QC) certifications to verify that the materials supplied for the project are in accordance with the requirements of this specification.
2. Inventory of materials received.

D. As installation proceeds, the Contractor shall submit certificates of subgrade acceptance, signed by the Contractor and Construction Quality Assurance (CQA) Inspector (see Sections 1.06 and 3.03) for each area that is covered by the GCL.

E. Warranty

After construction, the contractor shall submit material and installation warranty certificates.

1.05 QUALIFICATIONS

A. GCL Manufacturer must have produced at least 10 million sq. ft. (1 million sq. meters) of GCL, with at least 8 million sq. ft. (800,000 sq. meters) installed.

B. The GCL Installer must either have installed at least 1 million sq. ft. (100,000 sq. meters) of GCL, **or** must provide to the Engineer satisfactory evidence, through similar experience in the installation of other types of geosynthetics, that the GCL will be installed in a competent, professional manner.

1.06 CONSTRUCTION QUALITY ASSURANCE (CQA)

A. The Owner shall provide a third-party inspector for CQA of the GCL installation. The inspector shall be an individual or company who is independent from the manufacturer and installer and who shall be responsible for monitoring and documenting activities, related to the CQA of the GCL throughout installation.

B. Testing of the GCL as necessary to support the CQA effort shall be performed by a third party laboratory retained by the Owner and independent from the GCL manufacturer and installer.

WARRANTY

The geomembrane material shall be warranted, on a pro-rata basis against manufacturer's defects for a period of five (5) years from the date of liner installation. The installation shall be warranted against defects in workmanship for a period of (1) year from the date of liner completion.

PART 2. PRODUCTS

2.01 MATERIALS

A. Acceptable products for the GCL are GCL Bentomat® SDN, as manufactured by CETCO, 1350 West Shure Drive, Arlington Heights, Illinois 60004 USA (847-392-5800), or an engineer-approved reinforced needlepunched GCL material equal to Bentomat SDN.

B. The delineation of areas to receive GCL shall be agreed by the Installer and the Engineer prior to installation.

C. The GCL and its components shall have the properties shown in the GCL Certified Properties table at the end of this section.

D. The reinforced GCL shall have 10,000 hour test data for large-scale constant-load (creep) shear testing for related products under hydrated conditions. The displacement shall be 0.13 in. (3.3 mm) or less at a constant shear load of 250 psf (12 kPa) and a normal load of 500 psf (24 kPa).

E. The reinforced GCL shall have seam test data from an independent laboratory showing that the seam flow with a grooved cut in one of the nonwoven geotextiles is less than 1×10^{-8} $m^3/m^2/s$ at 2 psi hydraulic pressure.

F. The minimum acceptable dimensions of full-size GCL panels shall be 150 ft. (45.7 m) in length. Short rolls [(those manufactured to a length greater than 70 ft. (21 meters) but less than a full-length roll)] may be supplied at a rate no greater than three (3) per truckload or three (3) rolls every 36,000 sq. ft. (3,500 sq. meters) of GCL, whichever is less.

G. A 6-inch (150 mm) overlap guideline shall be imprinted on both edges of the upper geotextile component of the GCL as a means for providing quality assurance of the overlap dimension. Lines shall be printed in easily visible, non-toxic ink.

2.02 PRODUCT QUALITY DOCUMENTATION

The GCL manufacturer shall provide the Contractor or other designated party with manufacturing QA/QC certifications for each shipment of GCL. The certifications shall be signed by a responsible party employed by the GCL manufacturer and shall include:

A. Certificates of analysis for the bentonite clay used in GCL production demonstrating compliance with the swell index and fluid loss parameters shown in the GCL Certified Properties tables.

B. Manufacturer's test data for finished GCL product(s) of bentonite mass/area, GCL tensile strength and GCL peel strength (reinforced only) demonstrating compliance with the index parameters shown in the GCL Certified Properties tables.

C. GCL lot and roll numbers supplied for the project (with corresponding shipping information).

2.03 PRODUCT LABELING

A. Prior to shipment, the GCL manufacturer shall label each roll, identifying:

1. Product identification information (Manufacturer's name and address, brand product code).
2. Lot number and roll number.
3. Roll length, width and weight.

2.04 PACKAGING

A. The GCL shall be wound around a rigid core whose diameter is sufficient to facilitate handling. The core is not necessarily intended to support the roll for lifting but should be sufficiently strong to prevent collapse during transit.

B. All rolls shall be labeled and bagged in packaging that is resistant to photodegradation by ultraviolet (UV) light.

2.05 ACCESSORY BENTONITE

A. The granular bentonite sealing clay used for overlap seaming, penetration sealing and repairs shall be made from the same natural sodium bentonite as used in the GCL and shall be as recommended by the GCL manufacturer. Seaming of GCLs shall be conducted in accordance with the manufacturer's guidelines for each particular GCL. Please refer to the installation guidelines for Bentomat /Claymax GCLs.

PART 3. EXECUTION

3.01 SHIPPING AND HANDLING

A. The rolls of GCL shall be packaged and shipped by appropriate means to prevent damage to the material and to facilitate off-loading.

B. The Installation Supervisor shall be present during delivery and unloading of the GCL. A visual inspection of each roll should be made during unloading to identify if any packaging has been damaged. Rolls with damaged packaging should be marked and set aside for further inspection. The packaging should be repaired prior to being placed in storage. The Installation Supervisor shall prepare and submit an inventory that includes lot and roll number for materials received.

C. The Installer is responsible for unloading the GCL. The Owner will make available equipment and operators employed at the site to assist with unloading. The Installer shall coordinate with the Owner to determine equipment availability and should contact the Manufacturer prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment.

3.02 STORAGE

A. Storage of the GCL rolls shall be the responsibility of the Installer. A dedicated storage area shall be provided by the Owner at the job site. Submit storage area requirements (size and preferred location) with bid documents.

B. Rolls should be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks. Rolls should be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four).

C. All stored GCL materials and the accessory bentonite must be covered with a plastic sheet or tarpaulin until their installation.

D. The integrity and legibility of the labels shall be preserved during storage.

3.03 EARTHWORK

A. The low permeability soil layer upon which the GCL is installed shall be prepared and compacted prior to installation. The surface shall be smooth, firm, and unyielding, and free of:

1. Vegetation.
2. Construction debris.
3. Sticks.
4. Sharp rocks.
5. Void spaces.
6. Ice.
7. Abrupt elevation changes.
8. Standing water.
9. Cracks larger than 0.25 in. (6 mm) in width.
10. Any other foreign matter that could contact the GCL.

B. Immediately prior to GCL deployment, the low permeability soil layer shall be final-graded by the contractor to fill in all voids or cracks and then smooth-rolled to provide the best practicable surface for the GCL. At completion of this activity, no wheel ruts, footprints or other irregularities shall exist in the subgrade. Furthermore, all protrusions extending more than 0.5 in. (12 mm) from the surface shall either be removed, crushed or pushed into the surface with a smooth-drum compactor.

C. On a continuing basis, the project CQA inspector shall certify acceptance of the subgrade before GCL placement.

D. It shall be the Installer's responsibility thereafter to indicate to the Owner's Representative any change in the condition of the low permeability soil layer that could cause the subgrade to be out of compliance with any of the requirements listed in this Section. The Installation Supervisor shall certify in the daily report that no GCL was placed over visibly defective low permeability soil surface.

E. At the top of sloped areas of the job site, an anchor trench for the GCL shall be excavated by the contractor in accordance with the project plans. The trench shall be excavated and approved by the CQA Inspector prior to GCL placement. No loose soil shall be allowed at the bottom of the trench and no sharp corners or protrusions shall exist anywhere within the trench.

3.04 GCL PLACEMENT

A. GCL rolls shall be delivered to the working area of the site in their original packaging. Immediately prior to deployment, the packaging shall be carefully removed without damaging the GCL. The orientation of the GCL (i.e., which side faces up) shall be in accordance with the Owner Representative's recommendations.

B. Equipment which could damage the GCL, shall not be allowed to travel directly on it. If the installation equipment causes rutting of the subgrade, the subgrade must be restored to its originally accepted condition before placement continues.

C. Care must be taken to minimize the extent to which the GCL is dragged across the subgrade in order to avoid damage to the bottom surface of the GCL. A temporary geosynthetic subgrade covering commonly known as a slip sheet or rub sheet may be used to reduce friction damage during placement.

D. The GCL panels shall be placed parallel to the direction of the slope.

E. All GCL panels shall lie flat on the underlying surface, with no wrinkles or folds, especially at the exposed edges of the panels.

F. Only as much GCL shall be deployed as can be covered at the end of the working day with soil, a geomembrane, or a temporary waterproof tarpaulin. The GCL shall not be left uncovered overnight. If the GCL is hydrated when no confining stress is present, the Installer shall remove and replace the hydrated material as directed by the Owner Representative.

3.05 ANCHORAGE

A. As directed by the project drawings and specifications, the end of the GCL roll shall be placed in an anchor trench at the top of the slope. The front edge of the trench shall be rounded so as to eliminate any sharp corners. Loose soil shall be removed from the floor of the trench. The GCL shall cover the entire trench floor, but shall not extend up the rear trench wall.

3.06 SEAMING

A. The GCL seams shall be constructed by overlapping their adjacent edges according to the manufacturer's recommendations. Care should be taken to ensure that the overlap zone is not contaminated with loose soil or other debris.

B. The minimum dimension of the longitudinal overlap should be 6 in. (150 mm) for Bentomat SDN. If the GCL is manufactured with a grooved cut in the nonwoven geotextile that allows bentonite to freely extrude into the longitudinal overlap then no bentonite-enhanced seam is required for this overlap. If the GCL does not have a grooved cut in one of the nonwoven geotextiles in the longitudinal overlap, then bentonite-enhanced seams are required as described below.

C. End-of-roll overlapped seams shall be constructed with a minimum overlap of 24 in. (600 mm) for Bentomat SDN. Seams at the ends of the panels should be constructed such that they are shingled in the direction of the grade to prevent the potential for runoff flow to enter the overlap zone. End-of-roll overlapped seams for all reinforced GCL seams require bentonite-enhanced seams as described below.

D. Bentonite-enhanced seams shall be constructed between the overlapping adjacent panels as follows. The underlying edge of the longitudinal overlap is exposed and then a continuous bead of granular sodium bentonite is applied along a zone defined by the edge of the underlying panel and the 6-inch (150 mm) line. The granular bentonite shall be applied at a minimum application rate of one quarter pound per lineal ft. (0.4 kg/m). A similar bead of granular sodium bentonite is applied at the end-of-roll overlap.

3.07 DETAIL WORK

A. There shall be no penetrations through the GCL.

B. Cutting the GCL should be performed using a sharp utility knife. Frequent blade changes are recommended to avoid damage to the geotextile components of the GCL during the cutting process.

3.08 DAMAGE REPAIR

A. If the GCL is damaged (torn, punctured, perforated, etc.) during installation, it may be possible, if approved by the Owner's Representative, to repair it by cutting a patch to fit over the damaged area. The patch shall be obtained from a new GCL roll and shall be cut to size such that a minimum overlap of 12 in. (300 mm) is achieved around all of the damaged area. Granular bentonite or bentonite mastic shall be applied around the damaged area prior to placement of the patch. It may be desirable to use an adhesive to affix the patch in place so that it is not displaced during cover placement. Patching shall be observed and approved by the Owner's Representative.

GCL CERTIFIED PROPERTIES

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY $ft^2(m^2)$	REQUIRED VALUES
Bentonite Swell Index[1]	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss[1]	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area[2]	ASTM D 5993	40,000 ft^2 (4,000 m^2)	0.75 lb/ft^2 (3.6 kg/m^2) min
GCL Grab Strength[3]	ASTM D 6768	200,000 ft^2 (20,000 m^2)	30 lbs/in (53 N/cm) MARV
GCL Peel Strength[3]	ASTM D 6496	40,000 ft^2 (4,000 m^2)	2.5 lbs/in (4.4 N/cm) min
GCL Index Flux[4]	ASTM D 5887	Weekly	1×10^{-8} m^3/m^2/sec max
GCL Hydraulic Conductivity[4]	ASTM D 5887	Weekly	5×10^{-9} cm/sec max
GCL Hydrated Internal Shear Strength[5]	ASTM D 5321 ASTM D 6243	Periodic	500 psf (24 kPa) typ @ 200 psf

Notes

[1] Bentonite property tests performed at a bentonite processing facility before shipment the manufacturer's production facilities.
[2] Bentonite mass/aeea reported at 0 percent moisture content.
[3] All tensile strength testing is performed in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request, tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.
[4] Index flux and permeability testing with deaired distilled/deionized water at 80 psi (551kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. This flux value is equivalent to a permeability of 5×10^{-9} cm/sec for typical GCL thickness. Actual flux values vary with field condition pressures. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.
[5] Peak values measured at 200 psf (10 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.

END OF SECTION 02376

PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to construction of the HDPE (High Density Polyethylene) Piping at the Gypsum Management Facility and the CCB Management Facility.

1.02 RELATED SECTIONS

None.

1.03 REFERENCES

The following references, or cited portions thereof, govern the work

A. American Society of Testing and Materials:

1. ASTM D 2683 (2004); Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
2. ASTM D 3261 (2003); Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
3. ASTM D 3350 (2005); Specification for Polyethylene Plastics Pipe and Fittings Materials.
4. ASTM F 412 (2001a); Terminology Relating to Plastic Piping System.
5. ASTM F 1055 (1998); Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
6. ASTM F 1056 (2004); Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings.

1.04 SUBMITTALS

A. Qualifications

Submit qualifications of the Welding Supervisor who will be responsible for construction quality control of the pipe joining process.

B. Material Certifications

Submit manufacturer certifications that the pipe provided complies with the requirements herein.

C. Product Data

1. Submit product data and operating instructions for pipe joining equipment.
2. Submit pipe manufacturer's recommended procedures for storing, handling, and installing pipe and fittings.

1.05 QUALIFICATIONS

A. The Contractor or Subcontractor performing the work under this section shall have in his employ a Welding Supervisor who has completed a minimum of 1,000 ft of pipe joining work using the type of equipment proposed for use in this work. The Welding Supervisor shall be on site at all times during pipe line installation, and shall provide direct supervision over other employees.

1.06 WARRANTY

A. The pipe and fittings shall be warranted, on a pro-rata basis, against manufacturer's defects for a period of five (5) years from the date of pipe installation. The installation shall be warranted against defects in workmanship for a period of one (1) year from the date of completion of the leachate collection piping system.

PART 2. PRODUCTS

2.01 MATERIALS

A. Pipe

1. Pipe material shall be High Density Polyethylene (HDPE) PE 3408, according to ASTM F412, with a cell class designation of 345464C, according to ASTM D3350. Iron pipe size (IPS) and standard dimension ratio (SDR) shall be as indicated in the plans.
2. Size and spacing of holes in perforated pipe shall be as indicated in the plans.

B. Fittings

1. Fittings shall be made of the same material, and shall have a pressure rating no less than 160 psi. Butt fusion, socket, or electrofusion fittings, according to ASTM D3261, ASTM D2683, and ASTM F1055, respectively, are acceptable.

2.02 EQUIPMENT

A. Butt Fusion Machine

The butt fusion machine shall include the following features:

1. Facer with rotating planer block design.
2. Heater faces coated by the manufacturer to prevent molten plastic from adhering to the heater face.
3. Hydraulic-operated jaws suitable for use with the pipe sizes indicated in the plans.

B. Socket Fusion Equipment

Socket fusion heating tools and depth gauges shall be of the same manufacturer, unless they are all marked F1056, indicating compliance with ASTM F1056.

C. All equipment shall conform to any requirements specified in the pipe and socket manufacturer's installation instructions, and shall be approved by the Owner's Representative.

PART 3. EXECUTION

3.01 MATERIAL DELIVERY, STORAGE, AND HANDLING

A. HDPE pipe and fittings shall be packaged and shipped by appropriate means to prevent damage to the material and to facilitate off-loading. The Owner will provide an on-site storage site. Storage site requirements (size and preferred location) shall be submitted with the bid documents.

B. Storage and handling shall be according to manufacturer's recommendations.

3.02 BASE PREPARATION

All HDPE piping shall be installed on a layer of coarse aggregate placed by the Contractor in accordance with the plans. The grade of the coarse aggregate base shall be verified before installing the piping.

3.03 INSTALLATION

All pipe and fittings shall be installed according to the manufacturer's recommendations. Removal of weld beads is not required. Contractor shall place coarse aggregate along the pipe to provide lateral stability. Welds shall not be obscured until they have been approved by the Owner's Representative, the top of pipe shall not be covered until the Construction Quality Assurance (CQA) survey has been completed to verify conformance with specified tolerances.

3.04 INSPECTIONS

A. The Owner's Representative shall shall be visually inspect pipe materials to verify that each pipe material is properly stamped (by the manufacturer) for ASTM acceptance before installation. Defective or damaged materials shall be removed from the site.

B. Each weld and connection shall be visually inspected by the Owner's Representative. Defective welds shall be repaired as directed by the Owner's Representative and according to manufacturer's recommendations. Welds and connections shall not be covered until they have been approved by the Owner's Representative.

3.05 TOLERANCES

A. HDPE piping shall be located within 0.5 ft. of plan location, and elevation shall be within 0.1 ft. of plan elevation with no adverse slopes.

END OF SECTION 02936

PART 1. GENERAL

1.01 DESCRIPTION

A. This section includes manufacturing, furnishing, and installing High Density Polyethylene (HDPE) Geomembranes for the Gypsum Management Facility and the Gypsum Management Facility Recycle Pond.

B. The work includes furnishing all equipment and materials and providing all labor, supervision, administration and management necessary to perform the work as shown on the plans.

1.02 RELATED SECTIONS

A. The following sections contain items which are related to the work in this section:

1. 02373 – Geotextiles
2. 02376 – Geosynthetic Clay Liner

1.03 REFERENCES

A. The following references, or cited portions thereof, govern the work:

1. American Society for Testing and Materials (ASTM):

a. D 638, Standard Test Method for Tensile Properties of Plastics.
b. D 751, Standard Test Methods for Coated Fabrics.
c. D 792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
d. D 1004, Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
e. D 1204, Standard Test Method for Linear Dimensional Changes of Non Rigid Thermoplastic Sheeting or Film at Elevated Temperature.
f. D 1238, Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
g. D 1505, Standard Test Method for Density of Plastics by Density-Gradient Technique.
h. D 1603, Standard Test Method for Carbon Black in Olefin Plastics.
i. D 3895, Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis.
j. D 4218, Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.

k. D 4437, Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
l. D 4833, Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
m. D 5199, Standard Test Method for Measuring Nominal Thickness of Smooth Geomembranes.
n. D 5397, Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefins using Notched Constant Tensile Load Test.
o. D 5596, Standard Practice for Microscopical Examination of Pigment Dispersion in Plastic Compounds.
p. D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
q. D 5721, Practice for Air-Oven Aging of Polyolefin Geomembranes.
r. D 5820, Test Method for Air Testing.
s. D 5885, Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.
t. D 5994, Standard Test Method for Measuring Nominal Thickness of Textured Geomembranes
u. D 6365, Standard Practice for the Nondestructive Testing of Geomembrane Seams using The Spark Test

2. Geosynthetic Research Institute (GRI):

a. GRI GM 6, Pressurized Air Channel Test for Dual Seamed Geomembranes
b. GRI GM 9, Cold Weather Seaming of Geomembranes
c. GRI GM 10, Specification for Stress Crack Resistance of HDPE Geomembrane Sheet
d. GRI GM 13, Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
e. GRI GM 14, Test Frequencies for Destructive SeamTesting

1.04 SUBMITTALS

A. Submit the following to the Engineer or Owner, for review and approval, within a reasonable time so as to expedite shipment or installation of the Geomembrane:

1. Documentation of manufacturer's qualifications as specified in subsection 1.05A of this Section.
2. Manufacturer's Quality Control program manual or descriptive documentation.
3. A material properties sheet, including at a minimum all properties specified in GRI GM 13, including test methods used.
4. Sample of the material.

5. Documentation of Installer's qualifications, as specified below and in subsection 1.05B of this Section.
   a. Submit a list of at least ten completed facilities. For each name and type of facility; its location; the date of installation; number of contact at the facility; type and thickness of geomembrane and; surface area of the installed geomembrane.
   b. Submit resumes or qualifications of the Installation Supervisor, Master Seamer and Technicians to be assigned to this project.
   c. Quality Control Program.
6. Example Material Warranty and Liner Installation Warranty complying with subsections 1.07 and 1.08 of this Section.
7. Resin Supplier's name, resin production plant identification, resin brand name and number, production date of the resin, resin Manufacturer's quality control certificates, and certification that the properties of the resin meet the requirements

B. Shop Drawings

1. Submit copies of shop drawings for engineer's approval within a reasonable time so as not to delay the start of geomembrane installation. Shop drawings shall show the proposed panel layout identifying seams and details. Seams should generally follow direction of the slope. Butt seams or roll-end seams should not occur on a slope unless approved by the Owner's Representative. Butt seams on a slope, if allowed, should be staggered.
2. Placement of geomembrane will not be allowed to proceed until Owner's Representative has received and approved the shop drawings.

C. Additional Submittals (In-Progress and at Completion)

1. Manufacturer's warranty (refer to subsection 1.08).
2. Geomembrane installation warranty (refer to subsection 1.09).
3. Daily written acceptance of subgrade surface (refer to subsection 3.01.C).
4. Low-temperature seaming procedures if applicable (refer to subsection 3.03.A)
5. Prequalification test seam samples (refer to subsection 3.05.A.6).
6. Field seam non-destructive test results (refer to subsection 3.05.B.1).
7. Field seam destructive test results (refer to subsection 3.05.C.6).
8. Daily field installation reports (refer to subsection 3.05.G).
9. Installation record drawing, as discussed in subsection 3.05.G).

1.05 QUALITY CONTOL

A. Manufacturer's Qualifications:

The manufacturer of geomembrane of the type specified or similar product shall have at least five years experience in the manufacture of such geomembrane. In addition, the geomembrane manufacturer shall have manufactured at least

10,000,000 sq. ft. of the specified type of geomembrane or similar product during the last five years.

B. Installer's Qualifications:

1 The Geomembrane Installer shall be the Manufacturer, approved Manufacturer's Installer or a contractor approved by the Owner's Representative to install the geomembrane.

2 The Geomembrane Installer shall have at least three years experience in the installation of the specified geomembrane or similar. The Geomembrane Installer shall have installed at least 10 projects involving a total of 5,000,000 sq. ft. of the specified type of geomembrane or similar during the last three years.

3 Installation shall be performed under the direction of a field Installation Supervisor who shall be responsible throughout the geomembrane installation, for geomembrane panel layout, seaming, patching, testing, repairs, and all other activities of the Geomembrane Installer. The Field Installation Supervisor shall have installed or supervised the installation and seaming of a minimum of 10 projects involving a total of 5,000,000 sq. ft. of geomembrane of the type specified or similar product.

4 Seaming shall be performed under the direction of a Master Seamer (who may also be the Field Installation Supervisor or Crew Foreman) who has seamed a minimum of 3,000,000 sq. ft. of geomembrane of the type specified or similar product, using the same type of seaming apparatus to be used in the current project. The Field Installation Supervisor and/or Master Seamer shall be present whenever seaming, patching, other welding operations, and testing is performed.

5 All seaming, patching, other welding operations, and testing shall be performed by qualified technicians employed by the Geomembrane Installer.

1.06 DELIVERY, STORAGE AND HANDLING

A. Each roll of geomembrane delivered to the site shall be labeled by the manufacturer. The label shall be firmly affixed and shall clearly state the manufacturer's name, product identification, material thickness, roll number, roll dimensions and roll weight.

B. Geomembrane shall be protected from mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions.

C. Rolls shall be stored away from high traffic areas. Continuously and uniformly support rolls on a smooth, level prepared surface.

D. Rolls shall not be stacked more than three high.

1.07 PROJECT CONDITIONS

Geomembrane shall not be installed in the presence of standing water, while precipitation is occurring, during excessive winds, or when material temperatures are outside the limits specified in Section 3.03.

1.08 MATERIAL WARRANTY

As required by specification, or as required in GRI GM 13 (attachment A)

1.09 GEOMEMBRANE INSTALLATION WARRANTY

The Geomembrane Installer shall guarantee the geomembrane installation against defects in the installation and workmanship for 1 year commencing with the date of final acceptance.

1.10 GEOMEMBRANE PRE-CONSTRUCTION MEETING

A. Geomembrane Pre-Construction Meeting shall be held at the site prior to installation of the geomembrane. At a minimum, the meeting shall be attended by the Geomembrane Installer, Owner, Owner's representative (Engineer and/or CQA Firm), and the General Contractor.

B. Topics for this meeting shall include:
   1. Responsibilities of each party.
   2. Lines of authority and communication. Resolution of any project document ambiguity.
   3. Methods for documenting, reporting and distributing documents and reports.
   4. Procedures for packaging and storing archive samples.
   5. Review of time schedule for all installation and testing.
   6. Review of panel layout and numbering systems for panels and seams including details for marking on geomembrane.
   7. Procedures and responsibilities for preparation and submission of as-built panel and seam drawings.
   8. Temperature and weather limitations. Installation procedures for adverse weather conditions. Defining acceptable subgrade, geomembrane, or ambient moisture and temperature conditions for working during liner installation.
   9. Subgrade conditions, dewatering responsibilities and subgrade maintenance plan.
   10. Deployment techniques including allowable subgrade for the geomembrane.
   11. Plan for controlling expansion/contraction and wrinkling of the geomembrane.
   12. Covering of the geomembrane and cover soil placement.
   13. Measurement and payment schedules.
   14. Health and safety.

C. The meeting shall be documented by the Owner's Representative and minutes shall be transmitted to all parties.

PART 2. PRODUCTS

2.01 SOURCE QUALITY CONTROL

Manufacturing Quality Control

A. The test methods and frequencies used by the manufacturer for quality control/quality assurance of the above geomembrane prior to delivery, shall be in accordance with GRI GM 13, or modified as required for project specific conditions.

B. The manufacturer's geomembrane quality control certifications, including results of quality control testing of the products, as specified in subsection 2.01.C of this Section, must be supplied to the Owner's Representative. The certification shall be signed by a responsible party employed by the manufacturer, such as the QA/QC Manager, Production Manager, or Technical Services Manager. Certifications shall include lot and roll numbers and corresponding shipping information.

C. The Manufacturer will provide Certification that the geomembrane and welding rod supplied for the project have the same base resin and material properties.

2.02 GEOMEMBRANE

A. The geomembrane shall consist of new, first quality products designed and manufactured specifically for the purpose of this work which shall have been satisfactorily demonstrated by prior testing to be suitable and durable for such purposes. The geomembrane rolls shall be seamless, high density polyethylene (HDPE- Density >0.94g/cm) containing no plasticizers, fillers or extenders and shall be free of holes, blisters or contaminants, and leak free verified by 100% in line spark or equivalent testing. The geomembrane shall be supplied as a continuous sheet with no factory seams in rolls. The geomembrane will meet the property requirements as shown in Table A. (GRI GM 13)

B. Material shall be reviewed for conformance to the project specifications by the Owner's Representative

C. The geomembrane seams shall meet the property requirements as shown in Table 2, (Attachment B).

PART 3. EXECUTION

3.01 SUBGRADE PREPARATION

A. Geomembrane installed over geosynthetic clay liner (GCL).

The area of GCL to be covered with geomembrane shall be jointly inspected daily with the Owner's Representative before commencing geomembrane installation for the day, and the condition of the GCL shall be continuously observed as geomembrane installation progresses. Rocks, stones, sticks, sharp objects and debris of any kind shall be removed from the surface of the GCL. The Owner's Representative shall be notified of any discontinuities, premature hydration, or otherwise defective GCL. Geomembrane shall not be placed over suspect areas until they have been repaired to the satisfaction of the Owner's Representative. The Installation Supervisor shall certify daily in writing that the GCL surface was acceptable at the time of geomembrane installation.

B. Geomembrane installed over cushion dirt.

The area of cushion dirt to be covered with geomembrane shall be prepared in accordance with the Section 02200 – Earthwork. The surface shall be smooth and free of ruts and holes, rocks, stones, sticks, sharp objects and debris of any kind.

C. The Geomembrane installer shall provide daily written acceptance for the surface to be covered by the geomembrane in that day's operations. The surface shall be maintained in a manner, during geomembrane installation, to ensure subgrade suitability.

D. All subgrade damaged by construction equipment and deemed unsuitable by the Owner's Representative for geomembrane deployment shall be repaired prior to placement of the geomembrane. All repairs shall be reviewed by the Owner's Representative and approved by the Geomembrane Installer. This damage, repair, and the responsibilities of the contractor and Geomembrane Installer shall be defined in the preconstruction meeting.

3.02 GEOMEMBRANE PLACEMENT

A. No geomembrane shall be deployed until the applicable certifications and quality control certificates listed in subsection 1.04 of this Section are submitted to and approved by the Owner's Representative. Should geomembrane material be deployed prior to approval by the Owner's Representative it will be at the sole risk of the Geomembrane Installer and/or Contractor. If the material does not meet project specifications it shall be removed from the work area at no cost to the owner.

B. The geomembrane shall be installed to the limits shown on the project drawings and essentially as shown on approved panel layout drawings.

C. No geomembrane material shall be unrolled and deployed if the material temperatures are lower than 0 degrees C (32 degrees F). Temperature limitations should be defined in the preconstruction meeting. Typically, only the quantity of geomembrane that will be anchored and seamed together in one day should be deployed.

D. No vehicular traffic shall travel on the geomembrane other than an approved low ground pressure All Terrain Vehicle or equivalent.

E. Sand bags or equivalent ballast shall be used as necessary to temporarily hold the geomembrane material in position under the foreseeable and reasonably - expected wind conditions. Sand bag material shall be sufficiently close- knit to prevent soil fines from working through the bags and discharging on the geomembrane.

F. Geomembrane placement shall not be done if moisture prevents proper subgrade preparation, panel placement, or panel seaming. Moisture limitations should be defined in the preconstruction meeting.

G. Damaged panels or portions of the damaged panels which have been rejected shall be marked and their removal from the work area recorded.

H. The geomembrane shall not be allowed to "bridge over" voids or low areas in the subgrade. In these areas, the subgrade shall be prepared to allow the geomembrane to rest in intimate contact with the subgrade.

I. Wrinkles caused by panel placement or thermal expansion should be minimized in accordance with section 1.10 B. 11.

J. Considerations on Site Geometry: In general, seams shall be oriented parallel to the line of the maximum slope. In corners and odd shaped geometric locations, the total length of field seams shall be minimized. Seams shall not be located at low points in the subgrade.

K. Overlapping: The panels shall be overlapped prior to seaming to whatever extent is necessary to effect a good weld and allow for proper testing. In no case shall this overlap be less than 75mm (3 in.).

3.03 SEAMING PROCEDURES

A. Cold weather installations should follow guidelines as outlined in GRI GM9.

B. No geomembrane material shall be seamed when liner temperatures are less than 0 degrees C (32 degrees F).

C. No geomembrane material shall be seamed when the sheet temperature is above 75 degrees C (170 degrees F) as measured by an infrared thermometer or surface thermocouple.

D. Seaming shall primarily be performed using automatic fusion welding equipment and techniques. Extrusion welding shall be used where fusion welding is not possible such as at pipe penetrations, patches, repairs and short (less than a roll width) runs of seams.

E. Fishmouths or excessive wrinkles at the seam overlaps, shall be minimized and when necessary cut along the ridge of the wrinkles back into the panel so as to effect a flat overlap. The cut shall be terminated with a keyhole cut (nominal 10 mm (1/2 in) diameter hole) so as to minimize crack/tear propagation. The overlay shall subsequently be seamed. The key hole cut shall be patched with an oval or round patch of the same base geomembrane material extending a minimum of 150 mm (6 in.) beyond the cut in all directions.

3.04 PIPE AND STRUCTURE PENETRATION SEALING SYSTEM

A. Provide penetration sealing system as shown in the Project Drawings.

B. Penetrations shall be constructed from the base geomembrane material, flat stock, prefabricated boots and accessories as shown on the Project Drawings. The pre-fabricated or field fabricated assembly shall be field welded to the geomembrane as shown on the Project Drawings so as to prevent leakage. This assembly shall be tested as outlined in section 3.05.B. Alternatively, where field non destructive testing can not be performed, attachments will be field spark tested by standard holiday leak detectors in accordance with ASTM 6365 Spark testing should be done in areas where both air pressure testing and vacuum testing are not possible.

1. Equipment for Spark testing shall be comprised of but not limited to: A

hand held holiday spark tester and conductive wand that generates a high voltage.

2. The testing activities shall be performed by the Geomembrane Installer by placing an electrically conductive tape or wire beneath the seam prior to welding. A trial seam containing a non welded segment shall be subject to a calibration test to ensure that such a defect (non welded segment) will be identified under the planned machine settings and procedures. Upon completion of the weld, enable the spark tester and hold approximately 25mm (1 in) above the weld moving slowly over the entire length of the weld in accordance with ASTM 6365. If there is no spark the weld is considered to be leak free.
3. A spark indicates a hole in the seam. The faulty area shall be located, repaired and retested by the Geomembrane Installer.
4. Care should be taken if flammable gases are present in the area to be tested.

3.05 FIELD QUALITY CONTROL

The Owner's Representative shall be notified prior to all pre qualification and production welding and testing, or as agreed upon in the pre construction meeting.

A. Prequalification Test Seams

1. Test seams shall be prepared and tested by the Geomembrane Installer to verify that seaming parameters (speed, temperature and pressure of welding equipment) are adequate.
2. Test seams shall be made by each welding technician and tested in accordance with ASTM D 4437 at the beginning of each seaming period. Test seaming shall be performed under the same conditions and with the same equipment and operator combination as production seaming. The test seam shall be approximately 3.3 meters (10 feet) long for fusion welding and 1 meter (3 feet) long for extrusion welding with the seam centered lengthwise. At a minimum, tests seams should be made by each technician 1 time every 4–6 hours; additional tests may be required with changes in environmental conditions.
3. Two 25 mm (1 in) wide specimens shall be die-cut by the Geomembrane Installer from each end of the test seam. These specimens shall be tested by the Geomembrane Installer using a field tensiometer testing both tracks for peel strength and also for shear strength. Each specimen shall fail in the parent material and not in the weld, "Film Tear Bond"(F.T.D. failure). Seam separation equal to or greater than 10% of the track width shall be considered a failing test.
4. The minimum acceptable seam strength values to be obtained for all specimens tested are listed in Subsection 3.05.C.4 of this Section. All four specimens shall pass for the test seam to be a passing seam.
5. If a test seam fails, an additional test seam shall be immediately conducted. If the additional test seam fails, the seaming apparatus shall be rejected and not used for production seaming until the deficiencies are

corrected and a successful test seam can be produced.

6. A sample from each test seam shall be labeled. The label shall indicate the date, geomembrane temperature, number of the seaming unit, technician performing the test seam and pass or fail description. The sample shall then be given to the Owner's Representative for archiving.

B. Field Seam Non-destructive Testing

1. All field seams shall be non-destructively tested by the Geomembrane Installer over the full seam length before the seams are covered. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of tester and outcome of all non-destructive testing shall be recorded and submitted to the Owner's Representative.
2. Testing should be done as the seaming work progresses, not at the completion of all field seaming. All defects found during testing shall be numbered and marked immediately after detection. All defects found should be repaired, retested and remarked to indicate acceptable completion of the repair.
3. Non-destructive testing shall be performed using vacuum box, air pressure or spark testing equipment.
4. Non-destructive tests shall be performed by experienced technicians familiar with the specified test methods. The Geomembrane Installer shall demonstrate to the Owner's Representative all test methods to verify the test procedures are valid.
5. Extrusion seams shall be vacuum box tested by the Geomembrane Installer in accordance with ASTM D 4437 and ASTM D 5641 with the following equipment and procedures:
   a. Equipment for testing extrusion seams shall be comprised of but not limited to: a vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the base, port hole or valve assembly and a vacuum gauge; a vacuum pump assembly equipped with a pressure controller and pipe connections; a rubber pressure/vacuum hose with fittings and connections; a plastic bucket; wide paint brush or mop; and a soapy solution.
   b. The vacuum pump shall be charged and the tank pressure adjusted to approximately 35 kPa (5 psig).
   c. The Geomembrane Installer shall create a leak tight seal between the gasket and geomembrane interface by wetting a strip of geomembrane approximately 0.3m (12 in) by 1.2m (48 in) (length and width of box) with a soapy solution, placing the box over the wetted area, and then compressing the box against the geomembrane. The Geomembrane Installer shall then close the bleed valve, open the vacuum valve, maintain initial pressure of approximately 35 kPa (5 psig) for approximately 5 seconds. The geomembrane should be continuously examined through the viewing window for the presence of soap bubbles, indicating a leak. If no bubbles appear after 5 seconds, the area shall be

considered leak free. The box shall be depressurized and moved over the next adjoining area with an appropriate overlap and the process repeated.

d. All areas where soap bubbles appear shall be marked, repaired and then retested.

e. At locations where seams cannot be non destructively tested, such as pipe penetrations, alternate nondestructive spark testing (as outlined in section 3.04.B) or equivalent should be substituted.

f. All seams that are vacuum tested shall be marked with the date tested, the name of the technician performing the test and the results of the test.

6. Double Fusion seams with an enclosed channel shall be air pressure tested by the Geomembrane Installer in accordance with ASTM D 5820 and ASTM D 4437 and the following equipment and procedures:

a. Equipment for testing double fusion seams shall be comprised of but not limited to: an air pump equipped with a pressure gauge capable of generating and sustaining a pressure of 210 kPa (30 psig), mounted on a cushion to protect the geomembrane; and a manometer equipped with a sharp hollow needle or other approved pressure feed device.

b. The Testing activities shall be performed by the Geomembrane Installer. Both ends of the seam to be tested shall be sealed and a needle or other approved pressure feed device inserted into the tunnel created by the double wedge fusion weld. The air pump shall be adjusted to a pressure of 210 kPa (30 psig), and the valve closed,. Allow 2 minutes for the injected air to come to equilibrium in the channel, and sustain pressure for 5 minutes. If pressure loss does not exceed 28 kPa (4 psig) after this five minute period the seam shall be considered leak tight. Release pressure from the opposite end verifying pressure drop on needle to ensure testing of the entire seam. The needle or other approved pressure feed device shall be removed and the feed hole sealed.

c. If loss of pressure exceeds 28 kPa (4 psig) during the testing period or pressure does not stabilize, the faulty area shall be located, repaired and retested by the Geomembrane Installer.

d. Results of the pressure testing shall be recorded on the liner at the seam tested and on a pressure testing record.

C. Destructive Field Seam Testing

1. One destructive test sample per 150 linear m (500 linear ft) seam length or another predetermined length in accordance with GRI GM 14 shall be taken by the Geomembrane Installer from a location specified by the Owner's Representative. The Geomembrane Installer shall not be informed in advance of the sample location. In order to obtain test results prior to completion of geomembrane installation, samples shall be cut by the Geomembrane Installer as directed by the Owner's Representative as seaming progresses.

2. All field samples shall be marked with their sample number and seam number. The sample number, date, time, location, and seam number shall be recorded. The Geomembrane Installer shall repair all holes in the geomembrane resulting from obtaining the seam samples. All patches shall be vacuum box tested or spark tested. If a patch cannot be permanently installed over the test location the same day of sample collection, a temporary patch shall be tack welded or hot air welded over the opening until a permanent patch can be affixed.
3. The destructive sample size shall be 300 mm (12 in) wide by 1 m (36 in) long with the seam centered lengthwise. The sample shall be cut into three equal sections and distributed as follows: one section given to the Owner's Representative as an archive sample; one section given to the Owner's Representative for laboratory testing as specified in paragraph 5 below; and one section retained by the Geomembrane Installer for field testing as specified in paragraph 4 below.
4. For field testing, the Geomembrane Installer shall cut 10 identical 25 mm (1 in) wide replicate specimens from his sample. The Geomembrane Installer shall test five specimens for seam shear strength and five for peel strength. Peel tests will be performed on both inside and outside weld tracks. To be acceptable, 4 of 5 test specimens must pass the stated criteria in section 2.02 with less than 10% separation. If 4 of 5 specimens pass, the sample qualifies for testing by the testing laboratory if required.
5. If independent seam testing is required by the specifications it shall be conducted in accordance with ASTM 5820 or ASTM D4437 or GRI GM 6.
6. Reports of the results of examinations and testing shall be prepared and submitted to the Owner's Representative.
7. For field seams, if a laboratory test fails, that shall be considered as an indicator of the possible inadequacy of the entire seamed length corresponding to the test sample. Additional destructive test portions shall then be taken by the Geomembrane Installer at locations indicated by the Engineer, typically 3 m (10 ft) on either side of the failed sample and laboratory seem tests shall be performed. Passing tests shall be an indicator of adequate seams. Failing tests shall be an indicator of non-adequate seams and all seams represented by the destructive test location shall be repaired with a cap-strip extrusion welded to all sides of the capped area. All cap-strip seams shall be non-destructively vacuum box tested until adequacy of the seams is achieved. Cap strip seams exceeding 50 M in length (150 FT) shall be destructively tested.

D. Identification of Defects

1. Panels and seams shall be inspected by the Installer and Owner's Representative during and after panel deployment to identify all defects, including holes, blisters, undispersed raw materials and signs of contamination by foreign matter.

E. Evaluation of Defects: Each suspect location on the liner (both in geomembrane seam and non-seam areas) shall be non-destructively tested using one of the methods described in Section 3.05.B. Each location which fails non-destructive testing shall be marked, numbered, measured and posted on the daily "installation" drawings and subsequently repaired.

1. If a destructive sample fails the field or laboratory test, the Geomembrane Installer shall repair the seam between the two nearest passed locations on both sides of the failed destructive sample location.
2. Defective seams, tears or holes shall be repaired by reseaming or applying a extrusion welded cap strip.
3. Reseaming may consist of either:
   a. Removing the defective weld area and rewelding the parent material using the original welding equipment; or
   b. Reseaming by extrusion welding along the overlap at the outside seam edge left by the fusion welding process.
4. Blisters, larger holes, and contamination by foreign matter shall be repaired by patches and/or extrusion weld beads as required. Each patch shall extend a minimum of 150 mm (6 in) beyond all edges of the defects.
5. All repairs shall be measured, located and recorded.

F. Verification of Repairs on Seams: Each repair shall be non-destructively tested using either vacuum box or spark testing methods. Tests which pass the non-destructive test shall be taken as an indication of a successful repair. Failed tests shall be reseamed and retested until a passing test results. The number, date, location, technician and test outcome of each patch shall be recorded.

G. Daily Field Installation Reports: At the beginning of each day's work, the Installer shall provide the Engineer with daily reports for all work accomplished on the previous work day. Reports shall include the following:
1. Total amount and location of geomembrane placed;
2. Total length and location of seams completed, name of technicians doing seaming and welding unit numbers;
3. Drawings of the previous day's installed geomembrane showing panel numbers, seam numbers and locations of non-destructive and destructive testing;
4. Results of pre-qualification test seams;
5. Results of non-destructive testing; and
6. Results of vacuum testing of repairs.

H. Destructive test results shall be reported prior to covering of liner or within 48 hours.

3.06 LINER ACCEPTANCE

A. Geomembrane liner will be accepted by the Owner's Representative when:

1. The entire installation is finished or an agreed upon subsection of the installation is finished;

2. All Installer's QC documentation is completed and submitted to the owner
3. Verification of the adequacy of all field seams and repairs and associated geomembrane testing is complete.

3.07 ANCHOR TRENCH

A. Construct as specified on the project drawings.

3.08 DISPOSAL OF SCRAP MATERIALS

A. On completion of installation, the Geomembrane Installer shall dispose of all trash and scrap material in a location approved by the Owner, remove equipment used in connection with the work herein, and shall leave the premises in a neat acceptable manner. No scrap material shall be allowed to remain on the geomembrane surface.

PART 4. GRI GM13 SPECIFICATIONS

Geosynthetics Research Institute (GRI) Test Method GM13 – "Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes", Revision 8, Dated July 10, 2006.

ATTACHMENT A:

Minimum Average Weld Properties for Smooth and Textured HDPE Geomembranes (English units)									
Property	**Test Method**	**30 mil**	**40 mil**	**50 mil**	**60 mil**	**80 mil**	**100 mil**	**120 mil**
Peel strength (fusion & extrusion) lb/in.	ASTM 4437	39	52	65	78	104	130	156
Shear strength (fusion & extrusion) lb/in.	ASTM 4437	60	80	100	120	160	200	239

END OF SECTION 02800

PART 1. GENERAL

1.01 DESCRIPTION

This section pertains to seeding and placing mulch or erosion control blanket over seeded areas.

1.02 RELATED SECTIONS

A. Specified elsewhere:

1. 02200 - Earthwork

1.03 REFERENCES

The following reference or cited portions thereof, current at date of bidding documents unless otherwise specified, governs the work.

A. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007.

1.04 SPECIFICATIONS

A. Work shall conform to the applicable requirements of Sections 250 and 251 of Standard Specifications for Road and Bridge Construction and to the requirements hereinafter specified.

B. Exceptions: All references in the IDOT specifications to methods of measurement and payment shall not apply.

1.05 WARRANTY

A. Warranty for one (1) year plus one growing season from date of substantial completion shall be provided.

PART 2. PRODUCTS

2.01 MATERIALS

A. Seed: Seed shall conform to Article 1081.04 of the IDOT Standard Specifications. The composition of the Ameren Energy Resources Generating hay seeding mix shall be as follows:

Seed Type	Pounds/Acre
Vernal Alfalfa	12
Wrangler Alfalfa	8
Medium Red Clover	6
Timothy	4

B. Mulch Material and Erosion Control Blanket: Mulch material shall conform to Article 1081.06 and the excelsior blanket/knitted straw mat shall conform to Article 1081.10 of the IDOT Standard Specifications.

C. Fertilizer and agricultural ground limestone will not be permitted.

PART 3. EXECUTION

3.01 CONSTRUCTION

A. Seed bed preparation and seeding methods shall conform to Section 250 of the IDOT Specifications. Seeding of areas disturbed by construction activities after September 30, 2008 may be deferred until Spring 2009.

B. Seed shall be applied to the perimeter berm ditch, to disturbed portions of the perimeter berm, and to all disturbed earth surfaces outside of the existing perimeter berm. IDOT seeding mixture 7 shall be used on stockpiles. IDOT seeding mixture 1A shall be used on the gypsum stack perimeter earthen berm, the recycle pond dam embankment and on slopes that are 4H:1V or steeper. The Ameren hay seed mix shall be used on slopes flatter that 4H:1V.

C. Application rates for IDOT seed mixtures shall be as specified in Section 250 of the IDOT Specifications. The application rate for the Ameren Energy Resources Generating's seed mix shall be as specified in the Ameren Energy Resources Generating's hay seeding mix.

D. Seeded areas shall be mulched in accordance with Article 251.03. The Contractor may use either Method 2 or Method 3.

3.02 MAINTENANCE OF COMPLETED WORK

A. All areas seeded by the Contractor shall be maintained by the Contractor during the period between completion of such work and final completion and acceptance of the Contractor's work by the Owner. This maintenance shall be such that the completed work, at time of acceptance, complies in all respects with the requirements herein specified.

B. The areas seeded will be required to germinate. If the seed does not germinate, the Contractor will be required to regrade and reseed at no additional cost.

END OF SECTION 02936

PART 1. GENERAL

1.01 WORK INCLUDES

A. The complete installation of the formwork for cast-in-place concrete, with shoring, bracing and anchorage, openings for other work, form accessories, form stripping.

1.02 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

B. Section 03300 - Cast-In-Place Concrete.

C. Section 03400 – Concrete Embedment Liner.

1.03 REFERENCES

A. ACI 347 - Recommended Practice For Concrete Formwork.

B. ACI 301 - Specifications For Structural Concrete For Buildings.

1.04 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347 and 301.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for design, fabrication, erection and removal of formwork.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.08 COORDINATION

A. Coordinate this Section with other Sections of work which require attachment of components of formwork.

B. If formwork is placed which results in insufficient concrete cover over reinforcement, request instructions from Owner's Representative before proceeding.

PART 2. PRODUCTS

2.01 WOOD FORM MATERIALS

A. Softwood Plywood: 3/4 in. PS 1-83 "B-B" (concrete form) plywood, Class I, exterior grade or better, mill-oiled and edge sealed with each piece bearing legible inspection trademark.

B. Architectural Plywood: 3/4 in. PS 1-83 "B-B" plyform, Class I, with High Density smooth overlay, 1 surface, edge sealed with each piece bearing legible inspection trademark.

2.02 MANUFACTURERS - PREFABRICATED FORMS

A. Weyerhauser Concrete Form.

B. Georgia Pacific, G-P Exterior Soft Wood Plywood Product.

C. Plywood and Door Corporation's Finn-Form.

2.03 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.04 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, adjustable length, 1 in. back break dimension, free of defects that could leave holes larger than 1 in. in concrete surface; Dayton-Sure Grip snap-in-form ties, as manufactured by Dayton Superior

Corp., Symons Ties as manufactured by Symons Corporation, Snap-Tys as manufactured by Richmond Corporation. Ties shall be removed after forms are removed, and holes filled with mortar that matches the adjacent surfaces.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture; by Magic Kote manufactured by Symons Manufacturing Co., Form Coat manufactured by Concrete Services Co., Formcel manufactured by Lambert Corp.

C. Corners: Chamfered, wood strip type; 3/4 x 3/4 in. size on all exterior corners, 3 x 3 in. size where shown on the drawings; maximum possible lengths.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Concrete Embedment Liner, where required, shall be installed in accordance with Section 03400 – Concrete Embedment Liner.

PART 3. EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted, except for footings.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301. Metal forms shall be installed in strict accordance with manufacturer's directions and specifications.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members which are not indicated on drawings.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors, and other inserts.

D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean and remove foreign matter within forms as erection proceeds.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts or water to clean out forms. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.08 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

B. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view. Do no patch formwork.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finished concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION 03100

PART 1. GENERAL

1.01 WORK INCLUDES

A. The complete installation of the reinforcing steel bars and accessories for cast-in-place concrete.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.

B. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements For Reinforced Concrete.

C. ACI SP-66 - American Concrete Institute - Detailing Manual.

D. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

E. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.

1.04 SUBMITTALS

A. Submit under provisions of Section 01010.

B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel, and bending and cutting schedules. Contract drawings shall not be reproduced as the basis for shop drawings.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI Manual of Standard Practice.

B. Submit certified copies of mill test report of reinforcement materials analysis.

1.06 COORDINATION

A. Coordinate with placement of formwork, formed openings and other work.

PART 2. PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage, annealed steel wire, epoxy coated when used with epoxy-coated reinforcement.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Standard Practice and ACI SP-66.

B. Splice reinforcement on at locations indicated on drawings. Indicate location of splices on shop drawings.

PART 3. EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Clean reinforcement of foreign particles or coatings.

B. Accommodate placement of formed openings.

C. Conform to ACI 318 code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. Contractor shall notify the Owner's Representative at least 24 hrs. in advance of concrete placement. Placement of reinforcing shall occur in such sequence that the Owner's Representative has sufficient time to inspect the correctness of the reinforcing within the placement area. The Owner's Representative retains the right to require necessary revisions be made before concrete is placed.

END OF SECTION 03200

PART 1. GENERAL

1.01 WORK INCLUDES

A. The complete installation of cast-in-place concrete structures, including joint sealants.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork: Formwork and accessories.

B Section 03200 - Concrete Reinforcement.

C. Section 03400 – Concrete Embedment Liner

1.03 REFERENCES

A. ACI 301 – Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 305R - Hot Weather Concreting.

E. ACI 306R - Cold Weather Concreting.

F. ACI 308 - Standard Practice for Curing Concrete.

G. ACI 318 - Building Code Requirements for Reinforced Concrete.

H. ASTM C31 - Concrete Test Specimens.

I. ASTM C33 - Concrete Aggregates.

J. ASTM C94 - Ready-Mixed Concrete.

K. ASTM C150 - Portland Cement.

L. ASTM C260 - Air Entraining Admixtures for Concrete.

M. ASTM C494 - Chemical Admixtures for Concrete.

1.04 SUBMITTALS

A. Product Data: Provide data on joint devices, attachment accessories, admixtures.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Acquire cement and aggregate from same source for all work.

C. Conform to ACI 305R when concreting during hot weather.

D. Conform to ACI 306R when concreting during cold weather.

1.06 COORDINATION

A. Coordinate this Section with other Sections which require embedment of components in cast-in-place concrete.

1.07 PRODUCT DATA

A. Submit proposed mix design to Owner's Representative for review prior to commencement of work. Identify source and provide material certificates for cement, fine and coarse aggregates. Provide recent laboratory gradation for fine and coarse aggregates and mix design information in accordance with ACI 301.

B. Submit Construction joint plan.

PART 2. PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal Portland Type, Gray Color.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Potable.

2.02 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494. Maximum 0.05% Chloride Ion Contents.

C. The use of calcium chloride in any concrete is not permitted.

2.03 ACCESSORIES

A. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

B. Curing Compound: Dress and Seal No. 18 by L&M Construction Chemicals, MB-429 by Master Builders, or Sikagard Cure/Hard by the Sika Corporation.

C. Epoxy Grouted Adhesive Anchors: Hilti, Red Head, Simpson, or Rawl.

2.04 CONCRETE MIX

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301.

C. Provide normal weight concrete of the following characteristics:

1. Compressive strength at 28 days: 4,000 psi.

2. Slump: 4 in. - A tolerance of up to 1 in. above the maximum shall be allowed for one batch in any five consecutive batches tested.

3. Water/cement ratios: 0.4 (max).

D. Use accelerating admixtures in cold weather only when approved by Owner's Representative. Use of admixtures will not relax cold weather placement requirements.

E. Use set-retarding admixtures during hot weather only when approved by Owner's Representative.

F. Water-reducing admixtures may be used in all concrete except footings and in strict compliance with the manufacturer's directions.

G. Add air-entraining agent to concrete mix for air content of 6% (± 1%).

PART 3. EXECUTION

3.01 EXAMINATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify Owner's Representative minimum of 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Place concrete continuously between predetermined expansion, control, and construction joints.

F. When air temperature is between 80°F and 90°F, reduce the mixing and delivery time specified in ASTM C94 from 1-1/2 hours to 75 minutes. When the air temperature is above 90°F, reduce the mixing and delivery time to 60 minutes.

G. Cold weather concreting. Comply with ACI 306 except as follows:

1. In freezing weather, provide suitable means for maintaining concrete temperature at a minimum of 70°F for three days, or 50°F for five days after placing.

2. Cooling of concrete to outside temperature: Not faster than 1° per hour for first day and 2° per hour thereafter until outside temperature is reached.

3. Maximum temperature of concrete produced with heated aggregated, heated water, or both, at any time during its production or transportation: 90°F.

4. Do not mix chemicals or other foreign materials in concrete to prevent freezing or to accelerate hardening of concrete, unless approved in writing by Owner's Representative.

H. Hot weather concreting. Comply with ACI 305R.

1. ACI recommendations shall be observed when any combination of high air temperature, low relative humidity and wind velocity tend to impair the quality of fresh or hardened concrete.

2. Retarding and water reducing admixtures shall be approved in writing for each concrete mix design prior to placement.

3.03 CONCRETE FINISHING

A. Provide exterior concrete formed surfaces to be left exposed with smooth rubbed finish in accord with ACI 301. All other formed surfaces shall have fins, projections and offsets removed.

B. Provide Class A tolerances to exterior concrete slabs according to ACI 301.

1. Broom finish all exterior slabs. Broom out all tool marks.

C. Pitch slabs to drain.

3.04 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for a period necessary for hydration of cement and hardening of concrete in accordance with ACI 308.

C. Cure and protect finished concrete slabs in accordance with ACI 308.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01010, paragraph 8.0.

B. Testing firm will take cylinders, perform slump and air entrainment tests in accordance with ACI 301.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed concrete mix design to Owner's Representative firm for review 14 days prior to commencement of Work.

E. Testing frequency shall be as specified in Section 01010, paragraph 8, except that one additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.06 PATCHING

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Owner's Representative and performed by the Contractor at no additional cost to the project.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Owner's Representative for each individual area.

END OF SECTION 03300

PART 1. GENERAL

1.01 WORK INCLUDES

A. Specifications and guidelines for manufacturing and installing high-density polyethylene embedment liners.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.

B. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. D 1505 Test Method for Density of Plastics by the Density-Gradient Technique
2. D 1603 Test Method for Carbon Black in Olefin Plastics
3. D 5199 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
4. D 5596 Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
5. D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
6. D 1204 Standard Test Method for Linear Dimensional Changes of Nongrid Thermoplastic Sheeting or Film at Elevated Temperature
7. D 696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer
8. D 746 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
9. D 570 Standard Test Method for Water Absorption of Plastics
10. E 96 Standard Test Method for Water Vapor Transmission of Material

1.04 SUBMITTALS

A. All work for and in connection with the installation of the lining, field seaming and welding joints shall be completed in strict conformity with all applicable instructions and recommendations of the liner manufacturer.

B. Included with the shipment of liner, submit certified test reports that the liner and material are manufactured in accordance with standards specified herein.

1.05 QUALIFICATIONS

A. The HDPE liner specified in this section shall be furnished by a manufacturer who is fully experienced, reputable and qualified in the manufacturing of the materials. The manufacturer must at least 10 years of manufacturing experience.

B. Locking devices must be extruded to the sheet as a one step process.

C. Liner shall be GSE StudLiner as manufactured by GSE Lining Technology, Inc.

D. Liner shall be 8 feet in width.

E. Liner shall demonstrate a minimum pull-out strength of 14,000 psf.

1.06 COORDINATION

A. Coordinate with placement of formwork, formed openings and other work.

PART 2. PRODUCTS

2.01 ROLL DIMENSIONS

A. Embedment sheets shall be produced in rolls that are 8.0 ft (2.4 m) in width and a thickness range of 80 mils (2.0 mm) to 200 mils (5.0 mm) in thickness. Roll lengths vary according to thickness.

B. Locking studs of the same material as that of the liner shall be integrally extruded with the sheet. Stud spacing shall be on approximate 1.25 in (30 mm) centers, such that there are approximately 110 studs per square foot (1200 per square meter).

2.02 MATERIAL PROPERTIES

A. The material used in the embedment liner and in all welding strips shall be made from 97-98% virgin high density polyethylene and 1.5-3% carbon black or pigmentation for the purpose of an otherwise specified color.

B. Plasticizer shall not be added to the resin formulation.

C. Embedment sheet and welding strips shall be free of holes, pinholes, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.

D. The HDPE cap strips shall be made from HDPE, have good impact resistance and have an elongation sufficient to bridge up to 1/4 inch settling cracks.

E. Cap strips shall be approximately 4 inches wide or greater and shall be equivalent to that of the liner.

F. Material shall maintain a repairable state through it's lifecycle by methods approved and recommended by the manufacturer.

G. Embedment sheets shall have the following physical properties when tested in accordance with Table 1.

H. Raw resin shall have the following properties when tested in accordance with Table 2.

Table 1: Material Properties

Property	Test Method	Nominal Value				Testing Frequency
Thickness, mm (mil)	ASTM D 5199	2.00 (80)	3.00 (120)	4.00 (160)	5.00 (200)	Every 5th roll
Density, g/cm^3	ASTM D 1505	0.94	0.94	0.94	0.94	1/100,000 ft^2
Tensile Properties Strength@Yield, lb/in^2 (MPa) Elongation @ Break, %	ASTM D 6693 Type IV, Dumbell G.L.= 2.0in.	2,200 (14.5) 500	2,200 (14.5) 500	2,200 (14.5) 500	2,200 (14.5) 500	1/100,000 ft^2
Stud Pull-Out Strength[1], lb/ft^2 (kN/m^2)		>14,000 (669.89)	>14,000 (669.89)	>14,000 (669.89)	>14,000 (669.89)	1/ product
Carbon Black Content/ Pigment Content, % Black Liner Gray Liner	ASTM D 1603, mod. ASTM D 5630, mod.	2-3 1.5 – 2.5	2-3 1.5 – 2.5	2-3 1.5 – 2.5	2-3 1.5 – 2.5	1/100,000 ft^2
Carbon Black Dispersion[2]	ASTM D 5596	Note 2	Note 2	Note 2	Note 2	1/100,000 ft^2
Notched Constant Tensile Load, hours	ASTM D 5397	400	400	400	400	1/ formulation
Coefficient of Linear Thermal Expansion, per °C	ASTM D 696	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1/ product
Low Temperature Brittleness, °C	ASTM D 746	-77	-77	-77	-77	1/ product
Dimensional Stability, % (each direction)	ASTM D 1204	± 1.0	± 1.0	± 1.0	± 1.0	1/ product
Water Absorption, %	ASTM D 570	0.1	0.1	0.1	0.1	1/ product
Water Vapor Transmission, (g/m^2/day)	ASTM E 96	<0.01	<0.01	<0.01	<0.01	1/ product

[1]Note: Concrete must have a compressive strength of at least 5,000 lb/in^2 (34,500 kPa).
[2]Note: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view for category 3.

Table 2: Raw Material Properties

Property	Test Method	Value	Testing Frequency
Density, g/cm3	ASTM D 1505	0.932	1/ resin lot
Melt Flow, g/10 min	ASTM D 1238 (190/2.16)	$\leq$ 1.0	1/ resin lot
OIT, minutes	ASTM D 3895 (1atm/200°C)	100	1/ formulation

2.03 MATERIAL SUPPLY

A. Embedment sheets shall be supplied in roll form, sheets, pre-fabricated tubes or panels.

B. Cap strips shall be supplied in 4 inch widths or greater.

PART 3. EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Clean reinforcement of foreign particles or coatings.

B. Accommodate placement of formed openings.

C. Conform to ACI 318 code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. Contractor shall notify the Owner's Representative at least 24 hrs. in advance of concrete placement. Placement of the Concrete Embedment Liner shall occur in such sequence that the Owner's Representative has sufficient time to inspect the correctness of the placement within the concrete formwork area. The Owner's Representative retains the right to require necessary revisions be made before concrete is placed.

END OF SECTION 03200

AECOM

Appendix E: Operation & Maintenance Manual for #1 Ash Pond

Coffeen Power Station

Operational Procedure

X-XXX-XXXX--XXX

Operation & Maintenance Manual for #1 Ash Pond

(Bottom Ash Recycle Pond)

Effective Date: xx/xx/xxxx

Reason for Change: New Procedure

Approved By: x Date: xx/xx/xxxx

x
John Romang

Responsible Department: Coffeen 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

Section — Page Number

1.0 Purpose 1
2.0 Scope 1
3.0 Responsibilities 1
4.0 Historical Information 1
5.0 Water Supply .... Error! Bookmark not defined.
6.0 Operations Requirements 2
7.0 Dam Safety Requirements 3
8.0 Maintenance Logs 4
9.0 Contact Numbers 4
10.0 References 4

1.0 Purpose

1.1 This procedure is intended to ensure the safe and environmentally responsible operation and use of the #1 Ash Pond (Bottom Ash Recycle Pond) at the Coffeen Power Station. The primary purpose of the #1 Ash Pond is for the removal of bottom ash by settling and the recirculation of slag tank water. The pond is used to supply water to the Unit 1 and Unit 2 ash handling systems via the recycle pumps.

2.0 Scope

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

3.0 Responsibilities

3.1 Outside Unit Operator – Checks the pond level and screens once a shift. Operates the facilities as described in this Operational Procedure. Reports any conditions noted during routine activities to the Shift Supervisor and Chemistry Department. Writes job requests if a problem is identified.

3.2 Shift Supervisor (SS) - Calls the Chemistry Department when structural concerns or overflow conditions are reported. Make entries into the shift electronic log book (e-log) indicating the concern and actions taken.

3.3 Dam Safety Inspector - Conducts weekly detailed dam safety inspections and provides a report with findings and recommendations. Make entries in e-log indicating the concern and actions taken.

4.0 Historical Information

4.1 The #1 Ash Pond was initially constructed to be a mixed ash deposition pond and was put in service in the mid-1960's. It is located east of the Main Building. It is a 23 acre pond with a maximum outer berm height of 41.5 feet above ground surface level (approximately elevation 637.5'). The pond overflow was located on the north east corner of the pond and discharged into the flume.

4.2 The #1 Ash Pond was converted to act as a closed loop system in the late 1970's when the dewatering bins were installed. The mixed ash was removed and deposited into the #2 ash pond during the closure of #2 pond. The #1 Ash Pond berms were modified and an inner berms was added to the pond to aid in dropping out bottom ash solids. Exterior berm elevation is approximately 637.5 feet.

4.3 The #1 Ash Pond was equipped with an emergency overflow at the outlet structure. When the pond level reaches approximately 6.5 feet from the top of the berm, it will overflow into the flume. Overflow will be reported to the EPA. In 2011 there was an assessment of the overflow pipe which showed no obstructions or damage.

4.4 In 2006, the bottom ash system was modified to directly sluice bottom ash into the pond, bypassing the retired dewatering bins. Bottom Ash is removed from the pond via an outside contractor on an as needed (typically daily) basis.

5.0 Water Supply

All water inlets to the pond are located on the west side of the pond.

The ash sluice lines (from the valve house) discharge to the pond. These lines are used to convey ash from the slag handling system to the #1 Ash Pond. These lines are the southern most of the pond inlets. HPSW system is routed to the pond (valve house sparger valves, floor drains at Unit 1 cyclone level).

The Slag Tank Overflow sump pumps discharge into the pond at the concrete culvert located directly east of the of the lime/soda ash silo. Also in this area, a small stainless line extends thru the concrete. This is the discharge of the sludge pumps at the Waste Treatment System in the Recycle Pump House building.

The recycle pump flow control valves discharge to the pond through a line located at the northwest corner of the pond. Also in the vicinity of this line is the discharge pipe of the recycle pump house sump pumps.

Water from the Unit 1 and Unit 2 oil water separators are typically routed to the pond via the Slag Tank Overflow Pump (STOP) House sumps. Water entering these sumps are floor and roof drains in the plant and the yard area immediately to the north of the main building.

6.0 Operations Requirements

Pond Level - Plant personnel shall monitor the level of the #1 Ash Pond on a daily basis. Pond level is maintained at approximately 1.0’ to 1.5’ at the water level staff gauge located on the pond side of the screens. The staff gauge has elevation 629.0’ as the 0 elevation.

At 2.0’ water level (elevation 631.0 feet), the pond overflows resulting in a sampling and analysis requirement for Total Suspended Solids and Oil and Grease with reporting of the results to the IEPA. If the pond is found at or above 2.0’ on the pump side staff gauge, contact Chemistry immediately.

Water can be added to the pond from either the Unit 1 or Unit 2 Low Pressure Service Water (LPSW) headers via piping that discharges to the slag tank overflow trench.

Water can be drained from the pond via the water supply pipe to the dewatering bins. Opening this valve drains water from the recycle header which will remove water from the #1 Ash Pond.

Recycle Pump Intake Structure – Suction to the recycle pumps is supplied from the intake structure located at the west end of the north leg of the pond. This is the only water discharge point from the pond. Water level staff gauges are located upstream and downstream of the trash screens for determination of the screen differential. At 0.5’ differential, the screens should be cleaned. Level sensors are also installed upstream and downstream of the screens. Digital displays of the upstream and downstream levels are located along the north side of the catwalk leading out to the screen enclosure. These level sensors will generate a high screen differential alarm in the Control Room DCS. Check screen differential (should clean screens at 6 inches differential.) When the screens become plugged, suction to the recycle pumps is reduced. Call shift supervisor to report if screens needs to be cleaned.

Oil Boom – Plant personnel shall monitor the oil boom that is provided upstream of the intake structure. Check condition of oil booms across pond, at discharge, and across pond inlet. Booms should be replaced when they become oil saturated or damaged. Also check that booms have not come unattached from one another. Write JR to change out booms or to reconnect booms when required.

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.

7.0 Dam Safety Requirements

7.1 Dam Safety Inspections - 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: Weekly.
2. Vegetation: Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion form occurring. There should be NO trees on the earth embankment and none within a minimum of 20 feet of the embankment toe or other structures. Mowing frequency: Semiannually.
3. Well Readings: Record level of wells on the crest and toe of the berm. Frequency: Quarterly.
4. Special Inspections – Special inspections of the levees and 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 Log

8.1 Dam & Berm Inspector shall enter on e-log under the Dam Safety tab all weekly inspections, any usual occurrences, and maintenance performed.

9.0 Contact Numbers

Plant Environmental Supervisor: John Romang / 217-534-7629
Plant Dam & Berm Inspector: Vito Passariello/ 217-534-7664
Plant Control Room: 217-534-7668 / 217-534-7669
Supervising Engineer Dam Safety: Steve Bluemner / 314-554-6298
Dam Safety Staff Contact: Mike Wagstaff / 314-554-6296

10.0 References

Appendix F: Operation and Maintenance Manual, Gypsum Management FacilityOperation (2015)

Operation and Maintenance Manual
Coffeen Energy Center
Gypsum Management Facility
Montgomery County, Illinois

IDNR Permit # DS2014019
Dam Permit # IL50578 & IL50579

Prepared For:

ILLINOIS POWER GENERATING COMPANY
Coffeen Energy Center
134 CIPS Lane
Coffeen, Illinois 62017

Prepared By:

HANSON PROFESSIONAL SERVICES INC.
1525 South Sixth Street
Springfield, Illinois 62703

Amended By:

DYNEGY OPERATING COMPANY
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Original: February 2008
Amended: March 2015

OPERATION AND MAINTENANCE MANUAL
COFFEEN ENERGY CENTER
GYPSUM MANAGEMENT FACILITY
MONTGOMERY COUNTY, ILLINOIS

TABLE OF CONTENTS

Section **Page**

SECTION 1.0 General 1
1.1 Reasons For Development And Dissemination Of The O&M Manual 1
1.2 General Responsibilities Concerning Dams 1
SECTION 2.0 Definitions 2
SECTION 3.0 Information About The Dams 4
3.1 Location 4
3.2 Description Of Dam And Appurtenances 4
3.3 Size and Hazard Classification 5
3.4 Purpose Of The Dams 5
3.5 Pertinent Data 6
SECTION 4.0 Operations Activities 8
4.1 Introduction 8
4.2 Site Operations and Personnel 8
  4.2.1 Site Operations 8
  4.2.2 Personnel 8
4.3 Gypsum Management Facility Startup 8
4.4 Water Balance 9
4.5 Gypsum Management Facility Operation 9
  4.5.1 Routine Operations 9
  4.5.2 Piezometer Installation and Monitoring 10
4.6 Dam Inspections 12
  4.6.1 Operation and Maintenance Inspection 12
  4.6.2 Engineering Inspection 15
  4.6.3 Review of Emergency Action Plan 16
SECTION 5.0 Maintenance Activities 17

LIST OF TABLES

Table 3-1 Pertinent Data for the Gypsum Stack Earthen Dam 6
Table 3-2 Pertinent Data for the Recycle Pond Dam 7

LIST OF FIGURES

Figure 4-1 Anticipated Phreatic Surface in Gypsum Stack 11

LIST OF APPENDICES

APPENDIX A – Location Map
APPENDIX B – Operation and Maintenance Inspection Checklist
APPENDIX C – Engineering Inspection Form
APPENDIX D – Herbicides
APPENDIX E – Construction Drawings

SECTION 1.0
GENERAL

This operation and maintenance (O&M) manual outlines objectives, proposed policies, responsibilities, and procedures for Coffeen Energy Center personnel who are responsible for the management of the Coffeen Energy Center Gypsum Management Facility (GMF). The GMF incorporates two reservoirs, the Gypsum Pond and the Recycle Pond, for processing and storing gypsum.

1.1 REASONS FOR DEVELOPMENT AND DISSEMINATION OF THE O&M MANUAL

The State of Illinois Rivers, Lakes and Streams Act, (615 ILCS 5) Paragraph 23a includes the statement "The Department is authorized to carry out inspections of any dam within the State, and to establish standards and issue permits for the safe construction of new dams and the reconstruction, repair, <u>operation and maintenance</u> of all existing dams." (emphasis added).

Part 3702 of Section 17 of the Illinois Administrative Code, Chapter I entitled the "Construction and Maintenance of Dams" details the requirements to obtain a permit for the construction, operation, and maintenance of a dam. Section 3702.40 b) includes the following statements:

> "4) An applicant for a Class I or II dam shall submit an operational plan specifying the method and schedule for the operation of the dam and the routine operating procedures to keep the dam in good working order, including an emergency warning plan." and

> "5) As a condition of each permit, the dam owner shall submit a maintenance plan detailing the procedures and schedules to be followed to maintain the dam and its appurtenances in a reasonable state of repair."

Thus, it is a requirement of all dam owners who have dams which fall under the jurisdiction of the Illinois Department of Natural Resources Office of Water Resources (IDNR-OWR) to operate and maintain them safely.

As a dam owner, Illinois Power Generating Company (IPGC) Coffeen Energy Center is responsible for the safety of the public and for maintaining the structures at the facility for both safety and economy. The overall public interest is served by providing a document to serve as a basis for the safe and economical operation and maintenance of the dam during both emergency and day-to-day conditions.

1.2 GENERAL RESPONSIBILITIES CONCERNING DAMS

IPGC is responsible for the operation and maintenance of the Gypsum Pond Dam and the Recycle Pond Dam. These responsibilities include general maintenance (mowing, removing debris from decants, placing riprap where needed, etc.), operation, inspection and emergency action decisions.

SECTION 2.0
DEFINITIONS

Appurtenant Works - The structures or machinery auxiliary to dams which are built to operate and maintain dams; such as outlet works, spillways, gates, valves, channels, etc.

Boil - A stream of water discharging from the ground surface downstream of the dam carrying with it a volume of soil which is distributed around the hole formed by the discharging water.

Berm - A horizontal step or bench in the sloping profile of an embankment dam.

Breach - A break, gap, or opening (failure) in a dam which releases impoundment water.

Dam - A barrier built for impounding or diverting the flow of water.

Dike (Levee) - An embankment, usually applied to embankments or structures built to protect land from flooding.

Drain, Layer or Blanket - A layer of pervious material in a dam to facilitate the drainage of the embankment including such items as a toe drain, a weephole, and a chimney drain.

Drawdown - The resultant lowering of the water surface level due to the release of water from the impoundment.

Embankment - Fill material, usually rock or earth, placed with sloping sides.

Earthen Dam - Any dam constructed of excavated natural materials.

Emergency Action Plan - A predetermined plan of action to be taken to reduce the potential for property damage and loss of lives.

Failure - An incident resulting in the uncontrolled release of water from the dam.

Freeboard - The vertical distance between a stated water level and the top of the dam.

Gate or Valve - In general, a device in which a leaf or member is moved across the waterway to control or stop the flow.

Groin - The junction of the upstream or downstream face of the dam with the valley wall.

Maintenance - The upkeep, involving labor and materials, necessary for efficient operation of dams and their appurtenant works.

Operation - The administration, management, and performance needed to operate the dam and appurtenant works.

Operation and Maintenance Inspection - Inspections conducted by the dam operator. These inspections are frequent visual "Walk-around" inspections of the dam surface and appurtenant works.

Outlet - An opening through which water can freely discharge for a particular purpose from an impoundment.

Phreatic Surface - The upper surface of saturation in an embankment.

Piping - The progressive development of internal erosion by seepage, appearing downstream as a hole or seam, discharging water that contains soil particles.

Riprap - A layer of large stones, broken rock or precast blocks placed in a random fashion usually on the upstream slope of an embankment dam, on a reservoir shore, or on the sides of a channel as a protection against wave and ice action.

Silt/Sediment - Soil particles and debris in an impoundment.

Slump/Slide Area - A portion of earth embankment which moves downslope, sometimes suddenly, often with cracks developing.

Spillway System - A structure or structures over or through which flows are discharged. If the flow is controlled by gates, it is considered a controlled spillway. If the elevation of the spillway crest is the only control of the flows, it is considered an uncontrolled spillway.

Emergency Spillway - A spillway designed to operate very infrequently, only during exceptionally large floods, usually constructed of materials expected to erode slowly.

Principal Spillway - The main spillway which controls both normal and flood flows and is usually constructed of non-erodable materials.

Auxiliary Spillway - A spillway which works in conjunction with the principal spillway to control flood flows and is usually constructed of non-erodable materials.

Stilling Basin - A basin constructed to dissipate the energy of fast flowing water, such as from a spillway, and to protect the streambed from erosion.

Toe of Embankment - The junction of the face of the dam with the ground surface in the floodplain upstream or downstream of the dam.

SECTION 3.0
INFORMATION ABOUT THE DAMS

3.1 LOCATION

The Gypsum Pond Dam and Recycle Pond Dam are located in the NW 1/4 of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian in Montgomery County, Illinois. More specifically, the dams are located approximately 1.5 miles south of Coffeen, Illinois. A map showing the location of the dams is included in Appendix A.

3.2 DESCRIPTION OF DAM AND APPURTENANCES

The gypsum pond perimeter earthen dam, the gypsum pond "gypsum" dam, and the recycle pond dam will all be regulated in accordance with 17 Illinois Administrative Code (IAC) Part 3702, Construction and Maintenance of Dams. The gypsum pond perimeter earthen dam, which will be lined with a dual high density polyethylene (HDPE) geomembrane system, will have a maximum embankment height of 13 ft and a maximum impounding capacity of 442 acre-ft (measured at the top of earthen dam elevation 632 ft). There will be an additional 123 acre-ft of incised storage. The total volume of gypsum stored within the completed gypsum pond dams will be approximately 2,478 acre-ft.

The dam for the recycle pond, which will be lined with a 60 mil HDPE geomembrane, will have a maximum embankment height of 16 ft and a maximum impounding capacity of 243 acre-ft (measured at the top of dam elevation 629 ft). There will be an additional 99 acre-ft of incised storage.

The gypsum pond will be divided into two sub-cells for the containment of scrubber sludge (gypsum). Discharges to the site will switch back and forth between the two sub-cells so that one sub-cell can be dewatered and raised while the other is in use. There will be two fixed decant pipes constructed in the gypsum stack – one for each sub-cell - which will discharge to stilling wells located adjacent to the perimeter ditches. The control elevation on the decant pipes will be maintained 5.0 ft below the lowest point on the stack cell crest. The decant pipes will enable the cells to be dewatered after storm events so that a minimum of 5.0 ft of freeboard will be maintained in each cell. A minimum of 4.7 ft of freeboard is required above the decant inlet to contain the Probable Maximum Flood (PMF) storm event in addition to peak wind generated waves.

The gypsum pond dam perimeter ditches will be located on the interior sides of the earthen dam. Runoff from the stack will be conveyed through the ditches to a transfer channel which will discharge into the recycle pond. The ditches will be trapezoidal in shape with a 15 ft bottom width, a maximum depth of 9 ft and a longitudinal slope of 0.0005 ft/ft. Side slopes will be 3H:1V. During operation, the ditches will be monitored for erosion. If erosion of the designed ditch geometry occurs, a geogrid will be used for stabilization.

The transfer channel between the gypsum pond dam and the recycle pond have a trapezoidal cross-section with 3H:1V side slopes will be lined with HDPE. The 500 ft long transfer channel will transition from a 32-ft bottom width at an invert elevation of 623.0 ft at the upstream end to a 60-ft bottom width at an invert elevation of 622.0 ft at the downstream end. The transfer channel will be fitted with stop logs capable of raising the discharge control elevation to 625.0 ft. To prevent degradation of the HDPE liner due to flow velocities, the transfer channel and a portion of the recycle pond dam will incorporate an additional sacrificial layer of HDPE.

The emergency spillway for the recycle pond will consist of three 6 ft by 6 ft precast reinforced concrete risers (drop inlets) with a top elevation of 624 ft (5 ft below the top of the dam). The recycle pond's HDPE liner will attach to the exterior sides of each riser. A 4-ft diameter HDPE outlet conduit will be constructed at each riser with an upstream invert of 615.0 ft and a downstream invert of 613.0 ft. Assuming a normal pool elevation of 624 ft (control elevation of the risers), the emergency spillway has been designed to pass the 24-hour PMF storm event with adequate freeboard to prevent overtopping of the recycle pond crest by wind generated waves. The emergency spillway has been provided in the event of accident or catastrophic rainfall only. It is not expected to be activated during the life of the facility. As designed, all discharges from the system will be through the pump house located on the southeast corner of the recycle pond.

3.3 SIZE AND HAZARD CLASSIFICATION

If a worst case failure of the gypsum pond dam were to occur, and the entire volume of the stack is released easterly into Coffeen Lake, the Coffeen Lake reservoir has adequate freeboard to accept this additional volume without overtopping the dam during flood events up to and including the 60 percent PMF. However, the power plant and several residences could potentially be impacted if the gypsum stack dam were to fail in a westerly direction. Considering the regulatory criteria established in Part 3702, the gypsum stack perimeter earthen dam and the gypsum stack "gypsum" dam are classified as intermediate-size Class I (high hazard potential) dams.

A failure of the recycle pond dam would discharge water to Coffeen Lake but it is not anticipated to result in loss of life or any significant economic damage. Breach analyses indicate that a failure of the recycle pond dam during a PMF event would be expected to result in an increase in the Coffeen Lake water surface elevation of not more than ½ inch. Accordingly, the recycle pond dam is classified as a small-size Class III (low hazard potential) dam.

3.4 PURPOSE OF THE DAMS

The dams will be used to dewater, store and dispose of flue gas desulphurization sludge (gypsum) from the Coffeen Power Station (the Plant). Gypsum will be transported to the Gypsum Pond Dam in slurry form (approximately 20 percent solids) and allowed to settle. Clarified process water will then be decanted to the recycle pond and returned to the Plant for reuse via a pipeline.

3.5 PERTINENT DATA

Pertinent data about the dams, appurtenant works, and reservoirs are presented in Table 3-1 and Table 3-2.

Table 3-1 Pertinent Data for the Gypsum Pond Earthen Dam
(Based on the Construction of 2 Gypsum Cells)

Perimeter Ditches		
Bottom Width	15.00	feet
Top Width	73.50	feet
Depth	9.00	feet
Outer Side Slope	3:1	H:V
Inner Side Slope	3:1	H:V
Upstream Invert	624.85	feet
Downstream Invert	623.00	feet
Ditch slope	0.00050	ft/ft
Bank Full Cross-sectional Area	378.00	sf
Length of Each Ditch (Centerline)	3710.00	feet
Bank Full Volume of Each Ditch	32.19	acre-ft
Total Ditch length (Centerline)	7420.00	feet
Total Ditch Bank Full Volume	64.39	acre-ft

Transfer Channel		
Bottom Width	32.00	feet
Top Width	86.00	feet
Depth	9.00	feet
Upstream Invert	623.00	feet
Downstream Invert	622.00	feet
Weir Elevation	625.00	feet
Weir Length (at 2 ft height)	44.00	feet

Dam		
Top of Dam Elevation	632	feet
Reservoir Surface Area	77.29	acres
Total Watershed Area	77.29	acres
Dam Length	7720	feet
Dam Height	13	feet

1.0 PMF Storm Event		
Storm Duration	24	hours
Peak Outflow Discharge	1100.7	cfs
Total Discharge Volume	228.83	acre-ft
Peak WSEL in Perimeter Ditches	629.89	feet
Freeboard over Max WSEL	2.11	feet
Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	**YES**	

0.5 PMF Storm Event		
Storm Duration	24	hours
Peak Outflow Discharge	541.1	cfs
Total Discharge Volume	122.41	acre-ft
Peak WSEL in Perimeter Ditches	628.23	feet
Freeboard over Max WSEL	3.77	feet
Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	**YES**	

100-yr Storm Event - Critical Duration		
Storm Duration	12	hours
Peak Outflow Discharge	92.6	cfs
Total Discharge Volume	50.91	acre-ft
Peak WSEL in Perimeter Ditches	626.07	feet
Freeboard over Max WSEL	5.93	feet
Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	**YES**	

100-yr Storm Event - 24 Hour Duration		
Storm Duration	24	hours
Peak Outflow Discharge	62.9	cfs
Total Discharge Volume	57.01	acre-ft
Peak WSEL in Perimeter Ditches	625.84	feet
Freeboard over Max WSEL	6.16	feet
Wave Runup/Wind Setup	2.06	feet
Adequate Freeboard?	**YES**	

Note: The Critical Storm Duration is the duration of the rainfall event which produces the highest reservoir water surface elevation in the Gypsum Stack Perimeter Ditches for the given storm frequency. In each case, the starting normal pool elevation of the Recycle Pond is considered to be at elevation 624 ft.

Table 3-2 Pertinent Data for the Recycle Pond Dam
(Based on the Construction of 2 Gypsum Cells)

Dam		
Top of Dam Elevation	629	feet
Invert of Reservoir Elevation	605	feet
Reservoir Area at Invert	11.55	acres
Reservoir Area at Top of Dam	17.07	acres
Total Reservoir Volume	341.91	acre-ft
Volume at Elevation 624 ft	259.60	acre-ft
Total Watershed Area	94.36	acres
Dam Length	3600	feet
Dam Height	16	feet

3 Spillways- 6ft x 6ft inlet w/ 4ft dia outlet pipe		
Weir Length	22	feet
Weir Elevation	624.00	feet
Outlet Conduit Length	120	feet
Outlet Conduit Diameter (Inside)	48	inch
Upstream Invert	615	feet
Downstream Invert	614	feet
Outlet Conduit Slope	0.00833	

1.0 PMF Storm Event - Normal Pool at Elev. 624 ft		
Storm Duration	24	hours
Peak Inflow	1261.6	cfs
Peak Outflow	586.9	cfs
Peak Storage	315.47	acre-ft
Peak WSEL (HEC-HMS)	627.45	feet
Freeboard over Peak WSEL	1.55	feet
Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	**YES**	

1.0 PMF Storm Event - Normal Pool at Elev. 609 ft		
Critical Storm Duration	24	hours
Peak Inflow	1261.6	cfs
Peak Outflow	289.7	cfs
Peak Storage	280.65	acre-ft
Peak WSEL (HEC-HMS)	625.34	feet
Freeboard over Peak WSEL	3.66	feet
Wave Runup/Wind Setup	1.20	feet
Water Released from Dam?	**YES**	

0.5 PMF Storm Event - Normal Pool at Elev. 624 ft		
Storm Duration	24	hours
Peak Inflow	608.4	cfs
Peak Outflow	413.6	cfs
Peak Storage	286.48	acre-ft
Peak WSEL (HEC-HMS)	625.69	feet
Freeboard over Peak WSEL	3.31	feet
Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	**YES**	

0.5 PMF Storm Event - Normal Pool at Elev. 613 ft		
Critical Storm Duration	24	hours
Peak Inflow	608.4	cfs
Peak Outflow	0	cfs
Peak Storage	255.83	acre-ft
Peak WSEL (HEC-HMS)	623.75	feet
Freeboard over Peak WSEL	5.25	feet
Wave Runup/Wind Setup	1.20	feet
Water Released from Dam?	**NO**	

100-yr Storm Event - Normal Pool at Elev. 624 ft		
Critical Storm Duration	12	hours
Peak Inflow	113.2	cfs
Peak Outflow	95.8	cfs
Peak Storage	269.36	acre-ft
Peak WSEL (HEC-HMS)	624.63	feet
Freeboard over Peak WSEL	4.37	feet
Wave Runup/Wind Setup	1.20	feet
Adequate Freeboard?	**YES**	

100-yr Storm Event - Normal Pool at Elev. 619 ft		
Critical Storm Duration	24	hours
Peak Inflow	76.6	cfs
Peak Outflow	0	cfs
Peak Storage	258.48	acre-ft
Peak WSEL (HEC-HMS)	623.94	feet
Freeboard over Peak WSEL	5.06	feet
Wave Runup/Wind Setup	1.20	feet
Water Released from Dam?	**NO**	

Note: The above variation in normal pool elevations for the Recycle Pond is for the purpose of documenting the water surface elevation which must be maintained in the recycle pond in order to prevent the release of water from the GMF for the above described storm events.

SECTION 4.0
OPERATIONS ACTIVITIES

4.1 INTRODUCTION

The operations plan describes the proposed operation of the Coffeen Gypsum Management Facility (GMF) which includes the gypsum pond and the recycle pond.

4.2 SITE OPERATIONS AND PERSONNEL

4.2.1 Site Operations

The GMF will receive gypsum slurry 24 hours per day, seven days per week. Routine facility maintenance and construction activities will generally be conducted during day shift hours. The crest widths for both the gypsum stack earthen dam and the recycle pond dam are 20 ft. In addition, multi-directional ramps are being provided for both structures so that they are readily accessible by inspection, maintenance and gypsum recovery equipment.

The Plant is a restricted access location. Additional fencing around the perimeter of the active sedimentation cells of the gypsum stack and the recycle pond will be erected to prevent unauthorized access to the GMF, which is also under surveillance by security personnel.

4.2.2 Personnel

The proposed GMF will be owned and operated by Ameren Energy Generating Company (Ameren). Corporate offices are located in St. Louis, Missouri. Overall responsibility for the GMF operation lies with Ameren management personnel.

4.3 GYPSUM MANAGEMENT FACILITY STARTUP

The major components of the proposed GMF consist of:

- The gypsum stack dam/impoundment;
- The recycle pond;
- The earthen transfer channel that connects the two structures and through which process water will be decanted from the gypsum stack into the recycle pond; and
- The recycle pond decant and pumphouse through which process water will be returned to the Plant for reuse.

Both the recycle pond and the gypsum stack dam will be constructed before gypsum is placed within the gypsum stack dam/impoundment.

Upon startup, it is likely that the gypsum stack impoundment will have no more than a few feet of water in the bottom to prevent the high density polyethylene (HDPE) geomembrane from moving. The gypsum slurry (approximately 20 percent solids) will be pumped from the

Plant to the gypsum stack via piping. The piping will be HDPE with a suitable pressure rating for the intended hydraulic and static head. The HDPE pipe will discharge the slurry into the impoundment, and gypsum will settle by gravity.

It will take approximately 10 months before the gypsum stack impoundment is filled to elevation 623 ft, the point where process water may begin flowing into the recycle pond via the HDPE-lined earthen channel connecting the two structures. As soon as water begins to fill the recycle pond, it will be pumped back to the Plant for reuse.

4.4 WATER BALANCE

The capacity of the recycle pond has been designed to accommodate all precipitation runoff from the entire gypsum pond/recycle pond area during a 2-week complete maintenance outage at the Coffeen Power Station (the Plant) followed by a 12-week outage of one of the two units. The runoff and excess water accumulated during this time can be stored within the recycle pond without discharging. The design is based on the maximum 3.5 month precipitation that has occurred in the area since 1950. This occurred in April, May, June and half of July, 1957 and consisted of 28.83 inches of rainfall.

The water balance has been carried out for the expected life of the Site. During the first nine or ten months of operation, the water balance is positive, meaning that there is more water entering the gypsum stack/recycle pond system through process water and precipitation than is leaving the system through process water return and evaporation. However, there is 15 ft of freeboard between the pump discharge and the emergency spillway. With proper water-level management, the water surface will remain well below discharge elevation. After this initial startup period, the water balance is negative, meaning that other water sources will need to be continually added to the process water makeup stream to maintain the volume necessary for transport of the gypsum slurry.

The water balance is of particular concern since the entire system is designed to be a closed loop with no discharges. *(As previously noted, the recycle pond has been designed with an emergency spillway, but this is only to protect the structures in the event of an unforeseen accident or catastrophic rainfall event.)* Table 3.5-2 lists the maximum water surface elevation allowed in the recycle pond in order to prevent the discharge of water for the 100-year storm event and the 0.5 PMF storm event.

4.5 GYPSUM MANAGEMENT FACILITY OPERATION

4.5.1 Routine Operations

Gypsum slurry will initially be discharged at the southwestern corner of the gypsum pond impoundment. Settled gypsum will gradually create a plane of material sloping gently towards the north end of the impoundment. Depending on the slope of the settled gypsum, the discharge pipe may be moved to other corners of the impoundment to evenly distribute the material. Care must be taken during the initial filling period so to ensure that the sand layer covering the ring drains is not disturbed. If necessary, the sand may be armored with larger washed aggregate or the impoundment may be gradually filled with water to cover the sand prior to the discharge of gypsum slurry into the impoundment.

Once the gypsum plane reaches approximately elevation 627 ft (5 ft below the earthen dam crest), a track excavator or similar piece of equipment will be used to create the first gypsum berm and to form the perimeter ditch. Each gypsum berm will be approximately 10 ft in height and will effectively create a two-compartment impoundment within its perimeter. Gypsum for construction of the gypsum berm will be obtained from the settled material on the inside of the berm, creating an inner ditch. Gypsum slurry will then be discharged alternately into the inner ditch of each compartment. Gypsum will settle out into the inner ditch and clarified process water will flood the compartment to a depth of several feet. This water will be decanted to the perimeter ditch by way of an HDPE decant pipe which will discharge to a stilling well located at the toe of the gypsum stack.

As each compartment fills with settled gypsum, the discharge piping will be moved to the alternate compartment. The compartment, or sub-cell, that is not in service will be allowed to dewater and another gypsum berm will be constructed on top of the previous gypsum berm, effectively raising the gypsum stack another 10 ft. This alternating cycle of gypsum discharge, compartment dewatering and berm construction will continue. Gypsum will be deposited in the stack with an average dry density of approximately 74 lb/ft$^{3.}$ Drawing No. C-10201-25 provides a visual description of this process.

4.5.2 Piezometer Installation and Monitoring

The side slopes of the gypsum pond will be constructed with 3:1 side slopes. After consolidation of the settled gypsum over time, the final slopes should approach 3.75:1. The stability of each gypsum pond slope is critically dependent on the location of the phreatic surface which is anticipated to develop within the stack. Ring drains are intended to lower the phreatic surface so that it is located an adequate distance from the surface of the slope in order to maintain slope stability. In order to monitor the phreatic surface within the stack, piezometers will be installed on each side of the gypsum pond. The piezometers will be installed every 15 vertical feet up the slope (45 horizontal feet based on 3:1 side slopes) and will extend to a depth of at least 15 feet below the anticipated phreatic water surface elevation as shown in Figure 4-1. At the time of installation, each piezometer will be labeled with the "critical elevation" corresponding to the anticipated phreatic surface elevation at that location. The anticipated phreatic surface elevation is the water surface elevation which was used in the slope stability analysis of the gypsum pond. The water level in each piezometer will be read and recorded on a monthly basis. If at any time a reading is recorded higher than "critical elevation" for that specific peizometer, the design engineer must be contacted immediately for evaluation of the reading. Any readings above the "critical elevation" may be indicative of improper ring drain function and/or slope instability which could lead to a failure of the gypsum stack. Therefore, it is critical that the piezometers are installed in accordance with the construction plans and specifications and monitored in accordance with this manual. It may be necessary to install additional subdrainage to maintain the phreatic surface at the desired level within the gypsum stack.

Figure 4-1 Anticipated Phreatic Surface in Gypsum Pond

Refer to figure at the end of the report text.

4.6 DAM INSPECTIONS

The inspection program includes two types of dam inspections. The first is regularly conducted by the dam operator and is referred to as an Operation and Maintenance Inspection. The second type of inspection, referred to as the Engineering Inspection, is conducted by a qualified engineer approved by IPGC. All engineering inspection reports must be signed and sealed by an Illinois Registered Professional Engineer.

The dam operator will perform monthly Operation and Maintenance Inspections of the gypsum pond perimeter earthen dam and the gypsum berms and side slopes during the operating life of the structure. During these inspections, the gypsum stack ditches and the transfer channel will also be examined for signs of erosion and liner degradation. The "operating life of the structure" will be considered to cease upon covering of the gypsum with an HDPE/soil cover. Engineering Inspections will be conducted on an annual basis during the operating life of the structure and will continue after covering of the gypsum pond until authorization to abandon the structure is received from IDNR/OWR.

4.6.1 Operation and Maintenance Inspection

Occasional "walk-around" inspections of the dams and appurtenant works are to be made by the dam operator. During these inspections, a checklist of items to be maintained and items to be observed should be recorded. Appendix A provides an example of the Operation and Maintenance Inspection Checklist to be utilized for these inspections. **If any of the following items are found to be unusual or are cause for concern, the Shift Supervisor should be notified and the Emergency Action Plan should be immediately consulted for guidance on an appropriate course of action.**

Frequency: Operation and maintenance inspections will be performed by the dam operator on a monthly basis and also during and after unusual events such as heavy rainfall or an earthquake.

Inspection Items: During each inspection the following items should be noted in particular.

1. Water Level - Maximum reservoir levels as a result of heavy rainfall should be recorded.

2. Earth Embankment - Walk the crest, side slopes and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. These are described as follows:

   - Surface Erosion - Removal of vegetative cover by water action or pedestrian or vehicle usage forming deep ruts or gullies.

   - Seepage - The passage of water through and/or underneath the earth embankment abutment and natural groundline or at the contact between the embankment and outlet works. It can be indicated by cattails or other wet environmental vegetation, erosion, channelization, or slumping on the embankment face.

· Cracks - Deep cracks usually indicate the movement of the dam and/or the foundation and can be in either the longitudinal (along the length of the dam) or transverse (across the dam) directions. Cracking can be an indicator of the beginning of slumps. Shallow cracks may develop during the summer when the surface soils of the embankment become severely dried and are usually of no concern in regard to the safety of the dam.

· Settlement - Settlement is indicated by depressions or low spots and can be signs of consolidation of the dam or foundation or the loss of material beneath the settlement area.

· Slumps/Slides - A slow or sudden movement of the earth embankment slope on either face toward the toe of the dam.

· If seepage indicates the presence of soil particles, or if deep cracks, settlement, slumps, or slides are noticed, a qualified engineer should be contacted immediately for consultation.

· Animal Burrows - Animal burrows result in a loss of earth embankment material and can provide seepage paths for water through the embankment.

3. Gypsum Embankment - Walk the crest, side slopes and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides and animal burrows. The descriptions for these are the same as for earth embankment.

4. Vegetation - Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion from 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 toes or other structures. The gypsum embankment will not be seeded and is not expected to have any vegetation.

5. Gypsum Stack piezometers should be inspected for any damage or loss of function. Damaged piezometers must be promptly repaired or replaced since their function is critical to ensuring stability of the gypsum stack.

6. The water level in each Gypsum Stack piezometer must be measured and recorded during each monthly inspection. If the water level in any piezometer is above the "critical elevation" as discussed in Section 4.5.2 of this plan, the Ameren Technical Services Superintendent should be notified and the **Emergency Action Plan should be immediately consulted for guidance on an appropriate course of action**.

7. Gypsum Pond LD/LCRS Drains - The change in location or amount of flows discharging from the Leak Detection/Leachate Collection Recovery System (LD/LCRS) should be recorded. If a significant change has occurred, a qualified engineer should be contacted for consultation.

8. Gypsum Stack Ring Drains - The change in location or amount of flows discharging from the Ring Drains should be recorded. If a significant change has occurred, a qualified engineer should be contacted for consultation.

9. Gypsum Stack Fixed Decant – Check the alignment and supports for the pipe. Record the amount of flows discharging from the pipe and any erosion or scour around the discharge point.

10. Gypsum Stack Perimeter Ditch – The perimeter ditch should have a consistent prismatic shape for the entire length. Inspect the perimeter ditch for evidence of erosion, sediment deposition and irregularity in channel geometry, especially in the vicinity of siphon, decant or ring drain outfall structures. If irregularities are noted, repairs should be scheduled and completed.

11. Drawdown Facilities - Check to make sure that the drawdown stop logs in the transfer ditch are undamaged, operating well and allowing for the free flow of water over them. Confirm during inspections the valves are opened and closed at least quarterly.

12. Transfer Channel - Check for any debris or other obstructions which may block or restrict the free flow of water. Check for any pools or undulation of the floor of the channel.

13. Recycle Pond Decant - Check for any debris or other obstructions around the Recycle Pond decant which may block or restrict the free flow of water. The emergency dewatering valve should be lubricated. If there is no return water in the pipe, the emergency dewatering valve should be exercised. Record the physical and operating conditions of the system.

14. Recycle Pond Drop Inlet Spillways - Check for any debris or other obstructions around the inlet crest and at the bottom of the drop inlet which may block or restrict the free flow of water. Check for the development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of the concrete. Check for settlement or cracking of the crest. Check for any debris in the pipes which may restrict the flow of water. Check for any tears or leaks in the HDPE liner covering the concrete.

15. Recycle Pond Rip Rap Basin - Check for any debris or other obstructions in the riprap basin which may block or restrict the free flow of water. Check to make sure that the rip rap is remaining in a uniform position. Freeze/thaw action or flow over the rip rap may tend to lift or fracture, thus requiring replacement or leveling to maintain the necessary level of protection. NO trees or woody vegetation should be growing through the rip rap.

16. Fences - Check for damage, accumulated debris, operation of gates and locks, and adequacy of locations (this may change with time as people access the area or development occurs in the area).

17. Perimeter - Check the perimeter of the dams for a distance of at least 100 feet beyond the toe for signs of seepage or boils.

18. HDPE Liner – Wherever exposed, the HDPE Liner should be inspected for tears, gouges, protrusions under the liner and abrasion.

Records: A log book of activities occurring at the dam is to be kept current by the dam operator. The log book should be reviewed during the Engineering Inspection. This book should contain at the least the following documentation:

1. Completed operation and maintenance inspection checklists
2. Readings from all piezometers on the Gypsum Stack
3. Additional visual observations
4. A list of maintenance performed
5. A list of any unusual occurrences at the dam
6. Copies of the engineering inspection reports

4.6.2 Engineering Inspection

The engineering inspection is to be conducted by a qualified engineer approved by Ameren. The inspection will provide a thorough evaluation of the dam condition and appurtenances. Appendix B is an example of the inspection report form which is to be utilized for these inspections.

Frequency: The Gypsum Pond Dam is a Class I, High Hazard Potential dam and is to be inspected by an Illinois Registered Professional Engineer at least once per year. The Recycle Pond Dam is classified as a Class III, Low Hazard Potential dams and is to be inspected by an Illinois Registered Professional Engineer at least once every five years.

Inspection Items: The engineer will thoroughly inspect all of the items noted in Section 4.6.1 Operation and Maintenance Inspection.

Records: The Dam Inspection Report form from IDNR-OWR “Guidelines and Forms for Inspection of Illinois Dams” (a copy of which is included in Appendix B), will be completed by the inspecting engineer and will be signed and sealed by an Illinois Registered Professional Engineer. This report will document problem areas and deficiencies; recommend remedial actions for problem areas; and establish time requirements for dealing with the problems. The original report will be retained in Dynegy Operating Company (DOC) files, and a copy of the report will be submitted to the Illinois Department of Natural Resources, Office of Water Resources.

<u>4.6.3 Review of Emergency Action Plan</u>

The emergency action plan should be reviewed annually to assure that all contacts, addresses and telephone numbers are current. Changes in the adjacent land use should also be noted and may dictate the need for revisions to the plan. Changes to the plan should be made as appropriate but only with the concurrence of the Montgomery County Emergency Services and Disaster Agency and of the Illinois Department of Natural Resources, Office of Water Resources. Copies of any revisions should also be forwarded to all personnel and known emergency responders that possess previous versions the plan.

SECTION 5.0
MAINTENANCE ACTIVITIES

Timely repairs are a must after problem areas have been identified. The dam operator is to perform the work required to correct items noted in the operation and maintenance inspections and engineering inspections. Such items include repairing erosion of the gypsum slopes, mowing, seeding, tree and brush removal, replacing rip rap, repairing fences and locks, clearing debris, etc. The maintenance activities specified in the following sections are minimum requirements. NOTE: NO alterations or repairs to structural elements should be made without the assistance of the Ameren Chief Dam Safety Engineer and the concurrence of the Illinois Department of Natural Resources, Office of Water Resources.

Debris: Remove all trash, logs and other debris which may obstruct flow into the principal spillway pipes and drop inlets, or block passage from their discharge channels.

Rip Rap: Replenish rip rap as needed to provide adequate protection against erosion.

Vegetation Control

1. Maintain a good grass cover on the embankment by seeding, fertilizing and mulching areas which are refilled, barren, or thinly vegetated. Seeding mixtures used for maintenance reseeding shall result in a cover compatible with adjacent cover. The seeding mixture specified at the time of the dam's construction was IDOT Standard Specifications Class 1A (Salt Tolerant Lawn Mixture) as follows:

   <u>IDOT Class 1A Salt Tolerant Lawn Mixture</u>
   Bluegrass ....60 lb/acre
   Perennial Ryegrass..........20 lb/acre
   Dawsons Red Fescue.......20 lb/acre
   Scaldis Hard Fescue ....20 lb/acre
   Fults Salt Grass ....60 lb/acre

2. Grassed areas such as the embankment and the areas beyond the embankment toes for a distance of at least 20 feet should be mowed at least twice annually or at any time the height of the grass exceeds 1 foot.

3. All erosion areas will be filled and compacted, reseeded, fertilized and mulched to establish a thick erosion resistant cover.

4. Remove all trees and brush growing on the dam embankment to prevent development of a root system which could provide seepage paths. Herbicides utilized for tree and brush control are discussed in Appendix D.

5. Keep the riprap basin clear of weeds, brush, and trees.

6. Clear all brush and trees for a distance of approximately 20 feet beyond the toe of each dam.

Animal Damage: Fill rodent holes and other animal burrows with compacted clayey soil and reseed. If rodents become a nuisance, an effective rodent control program as approved by the Illinois Department of Natural Resources District Wildlife Biologist should be implemented.

Signs: All warning signs shall be maintained (repaired, painted, or replaced) as needed.

Gypsum Slopes: Erosion of the gypsum slopes will be evident with the presence of erosion rills. Erosion rills should be filled with additional gypsum material and graded to conform with the design slope.

Piezometers: All piezometers on the gypsum stack shall be inspected for signs of damage or displacement. Non-functioning piezometers shall immediately be replaced.

APPENDIX A
LOCATION MAP

APPENDIX B
OPERATION AND MAINTENANCE INSPECTION CHECKLIST

OPERATION AND MAINTENANCE INSPECTION CHECKLIST

Dam Name (circle one): Gypsum Pond Dam Recycle Pond Dam

Date: ____________________________ Time: ___________________________

Name of Inspector: ____

Reservoir Elevation: _______________ feet

ITEM	NO	YES	IF YES
Record Piezometer Readings for Gypsum Stack. Are any readings above the critical level? (see section 4.5.2 of O&M Manual)			Contact Manager, Environment & Chemistry and notify Hanson Professional Services
Note the condition of the Piezometers on the Gypsum Stack. Any damage?			Contact Manager, Environment & Chemistry
Deep Surface Cracks			Contact Manager, Environment & Chemistry
Slump or Slide on the upstream or downstream face			Contact Manager, Environment & Chemistry
Erosion from runoff, wave action or traffic			Repair and stabilize
Embankment, abutment or spillway seepage			Contact Manager, Environment & Chemistry
Seepage or flows of muddy water			Contact Manager, Environment & Chemistry
Uneven settlement			Contact Manager, Environment & Chemistry
Trees, brush or burrow holes on the embankment or in the riprap basin			Remove trees and brush, fill holes
Transfer channel or Spillway pipes blocked			Clear immediately
Damage to stop logs			Repair or replace
Damage to HDPE Liner			Repair and schedule engineer inspection
Settlement or displacement of Gypsum Pond fixed decant pipes or outlets			Schedule engineer inspection
Discharge from Gypsum Pond LD/LCRS Drains?			Record discharge rate for each outlet (time to fill bucket)
Discharge from Gypsum Pond Ring Drains?			Record discharge rate for each outlet (time to fill bucket)
Gypsum Stack Perimeter Ditch erosion			Schedule repair
Problems with Recycle Pond spillways			Contact Manager, Environment & Chemistry
Problems with Recycle Pond decant			Contact Manager, Environment & Chemistry
Height of grass (inches)		inches	If more than 1 foot, schedule mowing
Damage to fencing, gates and locks or other access restriction measures			Contact Manager, Environment & Chemistry
Confirm drawdown facilities are opened and closed at least quarterly.			Contact Manager, Environment & Chemistry

Comments:

APPENDIX C

ENGINEERING INSPECTION FORMS

Dam Inspection Report

Name of Dam ______________________ Dam Identification Number ______________________

Permit Number ______________________ Class of Dam ______________________

Location NW 1/4 Section 11 Township 7N Range 3W 3rd P.M.

Owner ______________________ ______________________

Name Telephone Number (Day)

______________________ ______________________

Street Telephone Number (Night)

______________________ County Montgomery

City Zip Code

Type of Dam ______________________

Type of Spillway ______________________

Date(s) Inspected ______________________

Weather When Inspected ______________________

Temperature When Inspected ______________________

Pool Elevation When Inspected ______________________

Tailwater Elevation When Inspected ______________________

Inspection Personnel:

____

Name Title

____

Name Title

____

Name Title

____

Name Title

Professional Engineer's Seal

The Department of Natural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act, 615 ILCS 5 (1994 State Bar Edition). Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non-compliance procedures as outlined in Section 702.160 of the "Rules for Construction and Maintenance of Dams". This form has been approved by the State Forms Management Center.

CONDITION CODES

EC	-	Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Chief Dam Safety Engineer; such as, pool draw down, work stoppage, plant stoppage.
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. Remediation should be completed within 1 month.
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 does not become worse
NA	-	Not applicable to this dam
NI	-	Not inspected - list the reason for non-inspection under deficiencies
EC	-	Emergency Condition. A serious dam safety condition exists that needs immediate action. Emergency measures implemented as instructed by Chief Dam Safety Engineer; such as, pool draw down, work stoppage, plant stoppage.

GYPSUM STACK - EARTH EMBANKMENT

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Surface Cracks			
Vertical and Horizontal Alignment of Crest			
Unusual movement or Cracking at or Beyond Toe			
Sloughing or Erosion of Outer Embankment Slopes			
Upstream Face Slope Protection (HDPE Liner)			
Seepage			
Animal Damage			

GYPSUM STACK - EARTH EMBANKMENT
(Continued)

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Vegetative Cover			

<u>GYPSUM STACK - GYPSUM EMBANKMENT</u>

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Surface Cracks			
Vertical and Horizontal Alignment of Crest			
Unusual movement or Cracking at or Beyond Toe			
Sloughing or Erosion of **Outside** Embankment Slopes			
Sloughing or Erosion of **Inside** Embankment Slopes			
Seepage			
Animal Damage			

GYPSUM STACK - GYPSUM EMBANKMENT

(Continued)

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Condition of Piezometers on Gypsum Stack			
Piezometer Readings on Gypsum Stack Above Critical Level?			

GYPSUM STACK – PERIMETER DITCH

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Ditch Geometry (15 ft bottom width, 3:1 slopes, 8-9 ft depth)			
Concrete Apron at ring drain outlets			
Ring Drain Discharge Pipes			
Stilling Wells for Fixed Decants			

TRANSFER CHANNEL - (between gypsum stack and recycle pond)

☐ Drop Inlet Structure ☒ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Debris			
Side Slope Stability			
HPDE Liner			
HDPE Liner Welds			
Stop Logs			
Differential Settlement			

RECYCLE POND - EMBANKMENT

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Surface Cracks			
Vertical and Horizontal Alignment of Crest			
Unusual movement or Cracking at or Beyond Toe			
Sloughing or Erosion of Outer Embankment Slopes			
Upstream Face Slope Protection (HDPE Liner)			
Seepage			
Animal Damage			

RECYCLE POND - EMBANKMENT

(Continued)

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Vegetative Cover			

RECYCLE POND - PRINCIPAL SPILLWAY (Left, Looking Downstream)

[X] Drop Inlet Structure [ ] Overflow Spillway Structure [ ] Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Alignment of Structure Walls			
Construction Joints			
Differential Settlement			
Erosion, Spalling, Cavitation			
Joint Separation			
Seepage Around or into Conduit			
Surface Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Left, Looking Downstream)

(Continued)

X Drop Inlet Structure | ☐ Overflow Spillway Structure | ☐ Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Structural Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Center)

[X] Drop Inlet Structure   [ ] Overflow Spillway Structure   [ ] Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Alignment of Structure Walls			
Construction Joints			
Differential Settlement			
Erosion, Spalling, Cavitation			
Joint Separation			
Seepage Around or into Conduit			
Surface Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Center)

(Continued)

X Drop Inlet Structure ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Structural Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Right, Looking Downstream)

[X] Drop Inlet Structure [ ] Overflow Spillway Structure [ ] Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Alignment of Structure Walls			
Construction Joints			
Differential Settlement			
Erosion, Spalling, Cavitation			
Joint Separation			
Seepage Around or into Conduit			
Surface Cracks			

RECYCLE POND - PRINCIPAL SPILLWAY (Right, Looking Downstream)

(Continued)

☒ Drop Inlet Structure ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Structural Cracks			

RECYCLE POND - ENERGY DISSIPATOR

X Principal Spillway ☐ Outlet Works Type: FHWA HEC-14, Riprap Basin

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Riprap			
Outlet Channel			
Debris			

RECYCLE POND - DECANT STRUCTURE

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Alignment			
Connection to Bollard			
Debris in Inlets			
Condition of Pipe			
Condition of Liner Beneath Pipe			
Connection to Ballast			
Connection of Pipe Boot to Liner			

RECYCLE POND - DECANT STRUCTURE

(continued)

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE
Seepage Around or into Conduit			

RECYCLE POND – WATER LEVEL GAGE STRUCTURE

ITEM	CONDITION	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES & SCHEDULE

APPENDIX D
HERBICIDES

HERBICIDES

Site personnel should check with the Illinois Department of Natural Resources, Regional Fisheries Biologist and the Regional Wildlife Biologist before using any herbicide. Read the product label prior to use and follow the use directions and precautions accordingly.

On March 1, 1979 the U.S. Environmental Protection Agency (U.S.E.P.A.) halted the use of the herbicide 2, 4, 5-T in parks and recreation areas. The use of silvex (2, 4, 5-TP) around water has also been banned.

The Agronomy Department at the University of Illinois and the Aquatic Biology Section of the Department of Natural Resources, Office of Scientific Research and Analysis indicate that the herbicides containing the 2, 4-D or 2, 4-DP are legal for use in parks and recreation areas and effective for controlling brush and woody growth. Some examples of approved herbicides are:

1. Tordon RTU by DOW Chemical. (Can be obtained with blue dye.)
2. WEEDONE 170 by Union Carbide
3. WEEDONE, 2, 4-DP by Union Carbide
4. A 1% to 2% solution of ROUNDUP
5. Garlon by DOW Chemical
6. Banvel by Sandoz

Your distributor may carry brand name herbicides other than those listed above. Be certain that the product does not contain the ingredients 2, 4, 5-T or 2, 4, 5-TP. An example of an unacceptable product is ESTERON 2, 4, 5 by DOW Chemical.

APPENDIX E
CONSTRUCTION DRAWINGS

Appendix G: Photos of 2015 Sloughing Repairs

Figure G.1. Photo of 2015 sloughing prior to repairs.

Figure G.2. Photo of 2015 sloughing prior to repairs.

Figure G.3. Photo of 2015 sloughing area after repairs.

Figure G.4. Photo of 2015 sloughing area after repairs.

ATTACHMENT C

Coffeen Power Plant – GMF Pond System'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 GMF Stack 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 GMF Stack Pond

Pollutant	Units	GMF Pond System		
		Stack Pond Surface Free Liquids Average Concentration	Stack Pond Subsurface Free Liquids Average Concentration	Recycle Pond Surface Free Liquids Average Concentration
Ammonia	mg/L	3045	1120	2885
Arsenic	mg/L	< 0.025	< 0.025	< 0.025
Barium	mg/L	0.057	0.058	0.060
Boron	mg/L	47.2	24.7	45.4
Cadmium	mg/L	< 0.034	0.016	0.034
Chloride	mg/L	1430	734	1355
Chromium	mg/L	< 0.010	< 0.005	< 0.008
Chromium (hexavalent)	mg/L	< 0.004	< 0.005	0.002
Copper	mg/L	0.013	0.008	0.013
Cyanide	mg/L	< 0.005	< 0.005	< 0.005
Fluoride	mg/L	43.2	22.3	40.3
Iron	mg/L	0.945	1.78	16.1
Lead	mg/L	< 0.015	< 0.015	< 0.015
Manganese	mg/L	59.1	< 30.4	58.7
Mercury	mg/L	0.00008	0.0005	0.00003
Nickel	mg/L	0.363	0.176	0.365
Nitrate	mg/L	36.5	37.6	35.8
Nitrite	mg/L	0.580	0.060	0.050
Nitrogen, Total Kjeldahl	mg/L	3000	1300	< 2850
Oil and Grease	mg/L	< 2.00	< 3.00	< 2.00
pH	SU	5.84	6.85	4.36
Phenols	mg/L	< 0.005	< 0.005	< 0.005
Phosphorus	mg/L	0.111	0.209	< 0.100
Selenium	mg/L	0.630	0.328	0.601
Silver	mg/L	< 0.001	< 0.001	< 0.001
Sulfate	mg/L	16900	10100	16200
TDS	mg/L	23450	13500	22400
TSS	mg/L	11.4	18.5	6.6
Zinc	mg/L	0.307	0.134	0.363

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

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

Chemical Additives
Bulab 9626 (corrosion and scale control)
Bulab 7041 (Water soluble polycarboxylate)
Nalco 71D5 PLUS (Anti-foaming agent)

Waste Streams and Sorbent Materials*
Coal combustion byproduct Landfill Leachate
Closed Ash Pond 2 Dewatering
Wet FGD
Low Pressure Surface Water Makeup
Limestone Runoff Pond

*No sorbent materials

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	FGD Gypsum
Synonyms:	Gypsum, calcium sulfate dihydrate, calcium sulphate dihydrate, gesso, alabaster, plaster of Paris.
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, agricultural amendment.
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):

- STOT-SE Category 3 (Respiratory Irritation)
- STOT-RE Category 1 (Lungs)
- Carcinogen Category 1A

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):	*May cause respiratory irritation.* *Causes damage to lungs after repeated/prolonged exposure via inhalation.* *May cause cancer of the lungs.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Do not breathe dust.* *Wash hands thoroughly after handling.* *Do not eat, drink or smoke when using this product.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Do not eat drink or smoke when using this product.* *Use outdoors or in a well-ventilated area.* *If inhaled: Remove to fresh air and keep comfortable for breathing.* *Get medical advice/attention if you feel unwell.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

The following elements may be present in trace amounts as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium. The exact composition of the gypsum will be dependent on the fuel source and flue additives composed of many constituents.

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*
Calcium sulfate, dihydrate	*10104-14-1*	*90 - 99%*	*STOT – Single Exposure Category 3 (Respiratory Irritation)*
Crystalline Silica	*14808-60-7*	*≥0.1 - 3%*	*STOT – Repeated Exposure Category 1 (Lung)* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	*See Footnote 1*	*STOT – Repeated Exposure Category 1 (Lungs)* *Carcinogen Category 1A*
Fly Ash	*68131-74-8*	*<2%*	*STOT – Single Exposure Category 3 (Respiratory Irritation)*

Footnote 1: The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen, Category 1A 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: Short-term airborne exposure to FGD gypsum dust may cause respiratory irritation. Direct exposure can dry and irritate the skin and cause dermatitis or eye irritation through mechanical abrasion.

Chronic Effects: Chronic (long-term) exposure to FGD gypsum may cause lung damage from repeated exposure. Prolonged inhalation of dusts containing respirable crystalline silica above certain concentrations may cause lung disease (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:	Above 1450°C (~2600°F), gypsum decomposes to calcium oxide and sulfur dioxide.

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)**
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Total Respirable	0.05-	0.05	0.025	0.05
Calcium Sulfate, anhydrous (CAS# 7778-18-9)	Total Dust	*	10	10	*
	Respirable	*	5	-	*
Note: In the absence of a CA-PEL, the value for Particulates Not Otherwise Regulated (PNOR) is applied.					

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.): White or gray cake-like material	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): 6 - 8	**Specific gravity or relative density:** 2.0 – 2.9
Melting point/freezing point (°C): 128	**Water Solubility:** 0.1 – 0.3%
Initial boiling point and boiling range (°C): >163	**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):** 1450
Flammability (solid, gas): Nonflammable/non-combustible	**Viscosity:** Not applicable

Section 10
Stability and Reactivity

10.1 Reactivity:	Avoid contact with strong acids or oxidizers and diazomethane.
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; 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:	Acids, ammonium salts, diazomethane, phosphorus and aluminum metal.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	Oral LD50 > 2000 mg/kg
Acute dermal toxicity	No data.
Acute inhalation toxicity	Inhalation LC50: > 3.26 mg/L
Skin corrosion/irritation	Not irritating or corrosive to skin based on 4-hour, semi-occlusive exposure to rabbits.
Eye damage/irritation	No positive responses in rabbits based upon 24-, 48-, and 72-hour mean scores for corneal opacity, iritis, conjunctival redness/edema.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Several in vitro and in vivo mutagenicity assays determined that calcium sulfate, dihydrate was non-mutagenic, with and without metabolic activation.
Carcinogenicity	No data on calcium sulfate, dihydrate. Carcinogenic studies were not conducted based on the non-neoplastic effects noted in the oral and inhalation repeated dose studies as well as the negative mutagenicity assays. Respirable crystalline silica has been identified as a carcinogen by NTP, IARC, ACGIH and OSHA.
Reproductive toxicity	No significant developmental or reproductive toxicity were identified in rabbits after exposure to either calcium sulfate, dehydrate or calcium sulfate, dihydrate.
STOT-SE	Acute toxicity testing did not result in direct organ toxicity after a single exposure to calcium sulfate, dihydrate. However, as the form tested was not indicated, FGD gypsum dust may result in mechanical respiratory irritation.
STOT-RE	A repeat dose oral toxicity study (35-45 days) with calcium sulfate, dihydrate conducted using rats reported a NOAEL for males of 100 mg/kg/day on the basis of decreased total protein, albumin, blood urea nitrogen, and creatinine levels observed at the 300 and 1,000 mg/kg/day dose groups. No effects were observed in females. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (silicosis) and lung cancer.
Aspiration Hazard	Not applicable based on product form.

Section 12
Ecological Information

12.1 Toxicity

Calcium sulfate (CAS# 7778-18-9) [1]	
Toxicity to Fish	Fathead Minnow (*Pimephales promelas*): Acute, 7-day LC50 > 1,970 mg/L Acute, 96-hour NOEC = 1,470 mg/L
	Rainbow trout (*Oncorhynchus mykiss*): Chronic, 30-day NOEC (survival, growth, reproduction) = 732 mg/L
	Bluegill (*Lepomis macrochirus*): Acute, 96-hour LC50 = 2,890 mg/L
Toxicity to Aquatic Invertebrates	Water Flea (*Ceriodaphnia dubia*): Acute, 96-hour NOEC = 1447.4 mg/L
	Water Flea (*Daphnia magna*): Acute, 48-hour LC50 = 1,970 mg/L Chronic, 21-day NOEC (and 42-day post-hatch): 1,600 mg/L
Toxicity to Aquatic Algae and Plants	Algae (*Navicula seminulum; Nitzschia linearis*): Chronic, 96-hour LC50 and EC50 (growth) = 3,200 mg/L

[1]The aquatic toxicity of sulfate has been shown to be dependent on water hardness, generally decreasing as hardness increases.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that 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
  - FGD gypsum as well as listed impurities are 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]
Gypsum; calcium sulfate; calcium sulfate dihydrate	7778-18-9 or 10101-41-4	Yes	Yes	Yes	No
Calcium carbonate	1317-65-3	Yes	Yes	Yes	No
Silica-crystalline (SiO_2), quartz	14808-60-7	Yes	Yes	Yes	No

[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 27, 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
- FGD: Flue Gas Desulfurization
- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration estimated to result in the mortality of 50% of an animal population
- LD50: Dose estimated to result 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:	1*	**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 GMF Pond at Coffeen Power Plant

Illinois Power Generating Company operates the coal fired Coffeen Power Plant (Plant) located in Montgomery County, Illinois. The Coffeen GMF Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF 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
Coffeen Power Station
GMF Gypsum Stack Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Gypsum Stack 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 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 §257.62); 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 Crown Fault, which is located approximately 31 miles northwest, and the Centralia Fault zone, located approximately 35 miles southeast of the Unit. The timeframe of the most recent activity on these 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.

<u>§257.62(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 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:

Memorandum

Date: 25 October 2021

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

Illinois Power Generating Company operates the coal fired Coffeen Power Plant (Plant) located in Montgomery County, Illinois. The Coffeen GMF Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF 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.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

16 October 2018
File No. 129788

SUBJECT: Location Restriction Demonstration – Placement Above Uppermost Aquifer
Coffeen Power Station
GMF Gypsum Stack Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Gypsum Stack 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 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 §257.60); 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.

Haley & Aldrich reviewed available information provided by Vistra including historic record drawings, design drawings, and boring logs, and based on review and evaluation of the information provided, the results do not demonstrate compliance with the requirements of 40 CFR §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 that the above-referenced CCR Unit does not meet 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:

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

Memorandum

BURNS McDONNELL

Date: 25 October 2021

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

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

This memorandum addresses the requirements of Section 845.330 Seismic Impact Zone, 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.

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 – Seismic Impact Zone
Coffeen Power Station
GMF Gypsum Stack Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Gypsum Stack 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.

A Seismic Impact Zone is defined in the CCR Rule (40 CFR §257.63) as "an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years". The 2014 US Geological Survey Hazard Map raw data for the Coffeen Power Station GMF Gypsum Stack Pond indicates that the maximum expected horizontal acceleration for 2 percent probability of exceedance in 50 years is 0.21g.

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 GMF Pond at Coffeen 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 Location Restrictions 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 and Floodplains Location Standard Demonstration for GMF Pond at Coffeen Power Plant

Illinois Power Generating Company (IPGC) is the owner of the coal fired Coffeen Power Plant (Plant) located in Montgomery County, approximately 2 miles south of the city of Coffeen, Illinois. The GMF Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF Pond are found in 35 Ill. Admin. Code (I.A.C.) 845 (Part 845).

This certification addresses the requirements of Part 845, Section 845.340 Unstable Areas and Floodplains, which states:

> Section 845.340 (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.*
>
> Section 845.340 (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 but not limited to 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).*

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 (a). Pursuant to Section 845.210(d)(2), a certification is not required for the unstable area demonstration. The previously completed unstable area demonstration meeting the requirements of Section 845.340 (a) is included in Attachment D.

> <u>Section 845.340 (c):</u> *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.*

The boundaries of the impoundment were determined by a survey conducted by a professional surveyor licensed in the State of Illinois. The surveyed boundaries were compared to the existing floodplain boundary from the effective FEMA Flood Hazard Boundary Map (FHBM) Number 170992 0009 A, dated January 9, 1981. The location of the Coffeen GMF Pond is outside of the FEMA 100-year floodplain, therefore, it was determined that the Coffeen GMF Pond is not located within the floodplain.

> <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).*

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 845.340 (Unstable Areas) and demonstrated in Attachment D. Therefore, a new certification is not included for Section 845.340 (a). Certification for Section 845.340 (c) is included below.

35 Illinois Administration Code Part 845:
Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments
Section 845.340 (c): Certification

I, *Sarah Espinosa*, 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).

Sarah Espinosa, P.E.

Printed Name

October 21, 2021

Date

2021.10.21 16:48:16-05'00'

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
Coffeen Power Station
GMF Gypsum Stack Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Gypsum Stack Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.64 *(Unstable Areas)* 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 §257.64); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.64).

§257.64(a): 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 due to liquefaction 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 GMF Pond at Coffeen Power Station" dated October 2016 concluded that a 1-ft thick layer of liqueifiable material existed below the impoundment and post-liquefaction stability analyses performed by AECOM concluded that the impoundment slopes would remain stable if that layer liquefied during the design seismic event.

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 ISGS data. The USGS data indicates that the Plant is in an area of low landslide incidence and the closest document landslide is more than 10 miles from the site. 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) - An inactive underground mine is located below the Unit, however an evaluation by AECOM (2016) concluded that the presence of this underground mine does not negatively affect the stability of 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

Memorandum

BURNS McDONNELL

Date: 25 October 2021

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

Illinois Power Generating Company operates the coal fired Coffeen Power Plant (Plant) located in Montgomery County, Illinois. The Coffeen GMF Pond is an existing surface impoundment storing coal combustion residuals (CCR). The requirements for the GMF 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
Coffeen Power Station
GMF Gypsum Stack Pond
Coffeen, Illinois

Illinois Power Generating Company operates the coal-fired Coffeen Power Station (Plant) located near Coffeen, Illinois. The GMF Gypsum Stack Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. This demonstration addresses the requirements of 40 CFR §257.61 *(Wetlands)* 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 §257.61); 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 (2015) and the results of on-site field assessments, the Unit is not located in wetlands as defined by 40 CFR §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:

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

ATTACHMENT E


COFFEEN GMF GYPSUM
STACK POND
ID #: W1350150004-03
ILLINOIS POWER
GENERATING COMPANY

ATTACHMENT F

Illinois Power Generating Company

COFFEEN POWER PLANT
MONTGOMERY COUNTY, ILLINOIS

Emergency Action Plan (EAP)

40 CFR § 257.73(a)(3), 35 Ill. Adm. Code 845.520
Coal Combustion Residual (CCR) Impoundments & Related Facilities

- Gypsum Management Facility (GMF) Pond (NID # IL50579) (IEPA # W1350150004-03)
- GMF Recycle Pond (NID # IL50578) (IEPA # W1350150004-04)
- Ash Pond No. 1 (NID # IL50722) (IEPA # W1350150004-01)
- Ash Pond No. 2 (NID # IL50723) (IEPA # W1350150004-02)

Revision Date: September 16, 2021

Qualified Professional Engineer Certification; Emergency Action Plan for the Coffeen Power Plant GMF Pond, GMF Recycle Pond, Ash Pond 1 and Ash Pond 2

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

COFFEEN POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENTS & RELATED FACILITIES

TABLE OF CONTENTS

Section Page

1 STATEMENT OF PURPOSE 1

2 COMMUNICATION 4

3 EAP ROLES AND RESPONSIBILITIES 8

4 EAP RESPONSE 9

5 PREPAREDNESS 14

6 FACILITY/IMPOUNDMENT DESCRIPTION 16

7 BREACH INUNDATION MAPS AND POTENTIAL IMPACTS 18

List of Tables

Table Page

Table 2-1. EAP Emergency Responders 7
Table 3-1. Summary of EAP Roles 8
Table 4-1. Guidance for Determining the Response Level 9
Table 4-2. Impoundment Trigger Elevations 10
Table 4-3. Step 3: Emergency Actions 11
Table 5-1. Emergency Supplies and Equipment 14
Table 5-2. Supplier Addresses 15
Table 6-1. Power Plant Impoundment Characteristics 17

List of Figures

Figure Page

Figure 1-1. Coffeen Power Plant Location Map 2
Figure 1-2. Coffeen Power Plant CCR Impoundments & Related Facilities 3
Figure 2-1. Summary/Sequence of Tasks 4-Step Incident Response Process 4
Figure 2-2. Notification Flowchart 5
Figure 2-3. EAP Response Process Decision Tree 6
Figure 7-1. GMF Pond Inundation Map 19
Figure 7-2. GMF Recyle Pond, Ash Pond No. 1, and Ash Pond No. 2 Inundation Map 20

COFFEEN POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENTS & RELATED FACILITIES

1 STATEMENT OF PURPOSE

The Coffeen Power Plant (Power Plant) is located near the town of Coffeen in Montgomery County, Illinois. The location of the Power Plant 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 (IPGC), a subsidiary of Dynegy. This Emergency Action Plan (EAP) was prepared in accordance with 40 CFR § 257.73(a)(3) and 35 Ill. Adm. Code 845.520 and covers the following Coal Combustion Residual (CCR) surface impoundments located at the site:

- Gypsum Management Facility (GMF) Pond (NID # IL50579) (IEPA # W1350150004-03)
- GMF Recycle Pond (NID # IL50578) (IEPA # W1350150004-04)
- Ash Pond No. 1 (NID # IL50722) (IEPA # W1350150004-01)
- Ash Pond No. 2 (Capped/Closed) (NID # IL50723) (IEPA # W1350150004-02)

The locations of these impoundments are shown in Figure 1-2. Section 6 of this EAP includes a description of each 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 CCR impoundments and related facilities at the Coffeen Power Plant.
2. Define the events or circumstances involving the CCR impoundments and related facilities at the Coffeen Power Plant 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 list of emergency responders.
5. Identify emergency actions in the event of a potential or imminent failure of the impoundments.
6. Identify the downstream area that would be affected by failure of the impoundments.
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 Emergency Action Plan.

0 5,000 Feet

1:60,000 (At original document size of 11x17)

Stantec DYNEGY

Project Location
Latitude: 39.059113
Longitude: -89.403293
Montgomery County, Illinois

175605019
Prepared by RMGB on 3/29/2017
Technical Review by NS on 3/29/2017
Independent Review by MM on 3/29/2017

Client/Project
Coffeen Power Station
Emergency Action Plan

Figure No.
1-1

Title
Location Map

Notes
1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

V:\1756\active\175605019\gis\mxd\004_coffeen\Figure1-1.mxd Revised: 2017-04-13 By: tfsmith

Legend

CCR Surface Impoundment Boundary

0 2,000 Feet

1:24,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

Stantec DYNEGY

Project Location 175605019
Latitude: 39.059113 Prepared by RMGB on 3/29/2017
Longitude: -89.403293 Technical Review by NS on 3/29/2017
Montgomery County, Illinois Independent Review by MM on 3/29/2017

Client/Project
Coffeen Power Station
Emergency Action Plan

Figure No.
1-2

Title
CCR Impoundments

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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

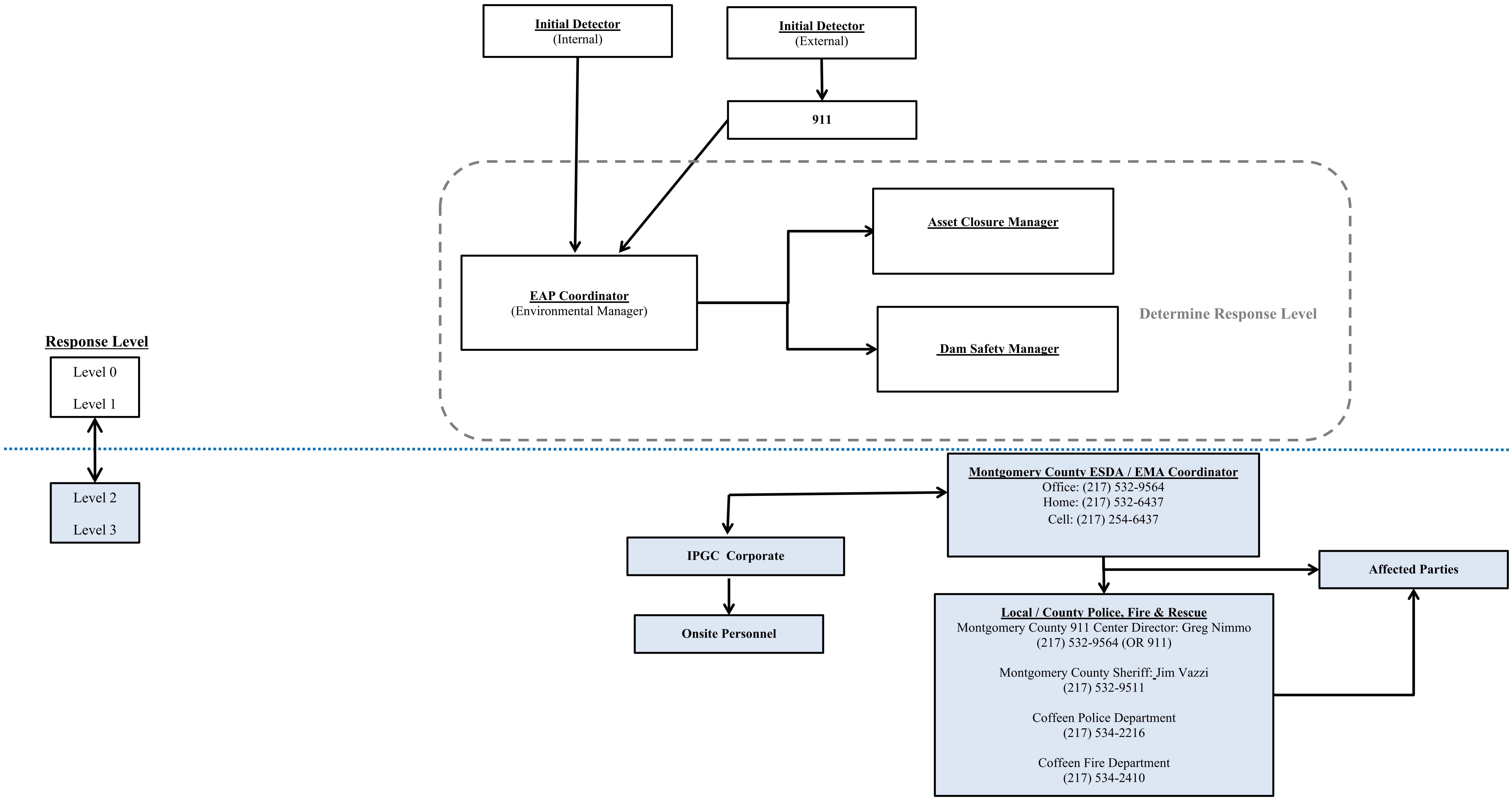


Figure 2-3. EAP Response Process Decision Tree

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.

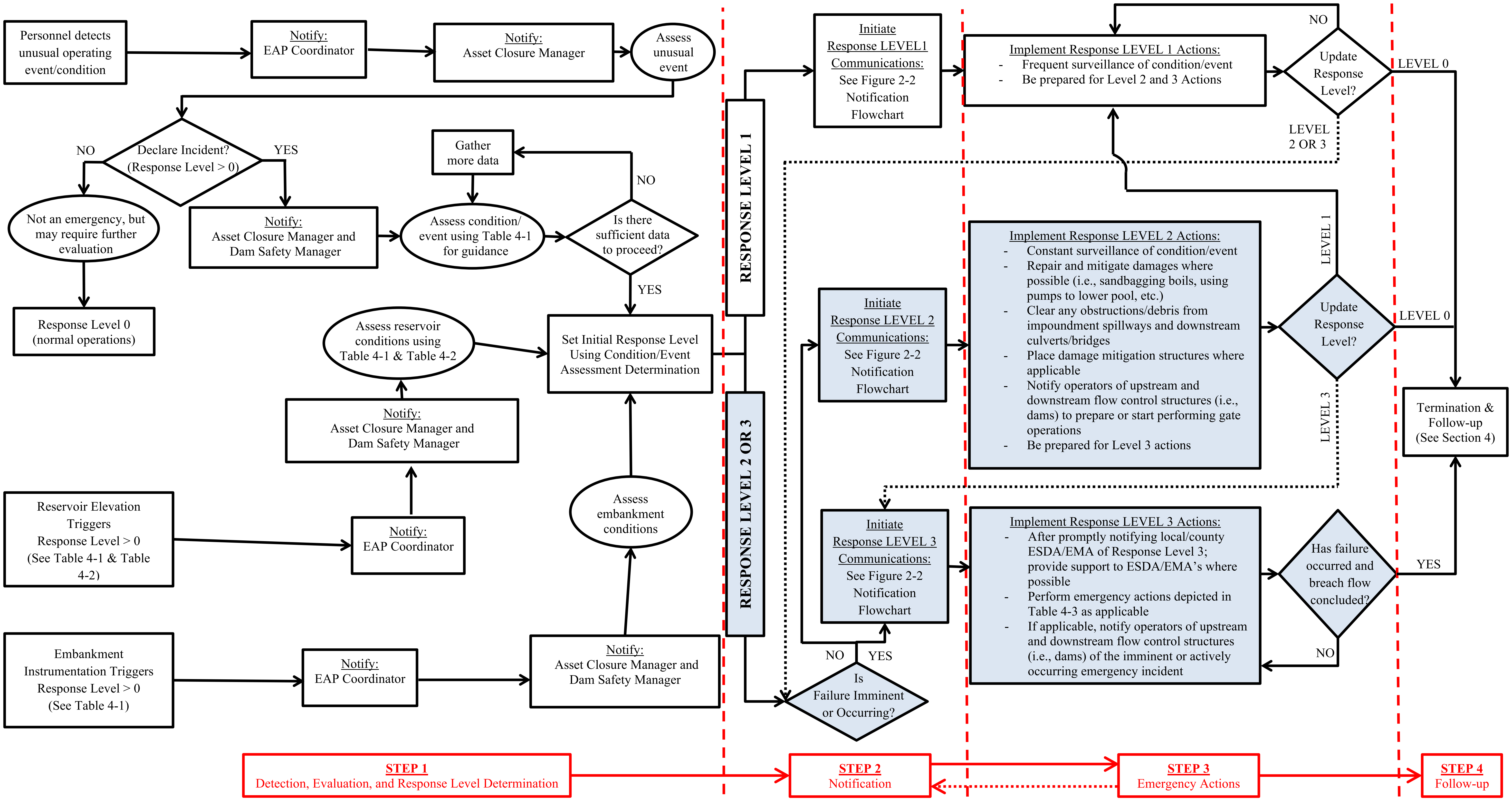


Table 2-1. EAP Emergency Responders

Position / Entity	Contact Information	
Internal Contacts		
Coffeen Power Plant	**Phone #**	
Asset Closure Manager	(903) 577-5207	
Environmental Manager (EAP Coordinator)	(217) 341-7319	
Control Room	(217) 534-7621	
IPGC Corporate Operations	**Contact**	
Dam Safety Manager		(618) 792-8488
External Contacts		
Local/County ESDA/EMA, Police, & Fire	**Phone #**	**Alternate Phone #**
Montgomery County 911 Emergency Communication Center	911	(217) 532-9564
Montgomery County Sheriff	(217) 532-9511	
Montgomery County ESDA/EMA Coordinator	(217) 532-9564	(217) 254-6437
Coffeen Police Department	(217) 534-2216	
Coffeen Fire Department	(217) 534-2410	
Montgomery County Ambulance	(217) 532-9562	
Montgomery County Engineer	(217) 532-6109	
State Emergency Management Agencies & Organizations	**Contact Phone #**	
IDNR-OWR Dam Safety Section Manager	(217) 782-4427	
Coffeen Lake State Fish & Wildlife Area	(217) 537-3351	
Illinois Conservation Police	(309) 338-1017	
Illinois State Police	(309) 833-4046	

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
IPGC Emergency Response Team (ERT)	**ERT: IPGC** personnel responsible for EAP implementation, distribution, updates/maintenance, and training activities. The *ERT* is comprised of the following roles: 1. **IPGC Corporate:** IPGC corporate entity, committee, team, or position with relevant responsibility for a given generating power plant. 2. **Asset Closure Management:** Personnel responsible for the management of the closure 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.
Montgomery County ESDA/EMA	1. Receive Response Level reports from *IPGC Corporate* through *EAP Coordinator*. 2. Coordinate emergency response activities with local/county 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 *IPGC 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 *IPGC Corporate*. 7. If necessary, coordinate with *State ESDA/EMA*.
Local/County Police, Fire & Rescue	1. Receive alert status reports from the *ERT* or the Montgomery County *ESDA/EMA*. 2. If necessary, notify affected parties and general public within inundation areas (see Section 7). 3. Render assistance to Montgomery County *ESDA/EMA*, as necessary. 4. Render assistance to *IPGC Corporate* and *Power Plant Management*, as necessary.

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 high pool fluctuation elevation.	Level 1
	Impoundment water surface elevation within 2 feet of the embankment crest 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
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

Table 4-1. Guidance for Determining the Response Level

Event	Situation	Response Level
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
GMF Pond	632.0 ft.	N/A	621 ft.	626 ft.
GMF Recycle Pond	629.0 ft.	624.1 ft.	610 ft.	623 ft.
Ash Pond No.1	637.5 ft.	631.0 ft.	629 ft.	633 ft.
Ash Pond No.2	638.0 ft.	N/A	N/A	N/A

Notes: Elevations are in reference to NAVD88

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
High Water Level/ Large Spillway Release	Not applicable to capped impoundments. See Table 4-1 and Table 4-2 for elevations and triggering water levels associated with the impoundments 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. 5. Make notifications as outlined in the lower portion of the Notification Flowchart (Figure 2-2) if condition worsens such that failure is imminent.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
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.
	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. 6. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
Embankment Deformation (cont.)	**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 in order 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. Supplier 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 EAP Coordinator for location(s).
Generator	Yes	Contact EAP Coordinator for location(s). Contact Grand Rental Station for additional generators (see Table 5-2).
Extension Cords	Yes	Contact EAP Coordinator for location(s).
Fire extinguishers	Yes	Contact EAP Coordinator for location(s).
Floodlights	Yes	Contact EAP Coordinator for location(s). Contact Grand Rental Station for additional emergency lighting (see Table 5-2).
Backhoe	Yes	Backhoe/tractor and 650 John Deere Track hoe available. Contact EAP Coordinator for location(s).
Dozer	Yes	D7 & D10 Crawler Tractors and two rubber-tired dozers (844B & 834B). Contact EAP Coordinator for location(s).
Dump Truck	Yes	Contact EAP Coordinator for location(s).
Large Equipment Rental (excavating equipment, large earth moving, etc.)	Occasionally	Contact EAP Coordinator for availability and location(s). Contact United Rentals (see Table 5-2) and/or other nearby large equipment rental providers for additional large equipment as necessary.
Pump and Hoses	Yes	Contact EAP Coordinator for location(s). Contact The Curry Companies or Rain for Rent for high-capacity portable pumps (see Table 5-2).
Sandbags	Yes	Contact EAP Coordinator for location(s). Contact Great Western Bag Co. for additional sandbags (see Table 5-2).
Fill (Stone, aggregate, sand)	Yes	Contact EAP Coordinator for location(s). Contact listed suppliers in Table 5-2 for gravel, sand, and riprap fill as necessary.
Concrete/grout	Yes	Contact EAP Coordinator for location(s). Contact Vandalia Ready Mix and/or Greenville Ready Mix for additional concrete (see Table 5-2).
Geotextile Filter Fabric	Yes	Two rolls of 10-ounce, non-woven filter fabric available. Contact EAP Coordinator for location(s).
Plastic Sheeting	Yes	Contact EAP Coordinator for location(s).
Rope	Yes	Contact EAP Coordinator for location(s). Should be maintained in close proximity to any features that might require immediate access.
Personal Flotation Devices	Yes	Contact EAP Coordinator for location(s).

Table 5-2. Supplier Addresses

Supply/Rental Item(s)	Supplier Contact Information	Distance from Site (miles)	Address
Sandbags	**Great Western Bag Co.** (314) 421-0498 (days) (314) 993-5287 (nights/weekends)	66	1416 N. Broadway St. Louis, MO
Gravel, Sand, & Riprap	**Fuller Brothers Ready Mix** (217) 532-2422	11	935 Ash Street Hillsboro, IL
Gravel, Sand, & Riprap	**Vandalia Sand and Gravel** (618) 283-4029	20	Route 140 Vandalia, IL
Gravel, Sand, & Riprap	**Central Illinois Materials** (618) 283-3259	20	RR 2 Vandalia, IL
Gravel, Sand, Riprap & High-Capacity Portable Pumps	**The Curry Companies** Brian Fenton: (217) 854-3101	40	21149 Route 4 Carlinville, IL
High-Capacity Portable Pumps	**Rain for Rent** Mark ByBee: (618) 931-0901	60	3711 Horseshoe Lake Road Granite City, IL
High-Capacity Portable Pumps	**Linden and Company** (800) 383-4811	145	800 W. Deerbrook Peoria, IL 61615
High-Capacity Portable Pumps	**Heartland Pumps** (618) 985-5110	120	1800 Supply Road, Suite A Carterville, IL 62918
Emergency Lighting, 5,000 to 8,500watt Generators, Concrete Mixers, Compact Excavators, Skid Steers, Portable Pumps, & Plate Compactors	**Grand Rental Station Fairview Heights, IL** (618) 277-7750 (866) 645-0218 (after hours)	60	5612 N. Illinois Street Fairview Heights, IL
Emergency Lighting, 4,000watt Generators, Concrete Mixers, Tractor Backhoes/Loaders, Compact Excavators, Skid Steers, Portable Pumps, & Compactors (Plate & Vibratory)	**Grand Rental Station Litchfield, IL** (217) 324-4000 (866) 645-0218 (after hours)	20	1105 West Weir Street Litchfield, IL 62056
Concrete (Ready Mix Concrete Supplier)	**Vandalia Ready Mix** (618) 283-1600	20	1021 Janette Drive Vandalia, IL 62471
Concrete (Ready Mix Concrete Supplier)	**Greenville Ready Mix** (618) 664-1340	17	1311 S. 4th Street Greeneville, IL 62246
Large Earthmoving Equipment (25,000 to 50,000 lb. Track hoe Excavators & 3.0 to 3.4 CY Wheel Loaders)	**United Rentals** (618) 345-6050	60	5076 Mid America Court Collinsville, IL 62234

6 FACILITY/IMPOUNDMENT DESCRIPTION

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

The Coffeen Power Plant is located in Montgomery County, Illinois approximately 1.5 miles south of Coffeen, Illinois. The plant is located on the east bank of Coffeen Lake, which is an impoundment created by Coffeen Lake Dam.

The GMF Pond is located northeast of power plant and north of the GMF Recycle Pond. The GMF Pond consists of a single pond formed by an earthen embankment around its perimeter. The earthen embankment crest elevation is currently 13-feet above grade; however, its final design has a crest elevation 100-feet above grade. The final design was used in the breach analysis and corresponding inundation map because the final design is more conservative than existing conditions (larger volume, greater dam height, etc.). The GMF Pond is used to dewater, store and dispose of gypsum from the Power Plant's flue gas desulphurization system. The GMF Pond discharges via a HDPE lined transfer channel into the GMF Recycle Pond. The transfer channel has a trapezoidal cross section with 3H:1V side slopes, a bottom width of 32 feet, a depth of 9-feet, and is 500-feet long.

The GMF Recycle Pond is located northeast of the power plant and south of the GMF Pond. The GMF Recycle Pond consists of a single pond formed by an earthen embankment around its perimeter. The pond is used to dewater, store and dispose of gypsum. It also is used to retain stormwater discharge from the GMF Pond transfer channel. The pool level is controlled by a recycle pump system that is located at the southeast corner. There is an emergency spillway located at the northeast corner that discharges into a creek that runs along the east side of the pond and discharges into the eastern cove of Coffeen Lake (Eastern Cove).

Ash Pond No. 1 is located east of the power plant and consists of a single pond formed by earthen embankments around the perimeter. The pool level is controlled by a recycle pump system that is located at the northwest corner. The emergency spillway consists of a pipe that connects to the top of the recycle pump intake pipe. The emergency spillway discharges into the cooling water discharge channel to the north which feeds into the eastern cove of Coffeen Lake. The stored material settled in the bottom of the pond consists of primarily bottom ash and boiler slag.

Ash Pond No. 2 is located east of the power plant, north of Ash Pond No. 1 and west of the Cooling Water Pond. Ash Pond No. 2 was closed by leaving CCR in place and constructing a final cover system. The boundaries of these impoundments encompass a total area of approximately 60 acres.

Table 6-1. Power Plant Impoundment Characteristics

Feature/Parameter	GMF Pond	GMF Recycle Pond	Ash Pond No.1	Ash Pond No.2
Maximum Embankment Height	13.0 feet	20.0 feet	41.5 feet	28.0 feet
Length of Dam	5,060 feet	3,600 feet	4,300 feet	6,400 feet
Crest Width	20 feet	20 feet	N/A	N/A
Crest Elevation	632.0 feet	629.0 feet	637.5 feet	638.0 feet
Reservoir Area at Top of Dam	37.6 acres	17.0 acres	N/A	N/A
Storage Capacity at Top of Dam	442 acre-feet	324 acre-feet	N/A	N/A
Primary Spillway Type	Trapezoidal Channel	Recycle Pump	Recycle Pump (48" dia. steel intake pipe)	Stormwater let-down structures are now the spillways
Primary Spillway Crest Elevation	623.0 feet	610.0 feet	N/A	N/A
Storage Capacity at Primary Spillway Elevation	1,150 acre-feet	49.7 acre-feet	N/A	N/A
Reservoir Area at Normal Water Surface Elevation	27.0 acres	10.4 acres	N/A	N/A
Auxiliary Spillway Type	None	(3x) 6'x6' conc. risers to (3x) 4'dia. HDPE pipes	N/A	N/A
Auxiliary Spillway Crest Elevation	N/A	624.1 feet	N/A	N/A

Notes:
Elevations are in reference to NAVD88

7 BREACH INUNDATION MAPS AND POTENTIAL IMPACTS

Inundation maps for GMF Pond, GMF Recycle Pond, Ash Pond No.1, and Ash Pond No.2 potential breach scenarios are provided in the following pages. It is the Montgomery 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 inundation maps.

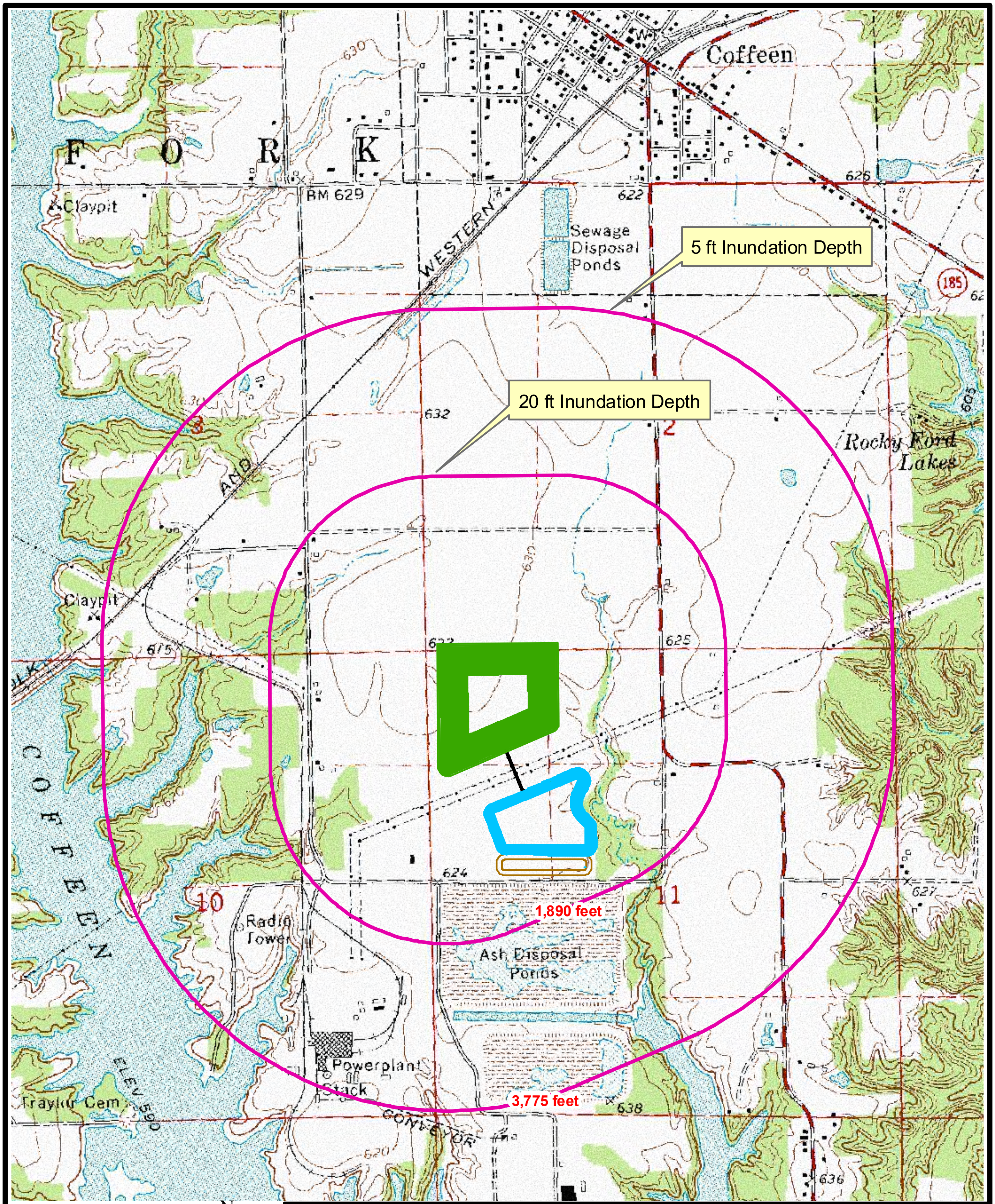
The methodology used to identify probable inundation extents for potential breach scenarios varied as a function of the impoundment size, location, surrounding topography, and surrounding structures/facilities/waterbodies.

The GMF Pond inundation map was developed by Hanson Professional Services Inc. (2007) using final design conditions (100-feet tall and 2,478 acre-feet of stored volume) and an approximate method of computing the inundation limits of gypsum slurry by computing a runout distance on a constant slope. It was assumed that a breach of the earthen perimeter embankment would cause saturated gypsum material to liquefy and release towards downstream areas in a semi-circular pattern. This breach scenario was simulated at multiple locations along the earthen perimeter dike and the corresponding results were used to create the inundation map shown as Figure 7-1.

The GMF Recycle Pond breach analysis consisted of a Probable Maximum Precipitation (PMP) failure scenario at the eastern embankment. The resultant breach discharges were modeled downstream using 1D and 2D capabilities of HEC-RAS. The approximate inundation area is illustrated in the inundation map shown as Figure 7-2.

The Ash Pond No. 1 breach analysis consisted of PMP failure scenarios of the embankment near the northwest and northeast corners of the pond. The breach discharges were modeled downstream using 1D and 2D capabilities of HEC-RAS. The approximate inundation area is illustrated in the inundation map shown as Figure 7-2.

The Ash Pond No. 2 breach analysis consisted of a failure scenario where the stored volume liquefies and breaches the embankment near the southwest corner of the pond. The breach discharge was modeled downstream using 2D capabilities of HEC-RAS. The approximate inundation area is illustrated in the inundation map shown as Figure 7-2.



GYPSUM BREACH INUNDATION MAP

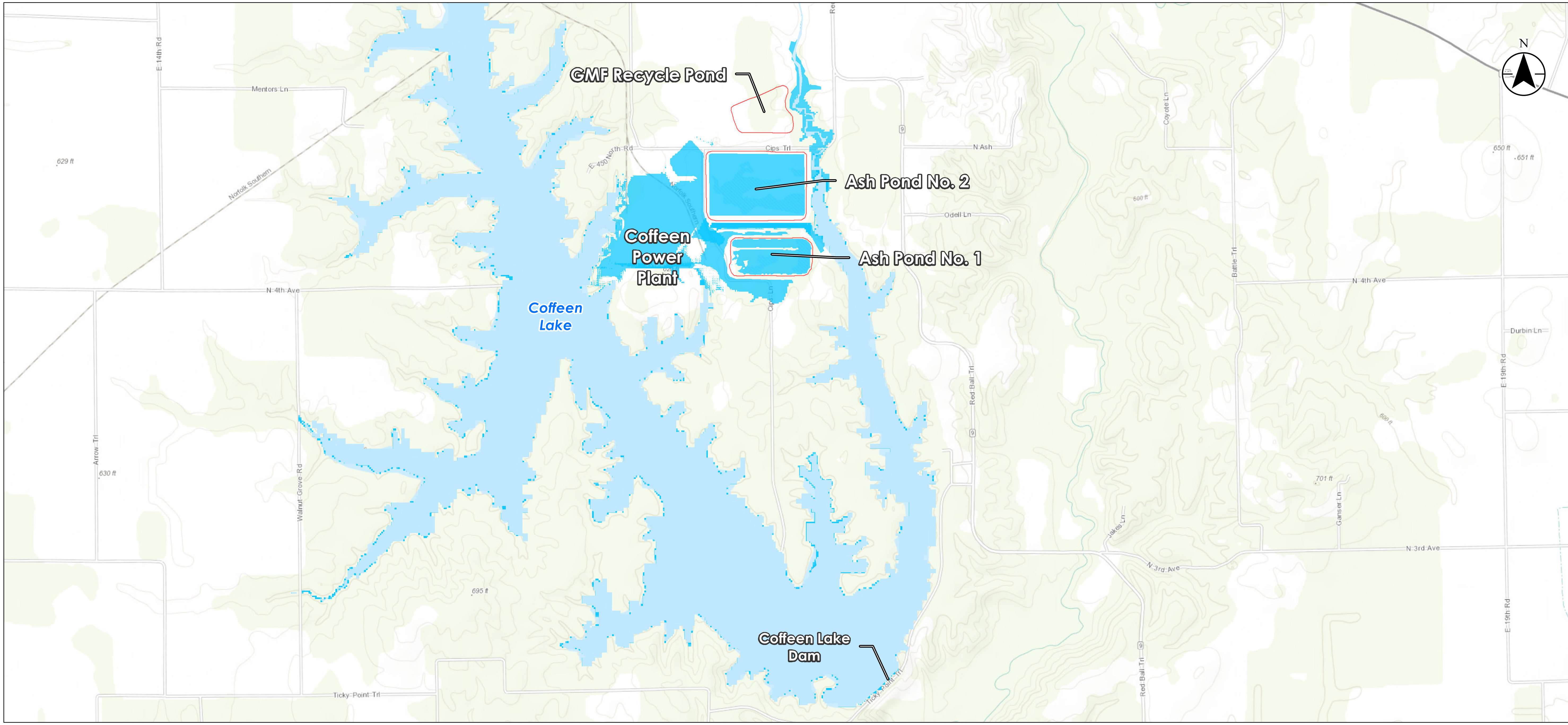
GYPSUM MANAGEMENT FACILITY
COFFEEN POWER GENERATING STATION
MONTGOMERY COUNTY, ILLINOIS

Hanson Professional Services Inc.

Job Number 05S3004A

Figure Appendix C - 1

I:\05jobs\05s3004A\GIS\Projects\IDNR-OWR Schematic.mxd



Legend

- CCR Surface Impoundment Boundary
- 100-year Storm Event Inundation Approximate Limits
- Expected Breach Inundation Area

0 2,000 Feet

1:24,000 (At original document size of 11x17)

Stantec DYNEGY

Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

Project Location 175605019
Latitude: 39.059113 Prepared by RMGB on 3/29/2017
Longitude: -89.403293 Technical Review by NS on 3/29/2017
Montgomery County, Illinois Independent Review by MM on 3/29/2017

Client/Project
Coffeen Power Station
Emergency Action Plan

Figure No.
7-2

Title
Inundation Map
GMF Recycle Pond, Ash Pond No.1, Ash Pond No.2

V:\1756\active\175605019\gis\mxd\004_coffeen\Figure7-2_all_web.mxd Revised: 2017-04-13 By: tsmith

ATTACHMENT G

CCR Fugitive Dust Control Plan

for

Coffeen Power Plant

Prepared for:

Illinois Power Generating Company

Coffeen Power Plant
134 Cips Lane
Coffeen, IL 62017

Prepared by:

Burns & McDonnell
Kansas City, Missouri

Amendment 1

October 2021

Table of Contents

1 Introduction 1-1

1.1 Facility Information 1-1
1.2 Certification 1-1

2 CCR Fugitive Dust Control Measures and Appropriateness 2-1

2.1 Management of CCR in the CCR Units 2-1
2.2 Handling of CCR 2-2

2.2.1 Conditioning of CCR Prior to Emplacement in CCR Landfill 2-2

2.3 Transportation of CCR 2-3

3 Procedures for Periodic Assessment of the Plan 3-1
4 Recordkeeping, Notification, Internet Site 4-1
5 Procedures to Log Citizen Complaints 5-1
6 Amendments 6-1

List of Tables

Table 2-1. Control Measures for CCR Management in CCR Units 2-1
Table 2-2. Control Measures for Handling CCR 2-2
Table 2-3. Control Measures for Transportation of CCR 2-3
Table 6-1. CCR Fugitive Dust Control Plan Amendments 6-1

1 Introduction

This Coal Combustion Residuals (CCR) fugitive dust control plan has been prepared for the retired Coffeen Power Plant, located in Montgomery 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: Coffeen Power Plant (Retired)
- Facility Address: 134 Cips Lane, Coffeen, IL 62017
- 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 surface impoundments and a 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 units, 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 emplacement.	Conditioning CCR 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. Use of conditioned CCR also achieves at least equivalent performance to conventional daily cover in terms of preventing wind entrainment.
	Wet management of CCR bottom ash and flue gas desulfurization materials 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.
	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

Bottom ash may be periodically removed from the CCR surface impoundments and remains sufficiently wet during and after handling activities, including dewatering, associated with transfer of the CCR. 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	CCR bottom ash removed from CCR surface impoundments and loaded into trucks for transport remains conditioned during handling.	Conditioned CCR allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation when CCR is handled.
	CCR fly ash to be emplaced in the landfill is conditioned before emplacement.	Conditioning allows CCR to bind together and thus minimizes the potential for CCR fugitive dust generation.
	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.
	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.

CCR generated offsite that is authorized for placement in the facility’s landfill, is conditioned in a pug mill or otherwise conditioned prior to emplacement into the facility’s 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 a combination of paved and 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 emplacement.	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 fly ash.	Covering or enclosing trucks transporting CCR on facility 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.
	Cover or enclose trucks used to transport CCR other than fly ash, as necessary.	Covering or enclosing trucks transporting CCR 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, including landfill roads, with water or dust suppressant as necessary.	Watering CCR haul roads, as well as landfill 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 Coffeen 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 incident, the name and contact information 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.
1940100806-002

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT GMF GYPSUM STACK POND

Project Name	**Coffeen Power Plant GMF Gypsum Stack Pond**
Project No.	**1940100806-002**
Recipient	**Illinois Power Generating Company**
Document Type	**Hydrogeologic Site Characterization Report**
Revision	**FINAL**
Date	**October 25, 2021**

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CONTENTS

Executive Summary		**6**
1.	**Introduction**	**11**
1.1	Overview	11
1.2	Part 845 Description	11
1.3	Previous Investigations and Reports	11
1.4	Site Location and Background	12
1.5	Site History and CCR Units	13
2.	**Regional and Local Geology**	**15**
2.1	Topography	15
2.2	Regional Geomorphology	15
2.3	Soils	15
2.4	Regional Geology	15
2.4.1	Unlithified Deposits	15
2.4.2	Bedrock	16
2.4.3	Structure	17
2.4.4	Seismic Setting	17
2.4.5	Mining Activities	17
2.5	Site Geology	18
2.5.1	Fill and CCR	19
2.5.2	Loess Unit	20
2.5.3	Hagarstown Member	20
2.5.4	Vandalia Member	21
2.5.5	Mulberry Grove Member	22
2.5.6	Smithboro Member	22
2.5.7	Yarmouth Soil	22
2.5.8	Lierle Clay Member/ Banner Formation	23
2.5.9	Bedrock	23
3.	**Regional and Local Hydrogeology**	**24**
3.1	Regional Hydrogeology	24
3.2	Site Hydrogeology	24
3.2.1	Hydrostratigraphic Units	24
3.2.2	Uppermost Aquifer	25
3.2.3	Potential Migration Pathways	25
3.2.4	Water Table Elevation and Groundwater Flow Direction	25
3.2.4.1	Vertical Hydraulic Gradient	26
3.2.4.2	Impact of Existing Ponds and Ash Saturation	27
3.2.4.3	Impact of Coffeen Lake on Groundwater Flow	27
3.2.5	Hydraulic Conductivities	28
3.2.5.1	Field Hydraulic Conductivities	28
3.2.5.2	Laboratory Hydraulic Conductivities	28
3.2.6	Horizontal Groundwater Gradients and Flow Velocity	29
3.2.7	Groundwater Classification	29
3.3	Surface Water Hydrology	30
3.3.1	Climate	30
3.3.2	Surface Waters	30

4.	**Groundwater Quality**	**32**
4.1	Summary of Groundwater Monitoring Activities	32
4.1.1	40 C.F.R. § 257 Program Monitoring and Well Network	32
4.1.2	IEPA Groundwater Monitoring	32
4.1.3	Part 845 Well Installation and Groundwater Monitoring	33
4.2	Groundwater Monitoring Results and Analysis	34
4.2.1	Arsenic	34
4.2.2	Beryllium	35
4.2.3	Cobalt	35
4.2.4	Lead	35
4.2.5	pH	35
4.2.6	Sulfate	35
4.2.7	Thallium	36
4.2.8	Total Dissolved Solids	36
5.	**Evaluation of Potential Receptors**	**37**
5.1	Water Well Survey	37
5.2	Surface Water	37
5.3	Nature Preserves, Historic Sites, Endangered/Threatened Species	37
6.	**Conclusions**	**39**
7.	**References**	**42**

TABLES (IN TEXT)

Table A History of Construction
Table B Average Monthly Temperature Extremes and Precipitation for Hillsboro, Illinois
Table C 40 C.F.R. § 257 Groundwater Monitoring Program Parameters
Table D IEPA Groundwater Monitoring Program Parameters
Table E Part 845 Groundwater Monitoring Program Parameters

TABLES (ATTACHED)

Table ES-1 Part 845 Requirements Checklist
Table 2-1 Geotechnical Data Summary
Table 2-2 Ash Analytical Results
Table 2-3 Leachate Analytical Results
Table 2-4 Soil Analytical Results
Table 3-1 Monitoring Well Locations and Construction Details
Table 3-2 Vertical Hydraulic Gradients
Table 3-3 Field Hydraulic Conductivities
Table 3-4 Horizontal Hydraulic Gradients and Groundwater Flow Velocities
Table 4-1 Groundwater Analytical Results
Table 4-2 Groundwater Field Parameters

FIGURES (IN TEXT)

Figure A Daily Gage Height of East Fork Shoal Creek Near Coffeen, Illinois (USGS 05593900)

FIGURES (ATTACHED)

Figure 1-1 Site Location Map
Figure 1-2 Site Map
Figure 2-1 Site Topographic Map
Figure 2-2 Soil Survey Map
Figure 2-3 Surficial Geologic Deposits
Figure 2-4 Generalized Stratigraphic Column
Figure 2-5 Major Structural Features of Illinois
Figure 2-6 Field Investigation Location Map
Figure 2-7 Geologic Cross Sections A-A' & B-B'
Figure 2-8 Bottom of CCR Map
Figure 3-1 Monitoring Well Location Map
Figure 3-2 Top of Uppermost Aquifer
Figure 3-3 Uppermost Aquifer Groundwater Elevation Contours – April 20, 2021
Figure 3-4 Uppermost Aquifer Groundwater Elevation Contours – July 26, 2021

APPENDICES

Appendix A Historic Topographic Map
Appendix B Information Pertinent to 35 I.A.C. § 845.220(a)(3)
Appendix C Boring Logs and Well Construction Logs
Appendix D Geotechnical Laboratory Reports
Appendix E Groundwater Contour Maps, Elevations, and Vertical Gradients
Appendix F Hydraulic Conductivity Test Data
Appendix G FEMA Flood Hazard Map

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
§	Section
%	percent
35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
AP1	Ash Pond No. 1
AP2	Ash Pond No. 2
bgs	below ground surface
CCR	coal combustion residuals
CCR Rule	40 C.F.R. § 257 Subpart D
cm/s	centimeters per second
CPP	Coffeen Power Plant
DA	deep aquifer
DCU	deep confining unit
ESRI	Environmental Systems Research Institute, Inc.
FEMA	Federal Emergency Management Agency
ft/day	feet per day
ft/ft	feet per foot
g	horizontal acceleration
GMF GSP	Gypsum Management Facility Gypsum Stack Pond
GMF RP	Gypsum Management Facility Recycle Pond
GMP	Groundwater Monitoring Plan
GMZ	Groundwater Management Zone
GWPS	Groundwater Protection Standard
Hanson	Hanson Professional Services, Inc.
HCR	Hydrogeologic Site Characterization Report
HDPE	high-density polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
HUC	Hydrologic Unit Code
ID	identification
IDNR	Illinois Department of Nature Resources
IEPA	Illinois Environmental Protection Agency
ILWATER	Illinois Water and Related Wells
IPGC	Illinois Power Generating Company
ISAS	Illinois State Archaeological Survey
ISGS	Illinois State Geological Survey
LCU	lower confining unit
LF	Landfill
mg/L	milligrams per liter
mil	millimeter
msl	above mean sea level
NAVD88	North American Vertical Datum of 1988

NGVD29	National Geodetic Vertical Datum of 1929
NID	National Inventory of Dams
NPDES	National Pollutant Discharge Elimination System
No.	number
NRT	Natural Resource Technology, Inc.
NRT/OBG	NRT, an OBG Company
Part 845	Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: 35 I.A.C. § 845
pcf	pounds per cubic foot
PMP	potential migration pathways
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	Surface Impoundments
Site	combined area including GMF RP and GMF GSP
SSURGO	Soil Survey Geographic Database
SU	Standard Units
TDS	total dissolved solids
UCU	upper confining unit
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

EXECUTIVE SUMMARY

This Hydrogeologic Site Characterization Report (HCR) for the Gypsum Management Facility (GMF) Gypsum Stack Pond (GSP) expands upon the hydrogeology and groundwater quality data presented in previous hydrogeologic investigation reports prepared for the Coffeen Power Plant (CPP) (Natural Resource Technology [NRT], 2017; Hanson Professional Services, Inc. [Hanson], 2009; Hanson, 2016). 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 conceptual site model includes hydrogeologic and groundwater quality data specific to the GMF GSP, which has been collected from 2015 to 2021. The GMF GSP is part of the CPP, which is two miles south of the city of Coffeen, Illinois and about eight miles southeast of the city of Hillsboro, Illinois.

The CPP operated as a coal-fired power plant from 1964 until November 2019 and has five coal combustion residuals (CCR) management units. The CCR unit that is the subject of this report is: GMF GSP, Vistra Identification [ID] Number [No.] 103, Illinois Environmental Protection Agency [IEPA] ID No. W1350150004-03, and National Inventory of Dams [NID] No. IL50579. The GMF GSP is a 77-acre, lined surface impoundment (SI) used to manage CCR waste streams at the CPP.

CPP is located between the two lobes of Coffeen Lake (**Figure 1-1**), which was formed in 1963 by damming the McDavid Branch of the East Fork of Shoal Creek. Coffeen Lake encompasses approximately 1,100 acres and was created to provide a source of cooling water for the CPP. Coffeen Lake borders the CPP to the west, east, and south, and agricultural land is located to the north.

Unlithified material present above the bedrock in the vicinity of the CPP was categorized into hydrostratigraphic units for this HCR. In addition to the CCR Unit, the hydrostratigraphic units occur in the following order (from surface downward) and include:

- **Upper Confining Unit (UCU):** Composed of the Roxana and Peoria Silts (Loess Unit) and the upper clayey portion of the Hagarstown Member which are classified as silts to clayey silts and gravelly clay below the surficial soil. Construction of the GMF GSP required the excavation and removal of this layer within the unit footprint and the UCU has been eroded east of the GMF GSP, near the Unnamed Tributary.
- **Uppermost Aquifer:** The uppermost aquifer is the Hagarstown Member which is classified as primarily sandy to gravelly silts and clays with thin beds of sands. Similar to the Loess Unit, the Hagarstown Member was excavated to facilitate construction of the GMF GSP and the Hagarstown Member is also absent in some locations near the Unnamed Tributary.
- **Lower Confining Unit (LCU):** Comprised of the Vandalia Member, Mulberry Grove Member, and Smithboro Member. These units include a sandy to silty till with thin, discontinuous sand lenses, a discontinuous and limited extent sandy silt which has infilled prior erosional features, and silty to clayey diamicton, respectively.
- **Deep Aquifer (DA):** Sand and sandy silt/clay units of the Yarmouth Soil, which include accretionary deposits of fine sediment and organic materials, typically less than five feet thick and discontinuous across the CPP.

- **Deep Confining Unit (DCU):** Comprised of the Banner Formation, generally consists of clays, silts, and sands. The Lierle Clay Member is the upper layer of the Banner Formation which was encountered at the CPP.

Bedrock of the Bond Formation which consists of limestone and calcareous clays and shale, was not encountered in the borings advanced at the CPP.

Flow of groundwater from central portions of the CPP to Coffeen Lake or the Unnamed Tributary through the uppermost aquifer are the primary pathways for contaminant migration. Groundwater elevations are primarily controlled by surface topography, geologic unit topography, and water levels within Coffeen Lake and the Unnamed Tributary. A groundwater divide trending north-south is observed running through the approximate center of the CPP. Phreatic surfaces or water elevations within the SIs are generally consistent and have not been observed to fluctuate with groundwater elevations, indicating limited hydraulic connection with the SIs.

35 I.A.C. § 845 parameters were monitored in the uppermost aquifer monitoring wells at the GMF GSP as part of the Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 and IEPA groundwater monitoring programs from 2015 to 2021. These data were supplemented with installation and sampling of additional wells installed in 2021. The results indicate the following parameters were detected at concentrations/measurements greater than (or less than for pH) the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Arsenic in downgradient uppermost aquifer well G215.
- Beryllium in downgradient uppermost aquifer well G209.
- Cobalt in downgradient uppermost aquifer wells G209, G213, and G217.
- Lead in downgradient uppermost aquifer wells G209 and G213.
- pH (low) in downgradient uppermost aquifer well G206.
- Sulfate in downgradient uppermost aquifer well G215 and in downgradient DA well G206D.
- Thallium in downgradient uppermost aquifer well G209.
- Total dissolved solids (TDS) in downgradient DA well G206D.

Groundwater monitoring results were compared to the applicable 35 I.A.C. § 845.600 GWPSs 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 or utilize 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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Part 845 Reference	Individual Part 845 Components Reviewed for Completeness	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 Table 3-3 Figures 3-2 through 3-5
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;	Sections 2.4 & 2.5 Figures 2-2 through 2-4
845.620(b)(7)	Structural characteristics;	Section 2.4.3 Figure 2-5
845.620(b)(8)	Geologic cross-sections;	Figure 2-7
845.620(b)(9)	Soil characteristics;	Section 2.3 Figure 2-2 Tables 2-1 & 2-4
845.620(b)(10)	Identification of confining layers;	Sections 3.2.1

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HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Part 845 Reference	Individual Part 845 Components Reviewed for Completeness	Location of Information in HCR
845.620(b)(11)	Identification of potential migration pathways;	Section 3.2.1 & 3.2.3
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 2.8 Figures 2-7 & 2-8 Appendix C
845.620(b)(14)	A map displaying any known underground mines beneath a CCR surface impoundment;	Section 2.7 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 2.8 Tables 2-1, 2-2, & 2-4 Appendices D & F
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 Appendices D & F
845.620(b)(16)(A)	water table depth;	Section 3.2.4 Figures 3-3 & 3-4 Appendix E
845.620(b)(16)(B)	hydraulic conductivities;	Sections 3.2.5 Tables 2-1 & 3-3 Appendices D & F
845.620(b)(16)(C)	effective and total porosities;	Section 2.5.1 Table 2-1

TABLE ES-1. PART 845 REQUIREMENTS CHECKLIST
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Part 845 Reference	Individual Part 845 Components Reviewed for Completeness	Location of Information in HCR
845.620(b)(16)(D)	direction and velocity of groundwater flow; and	Section 3.2.4 to 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; and	Section 3.2.7

[O: LDC 06/15/21, U: LDC 08/19/21; C: EJT 08/19/21; U:KLT 8/24/21, C: LDC 09/17/21]

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

1. INTRODUCTION

1.1 Overview

In accordance with requirements of the Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: 35 I.A.C. § 845 (Part 845) (IEPA, 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this HCR on behalf of CPP (**Figure 1-1**), operated by Illinois Power Generating Company (IPGC). This report will apply specifically to the CCR Unit referred to as the GMF GSP. However, information gathered to evaluate other CCR units on site regarding geology, hydrogeology, and groundwater quality is included, where appropriate. The GMF GSP is a lined impoundment with an underdrain system that covers an area of approximately 77 acres. This HCR includes Part 845 content requirements specific to 35 I.A.C. Part 845.620(b) (Hydrogeologic Site Characterization) for the GMF GSP at CPP.

1.2 Part 845 Description

Part 845 contains comprehensive rules for the design, construction, operation, corrective action, closure, and post closure care of SIs containing CCR. CCR is commonly referred to as coal ash, and CCR SIs are commonly referred to as coal ash ponds. This rule includes GWPSs applicable to each CCR SI at the waste boundary 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, the rule includes procedures for public participation, closure alternatives analyses, and closure prioritization. The rule also includes financial assurance requirements for CCR SIs.

1.3 Previous Investigations and Reports

Numerous hydrogeologic investigations have been performed concerning the CCR Units located at the CPP. The information presented in this HCR includes data collected in support of the monitoring well network established for development of the GMP and supplements comprehensive data collection and evaluations from prior hydrogeologic investigation reports (recent to oldest), including, but not limited to, the following:

- ***NRT, January 24, 2017. Hydrogeologic Site Characterization Report, Ash Pond 2, Coffeen Power Station, Coffeen, Illinois.***
  Summarizes the results of numerous hydrogeologic investigations that have been performed at the Site, including recent data collected to comply with 40 C.F.R. § 257 Subpart D (CCR Rule) as well as comprehensive data collection and evaluations from prior hydrogeologic investigation reports.
- ***NRT, January 24, 2017. Groundwater Management Zone Application, Coffeen Ash Pond No. 2, Coffeen Power Station, Coffeen, Illinois.***
  Establishes a three-dimensional Groundwater Management Zone (GMZ) containing groundwater being managed to mitigate a potential release of CCR constituents from Ash Pond No. 2 (AP2).
- ***NRT, January 24, 2017. Groundwater Monitoring Plan. Coffeen Power Station, Coffeen, Illinois*.**
  The plan describes the groundwater monitoring and reporting to be completed in support of the Closure Plan for AP2.

- ***NRT, January 24, 2017. Hydrostatic Modeling Report. Coffeen Power Station, Coffeen, Illinois.***
  Utilized the Hydrologic Evaluation of Landfill Performance (HELP) model to predict percolation from AP2 and to evaluate AP2 hydrostatic conditions in response to the proposed cover system as described in the Revised 30% Closure Design Package.
- ***NRT, January 24, 2017. Groundwater Modeling Report. Coffeen Power Station, Coffeen, Illinois.***
  Included simulations of the site hydrology, the extent of CCR leachate impacts on groundwater and the effect of pond closure on groundwater quality.
- ***Hanson, April 16, 2016. Corrective Action Plan.***
  A plan to remediate groundwater exceedances around AP2 and other units. Proposed plan includes reduction in leachate within AP2, enhanced cover system on AP2, and a GMZ.
- ***AECOM, April 2016. Revised 30% Closure Design Package for Coffeen Power Station Ash Pond No. 2.***
  A 30% design package for closure of AP2 including the design basis and summary in addition to preliminary construction costs and schedule.
- ***Hanson, April 2016. Uppermost Aquifer Considerations.***
  A discussion of the construction of the gypsum pond and relation to the uppermost aquifer in the vicinity of the site.
- ***Hanson, 2015. G153 Assessment.***
  Evaluation of manganese, sulfate, and TDS concentrations that were identified at concentrations greater than Class I Groundwater Standards at well G153, which concluded that elevated concentrations were also found upgradient of the Storm Water Runoff Pond and intrawell standards should be utilized.
- ***Hanson, July 2011. Hydrogeologic Report.***
  Supports permit applications for the GMF GSP and GMF Recycle Pond (GMF RP).

In conjunction with this report, a GMP is being prepared for the GMF GSP.

1.4 Site Location and Background

The CPP is located in Montgomery County, in central Illinois, within Section 11 Township 7 North and Range 7 East. The CPP is approximately two miles south of the city of Coffeen and about eight miles southeast of the city of Hillsboro, IL (**Figure 1-1**). The GMF GSP is located between the two lobes of Coffeen Lake (identified as "Coffeen Lake" and "Unnamed Tributary" on **Figures 1-1 and 1-2**) to the west, east, and south, and is bordered by agricultural land to the north. The approximately 1,100-acre Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the CPP. Historically, several coal mines were operated at depth in the vicinity of the CPP as well as a US Minerals processing facility located to the north. **Figure 1-2** is a site map showing the location of Ash Pond No. 1 (AP1), AP2, GMF GSP (Part 845 regulated CCR Unit and subject of this HCR), GMF RP, and Landfill (LF). The GMF RP is located south and immediately adjacent to the GMF GSP; therefore, the geology and hydrogeology are similar and results from the 845 investigations from both units are included and discussed in this report, and in the HCR prepared for the GMF RP. The combined area including the GMF RP and GMF GSP will hereinafter be referred to as the Site and data from both units will be utilized in portions of **Sections 2 and 3**. Groundwater quality data in **Section 4** includes only data from monitoring wells specific to the subject unit (GMF GSP).

1.5 Site History and CCR Units

The CPP was a coal-fired electrical generating plant that began operation in 1964. The plant initially burned bituminous coal from Illinois and CCR from the coal fired units was disposed of in AP1. AP2 was also utilized in the early 1970's and AP1 was reconstructed in 1978. Both of these units were used until the mid-1980's. Beginning in 2010, CCR material was placed in the LF and GMF Units.

GMF Gypsum Stack Pond (GMF GSP): The 77-acre GMF GSP received blowdown from the air emission scrubbers and was put into operation in 2010. Construction of the GMF GSP was in accordance with Water Pollution Control Permit 2008-EA-4661 and features a composite 60-millimeter (mil) high-density polyethylene (HDPE) liner with 3 feet of recompacted soil with a hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s), with internal piping and drains to collect contact water. Construction of the unit required excavation to approximately 603 feet and installation of a groundwater underdrain system to eliminate inward pressure on the liner prior to placement of CCR. The GMF GSP underdrain was actively pumped during construction, but is not actively pumped. IPGC ceased receipt of waste to the GMF GSP prior to April 11, 2021.

GMF Recycle Pond (GMF RP): The 17-acre GMF RP received blowdown from the air emission scrubbers and was put into operation in 2010. Construction of the GMF RP was in accordance with Water Pollution Control Permit 2008-EA-4661 and features a composite 60-mil HDPE liner with 3 feet of recompacted soil with a hydraulic conductivity of 1 x 10^{-7} cm/s, with internal piping and drains to collect contact water. Construction of the unit required excavation to approximately 601 feet and installation of a groundwater underdrain system to eliminate inward pressure on the liner prior to placement of CCR. The GMF RP underdrain is a passive, gravity drained system. IPGC ceased receipt of waste to the GMF RP prior to April 11, 2021.

Ash Pond No. 1 (AP1): This SI (also known as the Bottom Ash/ Recycle Pond) is a reclaimed ash pond that was reconstructed utilizing the existing earthen berms with reinforcement, as provided by Water Pollution Control Permit 1978-EA-389, issued by IEPA on May 26, 1978. AP1 (existing unlined SI) covers an area of approximately 23 acres, has berms up to 41 feet above the surrounding land surface, and a volume of 300 acre-feet. It primarily received bottom ash and low volume wastes from floor drains in the main power block building. Several years ago, air heater wash and boiler chemical cleaning wastes were directed to AP1, but this practice was discontinued. The bottom ash was periodically removed for beneficial uses by a third-party contractor. Sluicing of waste to AP1 ceased prior to November 4, 2019.

Ash Pond No. 2 (AP2): AP2 is a closed (IEPA approved) SI with a surface area of approximately 60 acres and berms 47 feet higher than the surrounding land surface. AP2 was originally removed from service and capped in the mid 1980's. A clay and soil cap was placed on the surface of the pond with contouring and drainage provided to direct storm water to four engineered revetment down drain structures. Prior to capping, this pond was identified as Outfall 004 in the facility National Pollutant Discharge Elimination System (NPDES) operating permit, IL0000108. Additional closure activities include the construction of a geomembrane cover system that began in July 2019 and was completed on November 17, 2020. The construction was completed in accordance with the Closure and Post Closure Care Plan approved by IEPA on January 30, 2018.

Landfill (LF): Fly ash was managed in a permitted composite lined landfill constructed in 2010. The LF has an active groundwater underdrain system that is currently being pumped. Additionally, the ash landfill leachate collection system is restricted by rule to no more than one foot of leachate on the composite liner. An IEPA groundwater monitoring program is in effect for the GMF (under Bureau of Water) and Ash Landfill (under Bureau of Land).

The approximate dates of construction of each successive stage of the CCR Units at the CPP are summarized in **Table A** below (AECOM, 2016).

Table A. History of Construction

Date	Event
1964	Construction of AP1 (formerly identified as the Bottom Ash Recycle Pond)
1971	Construction of AP2
1978-1979	Installation of internal embankment and new recycle intake structure in AP1 and abandonment of existing outfall structure
1984-1985	Closure of AP2 by installing a clay cover
2000	Installation of a sheet pile wall to facilitate construction of drainage flume along the northeast corner of AP1
2006	Bottom ash system modified in AP1
2008-2010	Construction of the GMF GSP and the GMF RP
2009	Installation of well dewatering system in AP2
2015	Notice of intent to close AP2
2015	Closure plans for AP1, AP2, GMF GSP, GMF RP, and LF submitted to IEPA
2018	IEPA approved Closure and Post-Closure Care Plan for AP2
2020	Completion of closure of AP2 with geomembrane cover system

2. REGIONAL AND LOCAL GEOLOGY

2.1 Topography

The CPP and embankments surrounding the GMF GSP are located at an elevation of approximately 632 feet North American Vertical Datum of 1988 (NAVD88) with the surrounding areas having low topographic relief, generally at an elevation of around 625 to 630 feet NAVD88 (**Figure 2-1**). East and south of the GMF GSP, towards the Unnamed Tributary and Coffeen Lake, the elevation decreases to less than 590 feet NAVD88.

Topographic maps drawn prior to construction (1947) indicate the areas of the CPP were generally from 600 to 640 feet above mean sea level (msl), with the elevations near the GMF GSP ranging from 620 to 640 feet msl (**Appendix A**). No former major drainage features run through the current extent of the GMF GSP.

2.2 Regional Geomorphology

The CPP is located in the central portion of the Springfield Plain of the Till Plains section, the largest physiographic division in Illinois, covering approximately four-fifths of the state. It is characterized by level to undulatory till plains with a few morainic ridges in a late youthful stage of erosion. The Springfield Plain includes the level to gently undulating portion of the Illinoian drift-sheet in central and south-central Illinois (Leighton et al., 1948; Zuehls et al., 1984). Distinguishing features include flatness and shallow drainage features. Moraines in this region are low and broad. Drainage systems are well developed, and the valleys tend to be shallow, broadly alluviated, and terraced (Leighton et al., 1948). Streams in the western portion of the Springfield Plain primarily flow westward, ultimately into the Mississippi River, while streams in the eastern portion flow eastward ultimately into the Wabash River.

2.3 Soils

Surficial soils at the CPP and vicinity are shown on **Figure 2-2** and based on Montgomery County soil survey data available in the Soil Survey Geographic Database (SSURGO) by the United States Department of Agriculture's Natural Resources Conservation Service provided by Environmental Systems Research Institute, Inc.'s (ESRI's) web hosted layer. Former soils underlying the CPP, not including the Fill and CCR within the limits of the GMF GSP are identified as: Herrick Biddle-Piasa silt loams (0 to 2 percent slopes) on the northwest boundary of the unit, surrounding background monitoring wells G270 and G280; Cowden-Piasa silt loams (0 to 2 percent slopes) southwest of the unit; Cowden silt loam (0 to 2 percent slopes) through the center of the unit; Marine silt loam (2 to 5 percent slopes) and Fishook silt loam (2 to 5 percent slopes, eroded) to the north and south of the unit, and through the eastern portion of the unit; and Atlas silt loam (5 to 10 percent slopes, eroded) east of the unit. Marine silt loam (2 to 5 percent slopes) is also found immediately east of the Unnamed Tributary.

2.4 Regional Geology

2.4.1 Unlithified Deposits

Pleistocene deposits of unlithified glacial diamictons, lacustrine/alluvial deposits, and windblown loess overlie Pennsylvanian-age bedrock throughout central Illinois. The most extensive glacial deposits are those from the Illinoian Stage which cover much of the state and are present at the CPP. Windblown (aeolian) deposits, the Peoria and Roxana Silts, cover the glacial deposits over a majority of the state. These units are fine-grained deposits blown from river valleys by prevailing winds (Hansel and Johnson, 1996).

Surficial deposits, as reported and mapped on a regional scale by the Illinois State Geological Survey (ISGS), are the Vandalia Member (**Figure 2-3**), although the Hagarstown Member has been identified in the vicinity of the CPP. The general sequence of unlithified Quaternary deposits, depicted on **Figure 2-4**, from ground surface down is:

- **Loess Unit**: The loess unit is comprised of the Peoria and Roxana Silts. The Peoria Silt is generally classified and described as light yellow-tan to gray, fine sandy silt. The Roxana Silt is predominately silt-sized material, but can be sandier in localized areas and the base of this unit is often colluvium of silt, and sand (Hansel and Johnson, 1996).
- **Glasford Formation**: Till members present in the surrounding area include the Hagarstown Member, the Vandalia Member, the Mulberry Grove Member, and the Smithboro Member (youngest to oldest). The Hagarstown Member is bounded at the top by the Sangamon Soil. The Vandalia Member is described as a sandy till with thin lenticular bodies of silt, sand, and gravel. It is calcareous, except where weathered, generally gray, and moderately compact. The member consists of gravelly till, poorly sorted gravel, well sorted gravel, and sand. The Mulberry Grove Member is intermittent at the CPP, and is described as a calcareous gray silt and fine sand containing some fossil mollusks. The Smithboro Member is described as a gray, compact, silty till. The Smithboro is bounded below by the Yarmouth Soil (Willman and Frey, 1970).
- **Banner Formation**: Composed primarily of glacial tills and intercalated outwash of sand, gravel, and silt. Members differentiated in western Illinois include the Yarmouth Soil and the Lierle Clay (Hanson, 2009).

2.4.2 Bedrock

Unlithified deposits at the CPP and surrounding areas, described in **Section 2.4.1**, are underlain by rocks belonging to the Pennsylvanian Bond Formation (Kolata, 2005). Detailed descriptions of the Pennsylvanian strata of Illinois were published by Willman et al. (1975). The Bond Formation includes all strata from the base of the Shoal Creek Limestone Member or the LaSalle Limestone Member to the top of the Millersville Limestone Member or the Livingstone Limestone Member. It is overlain by the Mattoon Formation and underlain by the Modesto Formation. It varies from less than 150 feet thick in eastern Illinois to over 300 feet thick in southeastern Illinois, averaging about 250 feet. The Bond Formation is characterized by a high percentage of limestone and calcareous clays and shales. The Bond and Modesto Formations of the McLeansboro Group also contain multiple thin (typically less than 2 feet) intermittent coal beds. The upper formation of the Kewanee Group is the Carbondale Formation which contains multiple coal beds, including the Herrin (No. 6) Coal, of varying thicknesses (up to 7 feet) (ISGS, 2020). It is bound by thick limestone members (up to 50 feet), the thickest and purest limestones in the Pennsylvanian System of Illinois. Gray shales constitute the greatest part of the formation, although thick channel sandstones are developed locally.

The elevation of the bedrock surface in the area ranges from 450 to 500 feet msl. The bedrock surface slopes gently towards the west into a minor bedrock valley that runs north-south (Herzog et al., 1994). Well logs indicate that the lithology of the uppermost bedrock is predominantly shale (Zeizel, 1959).

2.4.3 Structure

The major geologic structural features of Illinois are shown on **Figure 2-5**. There are no major structural features in Montgomery County. The nearest major structural feature to CPP is the Louden Anticline, which is north-south trending and located approximately 25 miles east of the CPP. Smaller-scale structural features within Montgomery County include the Hillsboro North and Hillsboro South Domes, which are located approximately 15 miles north of the CPP. The Crown Fault, which is a left-lateral fault, and the Girard Fault, which is a northeast dipping normal fault, are located approximately 31 miles northwest of the CPP.

Located south of the CPP in Bond County are the Ayers and Woburn Anticlines and the Greenville Dome. The Ayers Anticline is located approximately 10 miles south of the CPP and trends east-west. The Woburn Anticline is located approximately 10 miles southeast of the CPP and trends north-south. The Greenville Dome is located approximately 15 miles south of the CPP (Nelson, 1995). A review of the available data from the United States Geological Survey (USGS, 2010), ISGS, and other available 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 nearest known mapped fault is the Crown Fault referenced above, which is located approximately 31 miles northwest of the CPP, and the Centralia Fault zone, located approximately 35 miles southeast of the CPP. The timeframe of the most recent activity on these fault zones is unknown. There are no known active faults or fault damage zones that have had displacement in Holocene time reported or indicated within 200 feet of the GMF GSP (**Figure 2-5**).

2.4.4 Seismic Setting

The nearest areas of present-day fault related, seismic activity are the Northern Illinois Seismic Source Zone, the Wabash Valley Fault Zone near southwestern Indiana, and the New Madrid Fault Zone along the Ohio and Mississippi River Valleys in southeastern Illinois. No recent earthquake epicenters are located in Montgomery County. A magnitude 3.80 earthquake occurred approximately 15 miles south of CPP in Bond County in 1981 and a magnitude 3.60 earthquake occurred approximately 20 miles southeast of CPP in Fayette County in 1990.

35 I.A.C. § 845.330 requires that 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 GMF GSP 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 Inflow Design Flood Control System Plan for the GMF Pond at Coffeen 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

Several coal mines, both strip and underground types, previously operated in Montgomery County, Illinois. A survey to identify historic mining activities was conducted for a 1,000-meter radius around the Site. Based on records obtained from ISGS, three mines were identified within a 1,000-meter radius of the GMF GSP. A map showing the extent of historic mines is provided in **Appendix B**.

In the southeast portion of the CPP is the Hillsboro Mine (ISGS Mine No. 871), which was operated as a room and pillar panel mine. Operations began in 1964 under the Truax-Traer Coal Company. The mine was purchased by the Consolidation Coal Company in 1971 and production ceased in 1983. An approximately 5- to 7-foot-thick seam of Herrin Coal was mined at approximately 500 feet below ground surface (bgs) (ISGS, 2019). The mine showed indications of small-scale faulting, roof stability issues and floor heaving. The GMF GSP falls within the buffer zone of the Hillsboro Mine.

To the north/northwest is the Clover Leaf No. 4 Mine (ISGS Mine No. 442), which was operated as a room and pillar panel mine. Operations began in 1906 under the Clover Leaf Mining Company. Production discontinued in 1924 under Clover Leaf Coal Company ownership. An approximately 6- to 8-foot-thick seam of Herrin Coal was mined at approximately 510 feet bgs (ISGS, 2019). The GMF GSP directly overlies the southernmost portion of the Clover Leaf No. 4 Mine, and is entirely within the buffer zone of the mine.

To the northeast is the Clover Leaf No. 1 Mine (ISGS Mine No. 3001), which was operated as a room and pillar mine. Operations began in 1889 under the Coffeen Coal & Coke Company. The mine was purchased by the Clover Leaf Coal Company in 1901, and production ceased in 1908. An approximately 7- to 8-foot-thick seam of Herrin Coal was mined at approximately 534 feet bgs (ISGS, 2019). The GMF GSP does not overlie the Clover Leaf No. 1 Mine nor its corresponding buffer zone.

2.5 Site Geology

The Quaternary deposits in the vicinity of the CPP consist mainly of diamictons and interbedded outwash deposits that were deposited during Illinoian and Pre-Illinoian glaciations. The CPP geology summarized below is from a combination of the Hydrogeologic Monitoring Plan (NRT, an OBG Company [NRT/OBG], 2017) and a field investigation 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 bgs as specified in 35 I.A.C. § 845.620(b). Field investigation locations are shown on **Figure 2-6** and cross-sections are included in **Figure 2-7**. Soil boring logs and well construction logs are provided in **Appendix C**. Samples for geotechnical analysis were collected from interpreted geologic units and composited to obtain a representative sample of the entire geologic unit prior to submittal (**Table 2-1**). The unconsolidated deposits and bedrock which occur at the CPP include the following units (beginning at the ground surface):

- **CCR:** CCR consisting of gypsum is present within the GMF GSP and GMF RP and non-CCR fill material consisting of silt, clay, and sand comprises the berms surrounding the GMF GSP and GMF RP.
- **Loess Unit**: Clays and silts, including undifferentiated Roxana Silt and Peoria Silt with thicknesses ranging from 1 to 16 feet, where present at the CPP.
- **Hagarstown Member**: The Hagarstown Member (consisting of gravelly clay till and sandy materials in contact with the Vandalia Member (also referred to as Hagarstown Beds) has been separated into two units for this discussion: the first unit, consisting of the gravelly clay

till and the second unit consisting of sandy material overlying the Vandalia Member. The Upper Hagarstown Member is up to 6 feet thick, while the sandy portions, where present, are generally less than 3 feet thick, although thicknesses up to 7 feet have been observed north of the LF.

- **Vandalia Member**: Sandy, silt, or clay till that is generally greater than 15 feet thick.
- **Mulberry Grove Member**: Gray silt and sandy silt/clay unit found between the Vandalia Till and the Smithboro Till. Generally thin and not laterally continuous across the CPP.
- **Smithboro Member**: Thick, gray compacted silty clay diamicton.
- **Yarmouth Soil**: Sand and sandy silt/clay, which include accretionary deposits of fine sediment and organic materials, typically less than 5 feet thick and not laterally continuous.
- **Lierle Clay Member:** Clay and silt with some sand which is the upper portion of the Banner Formation. No borings advanced on site penetrated the full thickness of the Lierle Clay.

2.5.1 Fill and CCR

Gypsum scrubber waste and other non-CCR wastes are present within the GMP GSP. The gypsum grab sample locations are shown on **Figure 2-6.** The elevation at the top of the fill layer estimated from the topographic surface (**Figure 2-1**) within the limits of the GMF GSP is from approximately 610 to 624 feet NAVD88.

Borings were not advanced during the 2021 investigation in the GMF GSP due to safety concerns, and two grab samples of gypsum were collected near the northwest corner of the GMF GSP. Based on a topographic survey conducted in 2021 and the base of the GMF GSP (**Figure 2-8**), gypsum thickness is estimated from approximately 4 feet at the southern extent of the pond up to a maximum depth of 17 feet in the northern extent of the pond. This is consistent with the gypsum thickness estimated at a maximum of 16 feet in 2016 (AECOM, 2016).

The geotechnical testing results are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the CCR material in the grab sample indicated the following:

- Moisture content is 25.3 percent.
- Dry density is 78.0 pounds per cubic feet (pcf).
- Particle size distribution is 0 percent gravel, 22 percent sand, 78 percent fines.
- The sample was not analyzed for specific gravity, so porosity was not calculated. Based on grain size of the sample the estimated porosity of the sample is 3 to 19 percent (Fetter, 2001).

Solids samples collected from the gypsum grab sample were also collected for chemical analysis. The results of solids samples collected from within the GMF GSP are summarized in **Table 2-2**. Additionally, the NE Riser (**Figure 3-1**), which collects contact water from process piping located in the northeast corner of the GMF GSP, was sampled as a representative source water location in 2021. The results of source water samples collected from the GMF GSP are summarized in **Table 2-3**.

2.5.2 Loess Unit

The Loess Unit is the uppermost unlithified unit identified at the CPP. This unit is comprised of the combined Roxana and Peoria Silt and extends from beneath the topsoil, derived from the loess, to the top of the Hagarstown Member. The loess has been classified as silt or clayey silt, with minor amounts of sand. The Loess Unit is generally considered unsaturated, and the uppermost aquifer is recharged by precipitation that percolates through this unit.

The top of the Loess Unit was typically encountered from approximately 606 to 628 feet NAVD88. Loess Unit thickness ranges from 0 feet (absent) to 16 feet. Construction of the LF, GMF GSP, and GMF RP required the excavation and removal of this layer within the unit footprints. The Loess Unit is typically thickest to the north, and is absent near historic drainage features to the south.

During the 2021 investigation of the GMF GSP, the Loess Unit was typically encountered from 2 to 5 feet bgs, at elevations of approximately 626 to 629 feet NAVD88, and was generally 8 to 14 feet thick, where present near the GMF GSP and GMF RP. The Loess Unit was absent in borings G283 and G285, located near the Unnamed Tributary.

The geotechnical testing results are summarized in **Table 2-1** and geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Loess Unit indicated the following:

- Average moisture content is 20.6 percent and ranges from 20.2 to 21.2 percent.
- Average calculated porosity is 35.2 percent and ranges from 35.1 to 35.3 percent.
- Average dry density is 104.9 pcf and ranges from 103.4 to 105.9 pcf.
- Average specific gravity is 2.58 and ranges from 2.56 to 2.60.
- Particle size distribution is 0 percent gravel, 20 percent sand, and 80 percent fines (46 to 50 percent silt, and 30 to 34 percent clay).

Soil samples collected from the Loess Unit were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.3 Hagarstown Member

The Hagarstown Member (also referred to as Hagarstown Beds) exhibits two units; the first unit, consisting of the gravelly clay till and the second consisting of sandy material overlying the Vandalia Member. The clay till portion had varying thicknesses ranging from approximately 2 to 6 feet as observed adjacent to, south, and west of the Pond. Based on the historic topographic map (**Appendix A**), the Hagarstown Member is not present in former drainage features.

During construction of the LF, GMF GSP, and GMF RP, the Loess Unit and the Hagarstown Member were excavated to facilitate construction and eliminate groundwater flow into excavations. The excavations were backfilled with structural fill and an underdrain system was installed to mitigate inward hydraulic pressure and potential liner uplift damage before the CCR units were filled. The LF underdrain system remains but is no longer actively pumped. The GMF GSP underdrain system has not been actively pumped since construction was completed. The GMF RP gravity underdrain remains in place.

Where present, the sandy portion of the Hagarstown Member is generally 2 to 4 feet thick. The composition of the sandy portion of the Hagarstown unit varies across the CPP and has been classified as gravelly till, poorly sorted gravel, well sorted gravel, sand, and silty sand. The elevation of the top of the Hagarstown generally declines as the unit approaches Coffeen Lake or other topographic drainage features.

During the 2021 investigation, the sandy portion of the Hagarstown Member near the GMF GSP was generally encountered at 18 feet bgs, at an elevation of approximately 612 feet NAVD88, and was generally 2 to 4 feet thick, where present (**Figure 2-7**).

The geotechnical testing results are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Hagarstown Member indicated the following:

- Average moisture content of samples collected near the GMF GSP is 13.4 percent and ranges from 10.1 to 16.6 percent.
- Average calculated porosity of samples collected near the GMF GSP is 28.6 percent and ranges from 26.5 to 30.6 percent.
- Average dry density of samples collected near the GMF GSP is 115.0 pcf and ranges from 112.6 to 117.4 pcf.
- Average specific gravity of samples collected near the GMF GSP is 2.58 and ranges from 2.56 to 2.60.
- Particle size distribution of samples collected near the GMF GSP is 0 percent gravel, 46 to 57 percent sand, and 43 to 54 percent fines (28 to 34 percent silt and 15 to 20 percent clay).

Soil samples collected from the Hagarstown Member were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.4 Vandalia Member

The Vandalia (Till) Member is a sandy/silty till with thin, discontinuous lenses of silt, sand, and gravel. The Vandalia Member was encountered in all borings advanced at the CPP. The Vandalia Member typically ranged in thickness from 11.7 feet in the northern portion of the CPP, to 31.0 feet between the GMF GSP and the GMF RP. Similar to the observed top elevation of the Hagarstown Member, the top of the Vandalia Member declines in elevation near Coffeen Lake and topographic drainage features. This unit is relatively thick throughout the CPP, with an average thickness of over 15 feet (Hanson, 2009).

During the 2021 investigation, the Vandalia Member was encountered from 1.5 to 34 feet bgs, at elevations of approximately 598 to 608 feet NAVD88, where present. The geotechnical testing results are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Vandalia Member indicated the following:

- Average moisture content is 8.6 percent and ranges from 8.3 to 8.9 percent.
- Average calculated porosity is 18.6 percent and ranges from 17.7 to 19.4 percent.
- Average dry density is 132.1 pcf and ranges from 131.4 to 132.7 pcf.
- Average specific gravity is 2.60 and ranges from 2.56 to 2.64.

- Particle size distribution is 0 percent gravel, 46 to 47 percent sand, and 53 to 54 percent fines.

Soil samples collected from the Vandalia Member were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.5 Mulberry Grove Member

The Mulberry Grove (Silt) Member 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 Member. At the CPP, the Mulberry Grove Member is represented by pockets (generally less than 2 feet thick) of gray sandy silt. This unit was absent in many borings through the central portion of the Site from south to north. Where sampled, the Mulberry Grove Member ranged in thickness from 0.5 to 4.9 feet near the GMF GSP (Hanson, 2009). During the 2021 investigation, the Mulberry Grove Silt was not encountered in the borings near the GMF GSP. These silts appear to be deposited in depressions found in the surface of the underlying Smithboro Member.

2.5.6 Smithboro Member

The Smithboro (Till) Member is described as a gray, compact, silty, clayey diamicton. The Smithboro Member ranges in thickness from 6.7 to 21.2 feet northwest of the landfill.

The geotechnical testing results are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Smithboro Member indicated the following:

- The moisture content is 14.2 percent and ranges from 13.4 to 14.9 percent.
- Porosity is 27.3 percent and ranges from 26.2 to 28.4 percent.
- Dry density is 118.6 pcf and ranges from 116.6 to 120.6 pcf.
- Specific gravity is 2.62 and ranges from 2.61 to 2.62.
- Particle size distribution is 0 percent gravel, 26 to 29 percent sand, and 72 to 74 percent fines.

Soil samples collected from the Smithboro Member were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.7 Yarmouth Soil

The Yarmouth Soil is described as the weathered zone on the Kansan drift, but in some places, it consists of accretionary deposits of fine sediment and organic material that accumulated in poorly drained areas on the surface of the Kansan deposits. Historical borings in the northern portion of the CPP which encountered the Yarmouth were summarized previously by Hanson (2009) as ranging in thickness from 0 feet (absent) to 5.1 feet.

During the 2021 investigation, the Yarmouth Soil was encountered from 46 to 55 feet bgs, at an elevation from approximately 565 to 577 feet NAVD88, and was 1 to 3 feet thick, where present. The measured thickness was consistent with previous investigations.

The geotechnical testing results are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Yarmouth Soil indicated the following:

- Moisture content of the G206D sample is 14.9 percent.
- No samples were analyzed for dry density; therefore, average porosity was not calculated for the Yarmouth Soil. Based on material type encountered in the borings, the effective porosity is expected to range from 10 to 28 percent (Fetter, 2001).
- Specific gravity of the G206D sample is 2.75.
- Particle size distribution of the G206D sample is 0 percent gravel, 78 percent sand, 13 percent silt, and 9 percent clay.

Soil samples collected from the Yarmouth Soil were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.8 Lierle Clay Member/ Banner Formation

The Lierle Clay Member is the uppermost member of the Kansan Stage Banner Formation. It is described as an accretion gley with clay, silt, and some sand. It was encountered by Hanson (2009) in all but a few borings on site. During the 2021 investigation, borings G206D and SB289 encountered the Lierle Clay at 54 and 57 feet bgs, at approximately 571 feet NAVD88 in both borings. No borings penetrated the full thickness of the Banner Formation near the GMF GSP.

The geotechnical testing results from the sample collected at SB289 are summarized in **Table 2-1** and the geotechnical laboratory report is included in **Appendix D**. Geotechnical testing results from the Lierle Clay Member indicated the following:

- Moisture content of the sample collected from SB289 is 25 percent.
- Calculated porosity of the sample collected from SB289 is 40.0 percent.
- Dry density of the sample collected from SB289 is 98.4 pcf.
- Specific gravity of the sample collected from SB289 is 2.63.
- Particle size distribution of the sample collected from SB289 is 0 percent gravel, 21 percent sand, 36 percent silt, and 43 percent clay.

Soil samples collected from the Lierle Clay were also submitted to an analytical laboratory for chemical analysis. The results of this chemical analysis are summarized in **Table 2-4**.

2.5.9 Bedrock

Pennsylvanian-age Bond Formation bedrock was not encountered in any borings advanced at the CPP, so site-specific information is not available.

3. REGIONAL AND LOCAL HYDROGEOLOGY

3.1 Regional Hydrogeology

The water table conforms more or less to the topographic features of the land surface. Recharge occurs in the uplands and flows towards drainage features. Moderate thicknesses of unconsolidated materials fill shallow valleys or are present on the uplands bordering the main valleys. These materials contain thin and discontinuous deposits of sand and gravel. Potable water in Montgomery County is primarily serviced by the Hillsboro and Litchfield Water Departments. Surface water of Lake Glenn Shoals and Old Hillsboro Lake serves Hillsboro, Illinois and the surrounding communities (*e.g.,* Coffeen) (Hillsboro, 2021). Groundwater for domestic and farm supplies is obtained locally in this area from wells drilled in sand and gravel, but in some places good water-yielding deposits are absent and water from the unconsolidated material is obtainable only with large-diameter dug wells (Selkregg et al., 1957).

3.2 Site Hydrogeology

Over 100 monitoring wells have been installed since 2006 to monitor groundwater conditions around the five CCR units at the CPP for both State and Federal programs. Three monitoring wells were installed in 2008 and fourteen monitoring wells (one replacement) were installed in 2010 around the GMF GSP. One replacement well was installed near the GMF GSP in 2017 to meet requirements of the CCR Rule. In 2021, one additional well and one soil boring were installed to provide information to meet requirements of Part 845. A summary of the current monitoring well networks, and construction details, is included in **Table 3-1** and locations shown on **Figure 3-1**. This section discusses the recently (2021) collected information, focusing on the existing well network and monitoring wells installed after 2015 around the GMF GSP, as well as appropriate historical data from wells installed prior to 2015.

3.2.1 Hydrostratigraphic Units

Six hydrostratigraphic units have been identified at the CPP based on stratigraphic relationships and common hydrogeologic characteristics, and are summarized as follows:

- **CCR**: This unit is composed of CCR, consisting primarily of gypsum scrubber waste. This also includes earthen fill deposits of predominantly silt and clay materials from on-site excavations that were used to construct berms and roads surrounding the various impoundments across the CPP.
- **UCU**: Consists of the Loess Unit and the upper clayey portion of the Hagarstown Member which has generally lower vertical permeability and generally greater than 60 percent fines (**Table 2-1**). This Unit was encountered across most of the CPP, with the exception of the eastern edges of the SIs near the Unnamed Tributary where the unit was eroded following deposition or locations where it has been excavated for construction.
- **Uppermost Aquifer**: This unit consists primarily of sand and sandy silts and clays at the base of the Hagarstown Member and, in some locations, the uppermost weathered sandy clay portion of the Vandalia Member. This unit is absent in several locations due to weathering and in others due to excavation during construction of the CCR Unit. The hydraulic characteristics of the Hagarstown Member indicate the unit has a moderate hydraulic conductivity.

- **LCU**: This unit is composed of the sandy clay till of the Vandalia Member, the silt of the Mulberry Grove Formation, and the compacted clay till of the Smithboro Member. The unit underlies the uppermost aquifer and was encountered in all boring locations on the CPP. Results from laboratory tests completed for vertical hydraulic conductivity indicate the Vandalia Member has a very low vertical hydraulic conductivity.
- **DA**: This unit consists primarily of sandy silt and sands of the Yarmouth Soil, which are thin (less than 5 feet) and discontinuous across the CPP.
- **DCU**: This unit underlies the DA and is composed of the Banner Formation, of which the thick Lierle Clay is the first encountered unit. No boring penetrated the full thickness of this formation.

3.2.2 Uppermost Aquifer

The base of the Hagarstown Member is identified as the uppermost aquifer on Site. The sandy clay and sand of the uppermost aquifer is confined except where site excavations and ravines extend through the Loess Unit into the Hagarstown Member. The top of the 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 occurs at an elevation of 609 to 611 feet and was removed below the footprint of the GMF GSP (**Figure 2-7**). The base of the uppermost aquifer and the material on which the GMF GSP liner was placed is the top of the LCU which is comprised of the low permeability Vandalia Member, Mulberry Grove Member, and Smithboro Till.

3.2.3 Potential Migration Pathways

Potential migration pathways (PMPs) were interpreted using the lithologic composition and hydrogeologic properties (hydraulic conductivity and hydraulic position with respect to the unit) of the screened materials. In addition to the physical properties, the analytical results from the baseline groundwater monitoring performed in wells screened in the confining units and DA were used to identify PMPs. The uppermost aquifer is the first occurrence of groundwater and therefore the PMPs identified are in geologic units located below the uppermost aquifer. Monitoring well G206D is considered a DA PMP monitoring location and monitors the potential migration of impacts through the LCU.

3.2.4 Water Table Elevation and Groundwater Flow Direction

The NE Riser was utilized during the 2021 investigation to collect contact water samples from the GMF GSP. A transducer was installed near the NE Riser during the 2021 investigation to monitor pond water levels in the GMF GSP. The water elevations in the GMF GSP showed minimal variation, with elevations from approximately 625 to 627 feet NAVD88 (**Appendix E**).

No monitoring wells were installed in the UCU during 2021 investigation activities and no wells have historically been installed across solely the UCU because it is not present or is unsaturated in portions of the CPP.

During the 2021 Part 845 investigation, groundwater elevations in the uppermost aquifer ranged from approximately 591 to 625 feet NAVD88 across the CPP (**Appendix E**). Groundwater elevations were typically highest towards the northern extent of the CPP, near the GMF GSP and GMF RP, except monitoring well G307 south of AP1, which consistently had the highest groundwater elevation. Groundwater elevations were lowest near the Unnamed Tributary and east of AP1 towards Coffeen Lake. Groundwater elevations in the vicinity of the GMF GSP were typically from 617 to 622 ft NAVD88 (**Figures 3-3 and 3-4**). No seasonal variation has been observed in the uppermost aquifer monitoring wells, and any seasonal responses may be muted by the proximity and hydraulic connection to Coffeen Lake.

Overall groundwater flow within the uppermost aquifer is divided towards the two lobes of Coffeen Lake. The groundwater divide runs approximately through the center of the CPP, with groundwater east of the divide flowing east to southeast towards the Unnamed Tributary or the eastern lobe and groundwater west of the divide flowing west to southwest towards the western lobe. Groundwater flows east to southeast across the GMF GSP (**Figures 3-3 and 3-4** and **Appendix E**) toward the Unnamed Tributary. Based on the elevations of the Tributary (**Figure 2-7**) and groundwater elevations measured east of the tributary (**Figures 3-3 and 3-4**) the tributary is a hydraulic barrier and prevents groundwater migration east of the Unnamed Tributary. Although elevations vary seasonally, the groundwater flow direction in the uppermost aquifer is consistent and likely controlled by the proximity and hydraulic connection to Coffeen Lake.

Monitoring wells G206D, G275D, and G314D are screened across the DA. Groundwater elevation within the DA typically ranges from approximately 567 to590 feet NAVD88. G206D is nearest the GMF GSP and typically has groundwater elevations ranging from about 584 to 591 feet NAVD88. Groundwater contour maps are not generated for the DA; however, groundwater flow within the DA is expected to generally follow subsurface topography for the unit.

3.2.4.1 Vertical Hydraulic Gradient

Vertical hydraulic gradients were calculated using available groundwater elevation data from March through July 2021 and from historic readings from 2017 to 2019 at nested well locations within the uppermost aquifer, LCU, and DA. Vertical hydraulic gradients for the GMF GSP are presented in **Table 3-2**. Vertical hydraulic gradients for other nested well locations at the CPP, discussed below, are presented in **Appendix E**. The results of the vertical hydraulic gradient calculations between hydrostratigraphic units are summarized below:

- Uppermost aquifer to upper LCU (Vandalia Member)
  - In 2021, vertical gradients in well nest G405/T408, located north of AP2, were consistently downward, with an average vertical gradient of 0.03 feet per foot (ft/ft). From 2017 to 2020, vertical gradients in well nest G405/T408 varied between upward and downward, with an average (downward) vertical gradient of 0.04 ft/ft.
  - In 2021, vertical gradients in well nest G406/T409, located near the southwest corner of AP2, were consistently upward, with an average vertical gradient of -0.18 ft/ft. From 2017 to 2020, vertical gradients in well nest G406/T409 varied between upward and downward, with an average (downward) vertical gradient of 0.02 ft/ft.
  - Vertical hydraulic gradients indicate there is intermittent migration of groundwater from the uppermost aquifer downward into the LCU in the vicinity of well nests G405/T408 and G406/T409.

- Uppermost aquifer to DA
  - During 2021, vertical gradients at well nest G206/G206D, located near the southwest corner of the GMF GSP, were consistently strongly downward, with an average vertical gradient of 1.01 ft/ft.
- Upper LCU (Vandalia Member) to Lower LCU (Smithboro Member)
  - In 2021, vertical gradients at well nest T408/G45D, located north of AP2, were consistently downward with an average vertical gradient of 0.20 ft/ft. The direction is consistent with measurements from 2017 to 2020 although less than the average downward gradient measured (2.02 ft/ft).
  - In 2021, vertical gradients at well nest T409/G46D, located near the southwest corner of AP2, were downward with an average vertical gradient of 0.25 ft/ft. This direction is consistent with measurements from 2017 to 2020, although less than the average downward vertical gradient measured (1.28 ft/ft).
- LCU to DA
  - During 2021, vertical gradients in well nest G314/G314D were consistently strongly downward, with an average vertical gradient of 1.32 ft/ft.

Vertical hydraulic gradients indicate there is consistently downward migration of groundwater in most areas of the CPP, with the exception being northwest of AP1, where consistent upward gradients were measured between the upper LCU and UA in 2021.

3.2.4.2 Impact of Existing Ponds and Ash Saturation

During construction of the GMF GSP, the Loess Unit and the Hagarstown Member were excavated within the footprint of the GMF GSP. Groundwater surface does not appear to be affected by water levels in the GMF GSP, which is hydraulically isolated by a composite HDPE liner with 3 feet of recompacted soil with a hydraulic conductivity of 1 x 10^{-7} cm/s. Changes in pond elevations in 2021 are minimal, and do not result in, or vary with, corresponding changes in groundwater elevations. Saturated gypsum has been observed within the GMF GSP. As discussed above, the water within the GMF GSP is hydraulically isolated from surrounding groundwater; therefore, the thickness of saturated gypsum within the pond will vary with the level of water maintained in the pond.

3.2.4.3 Impact of Coffeen Lake on Groundwater Flow

Groundwater contour maps prepared from elevation data measured in monitoring wells indicate groundwater elevations can be variable but flow directions are generally consistent. Groundwater generally flows from the center of the CPP west towards Coffeen Lake, and east towards the Unnamed Tributary, the eastern lobe of Coffeen Lake, and the discharge flume, resulting in a groundwater divide (high) running through the middle of the CPP.

Construction of the LF, GMF GSP, and GMF RP required removal of the Hagarstown Member, in effect removing the aquifer beneath the footprint of these units (Hanson, 2016). It is uncertain whether these constructed units significantly limit lateral groundwater flow, either by creating no flow zones or by capturing groundwater via their dewatering (NRT, 2017).

3.2.5 Hydraulic Conductivities

3.2.5.1 Field Hydraulic Conductivities

Field hydraulic conductivity tests were performed by Hanson in 2021 as part of characterization efforts to complete Part 845 requirements. Individual field hydraulic conductivity test results conducted at the GMF GSP are summarized in **Table 3-3** and the field hydraulic conductivity data is included in **Appendix F**. The results of the tests are summarized as follows:

- Uppermost aquifer: Hydraulic conductivities near the GMF GSP ranged from 2.5×10^{-4} to 4.0×10^{-3} cm/s. Tests had a geometric mean of 1.4×10^{-3} cm/s. This is generally consistent, although higher than tests conducted prior to 2017 as part of CCR Rule characterization efforts that indicated hydraulic conductivities varied from 1.7×10^{-5} to 2.1×10^{-3} cm/s with a geometric mean of 2.9×10^{-4} cm/s (NRT, 2017).
- LCU: Hydraulic conductivities across the CPP ranged from 1.2×10^{-4} and 4.5×10^{-3} cm/s. Tests had a geometric mean of 7.2×10^{-4} cm/s (NRT, 2017). No monitoring wells near the GMF GSP are screened within the LCU. Monitoring wells with the highest hydraulic conductivities were located near the GMF RP and wells with the lowest hydraulic conductivities were located near AP1. Prior to 2017, field hydraulic conductivity tests completed in the LCU for monitoring well and temporary piezometers (G45D, G46D, T408, and T409) indicate horizontal conductivities from 4.0×10^{-8} and 3.4×10^{-5}. The elevated hydraulic conductivity values (10^{-4} to 10^{-3} cm/s) in wells near the GMF GSP relative to other areas of the CPP are likely not representative of the primary LCU lithology, but instead reflect the isolated and discontinuous sandy lenses in which the wells are screened (NRT, 2017).
- DA: Geometric mean hydraulic conductivity at DA well G314D, near AP1, was 8.7×10^{-5} cm/s and was slightly lower than tests completed in the northern portion of the CPP in 2009 that resulted in hydraulic conductivity values ranging from 1.3×10^{-4} to 1.7×10^{-3} cm/s, with a geometric mean of 4.4×10^{-4} cm/s (NRT, 2017). Field hydraulic conductivity testing was not performed on DA monitoring well G206D, located near the GMF GSP.
- No monitoring wells are screened only within the DCU, and no field hydraulic conductivity tests were conducted for the DCU.

3.2.5.2 Laboratory Hydraulic Conductivities

Falling head permeability tests (ASTM D5084 Method F) were performed in the laboratory on nine samples collected primarily from CCR and confining units at the CPP during the 2021 investigations. Samples collected from locations near the GMF GSP are shown on **Figure 2-6**. The geotechnical laboratory report is provided in **Appendix D**. The results samples are summarized in **Table 2-1** and discussed below.

- CCR: One geotechnical sample of CCR (gypsum) was collected as a grab sample near the NE Riser and the vertical hydraulic conductivity is 8.9×10^{-4} cm/s.
- UCU:
  - The 2021 sitewide geometric mean of vertical hydraulic conductivities of three samples collected from the UCU is 2.5×10^{-8} cm/s, which is consistent with historically reported values. Vertical hydraulic conductivity of a sample collected from SB289 near the GMF GSP is 1.1×10^{-8} cm/s.

   - Geotechnical tests conducted prior to 2017 indicated UCU vertical hydraulic conductivity values ranging from 1.3×10^{-8} to 5.0×10^{-7} cm/s, with a geometric mean of 1.0×10^{-7} cm/s (NRT, 2017).

- Uppermost Aquifer: One geotechnical sample of uppermost aquifer material was collected from G275D, near the GMF RP, with a vertical hydraulic conductivity of 1.6×10^{-4} cm/s. No uppermost aquifer samples collected near the GMF GSP were analyzed for vertical hydraulic conductivity.

- LCU:

   - The 2021 sitewide geometric mean of vertical hydraulic conductivities of three samples collected from the LCU is 1.8×10^{-7} cm/s. Vertical hydraulic conductivities from 2021 are consistent with those observed historically. No LCU samples collected near the GMF GSP were analyzed for vertical hydraulic conductivity.

   - Intermittently present within the LCU is the Mulberry Grove Member. Historic vertical hydraulic conductivities of the Mulberry Grove Member were measured as 1.6×10^{-6} and 1.9×10^{-6} cm/s.

   - Historic laboratory tests reported LCU hydraulic conductivity values ranging from 6.8×10^{-9} to 4.5×10^{-6} cm/s, with a geometric mean of 3.0×10^{-8} cm/s (NRT, 2017).

- **DA:** No laboratory vertical hydraulic conductivity tests were completed during 2021 on DA materials.

- **DCU:** No laboratory vertical hydraulic conductivity tests were completed during 2021 on DCU materials. Historic vertical hydraulic conductivity tests were performed on samples collected north and west of the GMF GSP. Vertical hydraulic conductivities of 6.8×10^{-9} and 4.5×10^{-6} cm/s were reported (NRT, 2017).

3.2.6 Horizontal Groundwater Gradients and Flow Velocity

Horizontal gradient and flow velocities are calculated using the flow path from R104 to G215 (**Table 3-4**). Horizontal gradients are from 0.003 to 0.005 ft/ft, equating to a minimum flow velocity of 0.05 feet/day (ft/day) and a maximum flow velocity of 0.11 ft/day. Average calculated flow velocity across the GMF GSP is 0.08 ft/day; however, the flow velocity is not representative of actual groundwater flow conditions since the uppermost aquifer is not present beneath the entire footprint of the GMF GSP.

3.2.7 Groundwater Classification

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

- Groundwater in the uppermost aquifer is located 10 feet or more below the land surface and

- Within a geologic material which is capable of a hydraulic conductivity of 1×10^{-4} cm/s or greater using a slug test (**Table 3-3**).

3.3 Surface Water Hydrology

3.3.1 Climate

Average climatic data was obtained from the National Oceanic and Atmospheric Administration National Centers for Environmental Information Climate Data Online. The data was recorded from 2001 to May 2021 from Hillsboro, Illinois, which is located approximately eight miles northwest of CPP. The data includes monthly maximum and monthly minimum daily temperatures (degrees Fahrenheit [°F]) and average rainfall for each month calculated from daily values collected over the 20-year period. The data is summarized in **Table B** below.

Table B: Average Monthly Temperature Extremes and Precipitation for Hillsboro, Illinois

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Maximum Temperature (°F)	38.4	42.8	54.8	67.2	77.2	86.1	88.4	86.0	82.3	69.5	54.2	44.9	66.3
Minimum Temperature (°F)	22.3	24.5	34.9	44.3	55.4	64.2	67.2	64.7	58.6	46.6	34.5	28.3	45.8
Precipitation (inches)	1.94	2.14	2.78	5.72	4.18	4.64	3.71	3.37	2.77	3.29	2.88	2.95	40.4
https://www.ncei.noaa.gov/orders/cdo/2651630.csv													

3.3.2 Surface Waters

The primary surface water body in the area, Coffeen Lake, is comprised of two lobes (identified as "Coffeen Lake" and "Unnamed Tributary" on **Figure 1-2**). The main body of Coffeen Lake is immediately adjacent to CPP on the west and south and the Unnamed Tributary borders CPP to the east.

In 1963, a 75 foot-high earthen dam was built across the McDavid Branch of East Fork Shoal Creek, creating Coffeen Lake for use as an artificial cooling lake for CPP. Coffeen Lake covers approximately 1,100 acres. The lake is part of the Shoal Creek Watershed (Hydrologic Unit Code [HUC] 07140203), which encompasses approximately 916 square miles. The average depth of Coffeen Lake is approximately 19 feet and the maximum depth is approximately 59 feet (Illinois Department of Nature Resources [IDNR], 2014). The average elevation of Coffeen Lake is approximately 591 feet NAVD88.

A USGS stream gage (USGS 05593900) for East Fork Shoal Creek near Coffeen, Illinois (latitude 39.1347 degrees north, longitude 89.3525 degrees west) is located approximately 6.5 miles northeast (upstream) of CPP. The gage datum elevation is 574.76 feet National Geodetic Vertical Datum of 1929 (NGVD29) (574.39 feet NAVD88). Daily gage heights for the period of January 1, 2018 through March 30, 2021 are shown below in **Figure A** (USGS, 2021a). The gage height of approximately 2 feet, representing approximate baseflow, occurs at an elevation of about 576.39 feet NAVD88.

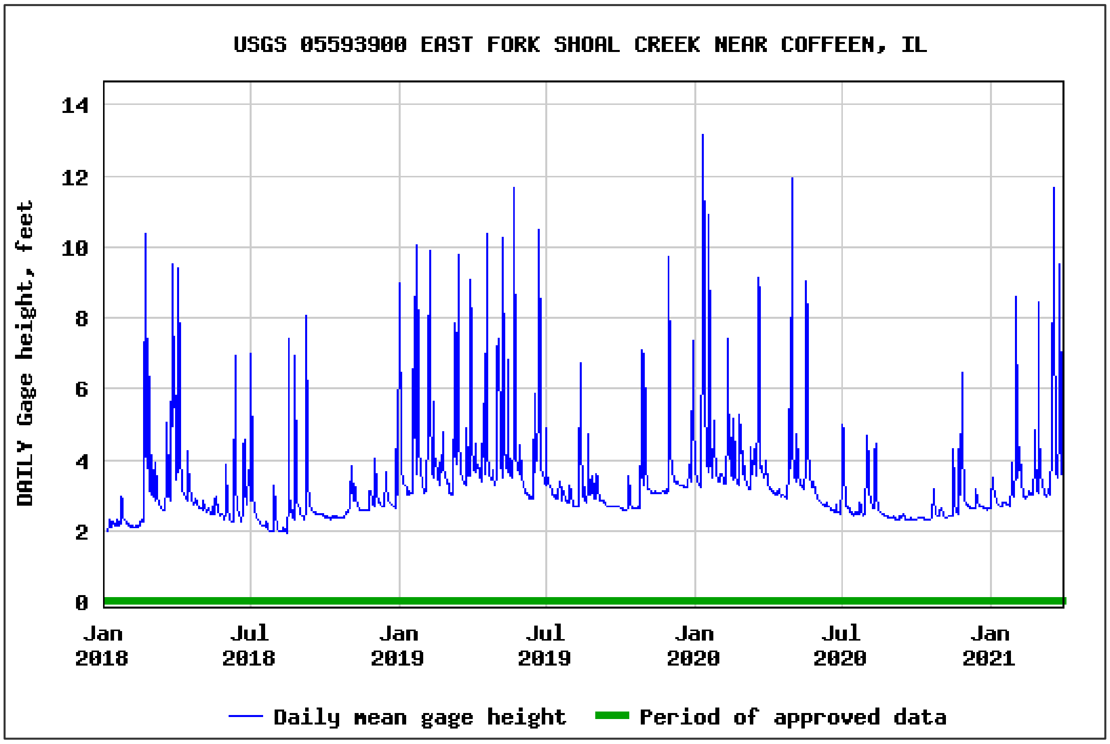

Figure A. Daily Gage Height of East Fork Shoal Creek Near Coffeen, Illinois (USGS 05593900)

Historically, Coffeen Lake received water discharge from both CPP and the Hillsboro Mine in additional to natural precipitation and drainage from East Fork Shoal Creek. At present, Coffeen Lake receives discharge from CPP under NPDES Permit No. IL 0000108. Additionally, an emergency spillway, located at the northeast corner of the GMF RP, discharges to the Unnamed Tributary, east of the CPP.

4. GROUNDWATER QUALITY

4.1 Summary of Groundwater Monitoring Activities

In accordance with the IEPA Water Pollution Control Permit No. 2020-EO-65043 the GMF GSP has been sampled since 2008. The monitoring program includes quarterly sampling and analysis of dissolved indicator parameters, and annual sampling for total concentrations. In 2015, additional well installation and groundwater sampling was initiated to meet the requirements of 40 C.F.R. § 257. Groundwater samples were collected and totals analyses were completed for Appendix III and Appendix IV parameters. In 2021, additional borings and wells were installed to comply with Part 845; wells were sampled for the parameters listed in 35 I.A.C. § 845.600. A review and summary of data from the annual IEPA groundwater sampling, 40 C.F.R. § 257, and Part 845 monitoring programs is included in the evaluation of groundwater quality at the Site.

4.1.1 40 C.F.R. § 257 Program Monitoring and Well Network

The 40 C.F.R. § 257 monitoring well network consists of seven monitoring wells screened in the uppermost aquifer, including two background monitoring wells (G200 and R201) and five compliance wells (G206, G209, G212, G215, and G218). The boring logs, well construction forms, and other related monitoring well forms for the 40 C.F.R. § 257 monitoring well network are available in the Operating Records as required by 40 C.F.R. § 257.91 for the CCR Unit, and included in **Appendix C** of this HCR. The well locations are shown on **Figure 3-1**.

40 C.F.R. § 257 monitoring well network groundwater samples are collected and analyzed for the laboratory parameters from Appendix III and Appendix IV of 40 C.F.R. § 257 as summarized in **Table C** below.

Table C. 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	TDS	Fluoride	
Appendix IV Parameters (Total)			
Antimony	Beryllium	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Chromium	Lithium	Thallium
Radium 226 and 228 combined			

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

4.1.2 IEPA Groundwater Monitoring

Routine quarterly groundwater monitoring is completed for a monitoring well network that includes wells for both the GMF GSP and GMF RP. The IEPA monitoring well network consists of thirty-one monitoring wells screened in the uppermost aquifer (G102, G103, R104, G105, G106, G200, G205, G206, G207, G208, G209, G210, G211, G212, G213, G214, G215, G216, G217, G218, G270, G271, G272, G273, G274, G275, G276, G277, G279, G280 and R201) in accordance with IEPA Water Pollution Control Permit No. 2020-EO-65043. The boring logs, well construction forms for the IEPA monitoring well network are included in **Appendix C** of this HCR. The IEPA monitoring well network well locations are shown on **Figure 3-1**. Quarterly and annual samples are analyzed for the following field and laboratory parameters listed in **Table D** below.

Table D. IEPA Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH		Elevation of Groundwater Surface	Specific Conductance
Depth to Water (below measuring point, below ground surface)		Elevation of Measuring Point	Temperature
Metals (Dissolved)			
Antimony	Cadmium	Manganese	Thallium
Arsenic	Chromium	Mercury	Vanadium
Aluminum	Cobalt	Molybdenum	Zinc
Barium	Copper	Nickel	
Beryllium	Iron	Selenium	
Boron	Lead	Silver	
Inorganics (Dissolved)			
Chloride	Fluoride	TDS	
Cyanide	Sulfate		
Other (Total)			
Phenols			

Note: Parameters are monitored as dissolved quarterly, and as dissolved and total annually.
[1]Dissolved oxygen, oxidation/reduction potential, and turbidity were recorded during sample collection.

4.1.3 Part 845 Well Installation and Groundwater Monitoring

In 2021, one additional monitoring well (G206D), one source sample collection point (NE Riser), and one soil boring (SB289) were installed around the GMF GSP 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). The boring logs, well construction forms, and other related monitoring well forms for the monitoring well network are included in **Appendix C** of this HCR.

Prospective Part 845 monitoring wells were sampled for eight rounds from February to August 2021 and the results were assessed for selection of the GMF GSP Part 845 monitoring well network presented in the GMP. Samples were collected from the new monitoring points and analyzed for 35 I.A.C. § 845.600 parameters summarized in **Table E** below. Part 845 groundwater monitoring results are discussed below in **Section 4.2**.

Table E. Part 845 Groundwater Monitoring Program Parameters

Field Parameters [1]			
pH	Groundwater Elevation	Turbidity	
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 GMF GSP 40 C.F.R. § 257 network monitoring wells from 2015 to 2021 were supplemented with sampling of additional locations in 2021 and 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). Based on this data set there were no concentrations of antimony, barium, boron, cadmium, calcium, chloride, fluoride, lithium, molybdenum, radium 226 and 228 combined, or selenium greater than the GWPSs. 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]. A summary of groundwater analytical data is provided in **Table 4-1**. Field parameters are included in **Table 4-2** and groundwater elevations are provided in **Appendix E**.

4.2.1 Arsenic

Arsenic has been detected intermittently at concentrations greater than the GWPS (0.010 milligrams per liter [mg/L]) at one downgradient uppermost aquifer well (G215). Arsenic was also detected above the GWPS in background uppermost aquifer well G200 during one event in October 2015. Arsenic concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.001) to 0.11 mg/L. Arsenic concentrations in the background uppermost aquifer well noted above ranged from non-detect to 0.038 mg/L mg/L.

[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.

The DA monitoring well did not have concentrations greater than the arsenic GWPS.

4.2.2 Beryllium

Beryllium was detected at concentrations greater than the GWPS (0.004 mg/L) in downgradient uppermost aquifer well G209 during one event in October 2015. Beryllium was also detected above the GWPS in background uppermost aquifer well R201 during one event in February 2016. Beryllium concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.001) to 0.0042 mg/L. Beryllium concentrations in the background uppermost aquifer well noted above ranged from non-detect to 0.0067 mg/L.

The DA monitoring well did not have concentrations greater than the beryllium GWPS.

4.2.3 Cobalt

Cobalt was detected infrequently at concentrations greater than the GWPS (0.006 mg/L) in three downgradient uppermost aquifer wells (G209, G213, and G217). Cobalt has also been detected intermittently above the GWPS in background uppermost aquifer well G200. Cobalt concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.002) to 0.016 mg/L. Cobalt concentrations in the background uppermost aquifer well noted above ranged from non-detect to 0.053 mg/L.

The DA monitoring well did not have concentrations greater than the cobalt GWPS.

4.2.4 Lead

Lead was detected infrequently at concentrations greater than the GWPS (0.0075 mg/L) in two downgradient uppermost aquifer wells (G209 and G213). Lead has been detected in upgradient uppermost aquifer well G102. Lead has also been detected intermittently above the GWPS in background uppermost aquifer well G200. Lead concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.001) to 0.029 mg/L. Lead concentrations in the upgradient uppermost aquifer well noted above ranged from non-detect to 0.0097 mg/L. Lead concentrations in the background uppermost aquifer well noted above ranged from non-detect (at a reporting limit of 0.0005) to 0.082 mg/L.

The DA monitoring well did not have concentrations greater than the lead GWPS.

4.2.5 pH

During one event in June 2016, pH was detected at measurements less than the lower GWPS (6.5 Standard Units [SU]) at downgradient uppermost aquifer well G206. Measurements of pH have ranged from 6.2 to 7.5 SU at this well.

None of the uppermost aquifer wells had measurements greater than the upper pH GWPS.

The DA monitoring well did not have measurements less than the lower pH GWPS or higher than the upper pH GWPS.

4.2.6 Sulfate

Sulfate is a primary indicator parameter for CCR leachate impacts on groundwater quality. Sulfate has been detected infrequently at concentrations greater than the GWPS (400 mg/L) at downgradient uppermost aquifer well G215. Sulfate concentrations at G215 ranged from 56 to 490 mg/L, with a median concentration of 120 mg/L.

Sulfate has been detected occasionally at concentrations greater than the GWPS at downgradient DA well G206D. Sulfate concentrations at G206D ranged from 250 to 600 mg/L, with a median concentration of 510 mg/L.

4.2.7 Thallium

Thallium was detected above the GWPS (0.002 mg/L) in downgradient uppermost aquifer well G209 during one event in October 2015. Thallium concentrations in the downgradient uppermost aquifer wells listed above ranged from non-detect (at a reporting limit of 0.001) to 0.0035 mg/L.

The DA monitoring well did not have concentrations greater than the thallium GWPS.

4.2.8 Total Dissolved Solids

During 2021 groundwater monitoring events, TDS was detected above the GWPS (1,200 mg/L) in downgradient DA well G206D during two events in March and April. Concentrations at G206D range from 1,200 to 1,300 mg/L, with a median concentration of 1,250 mg/L.

None of the uppermost aquifer wells had concentrations greater than the TDS GWPS.

5. EVALUATION OF POTENTIAL RECEPTORS

5.1 Water Well Survey

A water well survey was conducted for a 1,000-meter radius around the GMF GSP. Based on State of Illinois records obtained from the ISGS Illinois Water and Related Wells (ILWATER) Map[1] there are sixteen Illinois water wells located within 1,000 meters of the GMF GSP. These included eleven monitoring wells, four farm/domestic wells, and one industrial use well. A map of wells in the vicinity of the GMF GSP is presented in **Appendix B**.

5.2 Surface Water

A search was performed utilizing the United States Fish and Wildlife Service (USFWS) Wetlands Mapper[2] and the USGS National Map [3] for surface water bodies within 1,000 meters of the GMF GSP. The predominant surface water body in the region is Coffeen Lake and associated tributaries. Coffeen Lake consists of two lobes which are located approximately 1,300 feet west, 3,700 feet south, and 150 feet east and downgradient from the GMF GSP. A USGS stream gage (USGS 05593900) for the East Fork Shoal River near Coffeen, Illinois is located 6.5 miles north and east (upstream) of CPP.

Additional surface waters indicated in the USFWS Wetland Mapper and USGS National Map include several man-made freshwater ponds ranging from a roughly 0.6 acre freshwater forested/shrub wetland located northwest of the GMF GSP, several man-made freshwater ponds ranging from 0.1 to 0.8 acres, and one emergent wetland approximately 1.6 acres in size to the southeast of the GMF GSP. A map of wetlands and surface waters in the vicinity of the GMF GSP is presented in **Appendix B**.

The USGS National Map places CPP within the Shoal Creek watershed (HUC 07140203), which is part of the Middle Kaskaskia River Watershed (USGS, 2021b).

A Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Montgomery County, Illinois (Map No. 170992 0009 A, effective: January 9, 1981) is available in **Appendix G**. The GMF GSP does not occur within the special flood hazard zones identified on the 1981 FEMA map. The flood hazard areas shown on the map are defined as those areas subject to inundation by the 1 percent annual chance flood (*i.e.,* 100-year flood), also known as the base flood, that has a 1 percent chance of being equaled or exceeded in any given year.

5.3 Nature Preserves, Historic Sites, Endangered/Threatened Species

A comprehensive search of the IDNR Natural Heritage Database[4] for natural areas and protected areas within 1,000 meters of the GMF GSP was performed. No natural or protected areas within the IDNR database were identified within 1,000 meters of the GMF GSP. A list of sites identified at the county level is found in **Appendix B**.

[1] ISGS ILWATER Map: https://prairieresearch.maps.arcgis.com/apps/webappviewer/index.html?id=e06b64ae0c814ef3a4e43a191cb57f87
[2] USFWS Wetlands Mapper: https://www.fws.gov/wetlands/data/mapper.html
[3] USGS National Map: https://apps.nationalmap.gov/viewer/
[4] 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[5] lists eleven threatened and endangered species as located within Montgomery County, including six endangered and five threatened species. Habitats for endangered or threatened species are identified at the county level only.

Additionally, a search of the IDNR Historic Preservation Division[6] database for historic sites in the vicinity of the Site yielded six results at the county level located within Montgomery County. Four of these sites were identified from the Illinois Natural Areas Inventory and two were identified from the Illinois Nature Preserves list. None of these sites fall within 1,000 meters of the GMF GSP. The Illinois State Archaeological Survey (ISAS)[7] databases that do not require credentials to access were also searched and yielded no results within 1,000 meters of the GMF GSP.

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

6. CONCLUSIONS

Based on extensive site investigation and monitoring, the GMF GSP has been characterized and a detailed site conceptual model has been developed. Results of these hydrogeologic studies were summarized and updated to include geologic, hydrogeologic, and groundwater quality data collected with a focus on the GMF GSP (Part 845 regulated CCR Unit and subject of 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 GMF (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 GMF GSP collected from 2015 to present was compared to the Part 845 GWPS.

The results of the hydrogeologic and groundwater quality evaluation are:

- There are eight principal unlithified units above the bedrock in the vicinity of the GMF GSP, these include the following in descending order:
  - **CCR**: CCR consisting primarily of gypsum scrubber waste is present within the GMF GSP and non-CCR fill material consisting of silt, clay, and sand comprises the berms surrounding the GMF GSP.
  - **Loess Unit**: Clays and silts, including undifferentiated Roxana Silt and Peoria Silt with thicknesses ranging from 1 to 16 feet, where present. Construction of the GMF GSP required the excavation and removal of this layer within the unit footprint.
  - **Hagarstown Member**: The Hagarstown Member (consisting of gravelly clay till and sandy materials in contact with the Vandalia Member (also referred to as Hagarstown Beds) which has been subdivided into two units: the first unit consists of the gravelly clay till and the second unit consists of sandy material overlying the Vandalia Member. The Upper Hagarstown Member is up to 6 feet thick, while the sandy portions, where present, are generally less than 3 feet thick. During construction of the GMF GSP, the Hagarstown Member was excavated to facilitate construction and eliminate groundwater flow into excavations.
  - **Vandalia Member**: Sandy, silt till, or clay till that is generally greater than 15 feet thick.
  - **Mulberry Grove Member**: Gray silt and sandy silt/clay unit found between the Vandalia Member and the Smithboro Member. Generally thin and not laterally continuous across the Site.
  - **Smithboro Member**: Thick, gray compacted silty clay diamicton.
  - **Yarmouth Soil**: Sand and sandy silt/clay, which include accretionary deposits of fine sediment and organic materials, typically less than 5 feet thick and not laterally continuous.
  - **Lierle Clay Member**: Clay and silt with some sand which is the upper portion of the Banner Formation. No borings advanced on site penetrated the full thickness of the Lierle Clay.
  - **Bedrock**: Was not encountered in any deep borings advanced at the GMF GSP.

- Unlithified materials, described above, in the vicinity of the CPP were categorized into hydrostratigraphic units for this HCR. In addition to the CCR Unit, the hydrostratigraphic units occur in the following order (from surface downward) and include:
  - **UCU**: Composed of the Loess Unit and clayey portions of the Hagarstown Formation which are classified as silts to clayey silts and gravelly clay below the surficial soil. The UCU has been eroded east of the GMF GSP, near the Unnamed Tributary.
  - **Uppermost Aquifer**: The uppermost aquifer is the Hagarstown Member which is classified as primarily sandy to gravelly silts and clays with thin beds of sands. Similar to the Loess Unit, the Hagarstown is also absent in some locations near the Unnamed Tributary.
  - **LCU**: Comprised of the Vandalia Member, Mulberry Grove Member, and Smithboro Member. These units include a sandy to silty till with thin, discontinuous sand lenses, a discontinuous and limited extent sandy silt which has infilled prior erosional features, and silty to clayey diamicton, respectively.
  - **DA**: Sand and sandy silt/clay units of the Yarmouth Soil, which include accretionary deposits of fine sediment and organic materials, typically less than 5 feet thick and discontinuous across the Site.
  - **DCU**: Comprised of the Banner Formation, generally consists of clays, silts, and sands. The Lierle Clay Member is the upper layer of the Banner Formation which was encountered at the Site.
- The elevations of water within the GMF GSP are greater than the surrounding areas; however, the GMF GSP is lined and water elevation within the GMF GSP does not vary coincidentally with surrounding groundwater elevations.
- Groundwater flow within the uppermost aquifer is divided towards the two lobes of Coffeen Lake. The groundwater divide runs approximately through the center of the CPP property, with groundwater east of the divide flowing east to southeast towards the Unnamed Tributary or the eastern lobe and groundwater west of the divide flowing west to southwest towards the western lobe. Groundwater flows east to southeast across the GMF GSP.
- Vertical gradients measured near the site indicate downward flow from the uppermost aquifer to the LCU and DA. The DA has been identified as a PMP due to the presence of downward gradients and the relatively higher hydraulic conductivities measured in the DA.
- As determined by the detailed geologic information provided for the GMF GSP, and the hydrogeologic and groundwater quality data, groundwater within the uppermost aquifer at the GMF GSP is classified as Class I – Potable Resource Groundwater.
- Potential exceedances of 35 I.A.C. § 845.600 GWPSs were detected in monitoring wells downgradient of the GMF GSP in the various hydrostratigraphic units as follows:
  - Arsenic in downgradient uppermost aquifer well G215. Arsenic was also detected in background uppermost aquifer well G200.
  - Beryllium in downgradient uppermost aquifer well G209. Beryllium was also detected in background uppermost aquifer well R201.
  - Cobalt in downgradient uppermost aquifer wells G209, G213, and G217. Cobalt was also detected in background uppermost aquifer well G200.

- Lead in downgradient uppermost aquifer wells G209 and G213. Lead was also detected in upgradient uppermost aquifer well G102 and in background uppermost aquifer well G200.
- pH (lower limit) in downgradient uppermost aquifer well G206.
- Sulfate in downgradient uppermost aquifer well G215 and in downgradient DA well G206D.
- Thallium in downgradient uppermost aquifer well G209.
- TDS in downgradient DA well G206D.

Groundwater 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 GMP.

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

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TABLES

TABLE 2-1. GEOTECHNICAL DATA SUMMARY
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample ID	Field Location ID	Top of Sample (ft bgs)	Bottom of Sample (ft bgs)	Moisture Content (%)	Dry Density (pcf)	Specific Gravity	Calculated Porosity [1] (%)	Vertical Hydraulic Conductivity (cm/s)	LL	PL	PI	USCS	Gravel (%)	Sand (%)	Fines (%)
Loess Unit															
G206D/Comp 1	G206D	4	16	20.5	105.3	2.60	35.1	--	42	18	24	CL	0	20	80
SB289/Comp 1	SB289	4	16	21.2	103.4	2.56	35.3	--	40	18	22	CL	0	20	80
SB289, ST5	SB289	8	10	20.2	105.9	--	--	1.1E-08	--	--	--	CL/CH	--	--	--
Hagarstown Member															
G206D/Comp 2	G206D	18.8	20	10.1	117.4	2.56	26.5	--	22	15	7	SC	0	57	43
SB289/Comp 2	SB289	18	22	16.6	112.6	2.60	30.6	--	23	14	9	CL	0	46	54
Vandalia Member															
G206D/Comp 3	G206D	20	31.8	8.3	131.4	2.56	17.7	--	21	13	8	CL	0	46	54
SB289/Comp 3	SB289	22	32.9	8.9	132.7	2.64	19.4	--	19	12	7	ML	0	47	53
Smithboro Member															
G206D/Comp 4	G206D	34	52	13.4	120.6	2.62	26.2	--	29	14	15	CL	0	29	72
SB289/Comp 4	SB289	34	52	14.9	116.6	2.61	28.4	--	31	15	16	CL	0	26	74
Yarmouth Soil															
G206D/Comp 5	G206D	54	58	14.9	--	2.75	--	--	18	12	6	SM	0	78	22
Lierle Clay															
SB289/Comp 5	SB289	54	60	25	98.4	2.63	40.0	--	48	18	30	CL	0	21	79
CCR															
Gypsum	NE Riser	grab	grab	25.3	78.0	--	--	8.9E-04	NP	NP	NP	Gypsum	0	22	78

[O:KLT, QC: FPO; U: FPO, QC:KLT 8/9/21; U:KLT 8/13/21, C:EDP 8/30/21]

Notes:
[1] Porosity calculated as relationship of bulk density (p_b) to particle density (p_d) ($n = 100[1- (p_b/p_d)]$)
-- = not analyzed
% = Percent
bgs = below ground surface
cm/s = centimeters per second
ft = foot/feet
GMF = Gypsum Management Facility
LL = Liquid limit
NP = Non Plastic
pcf = pounds per cubic foot
PI = Plasticity Index
PL = Plastic Limit

USCS = Unified Soil Classification System
CH = Fat Clay
CL = Lean Clay
ML = Silt
SC = Clayey Sand
SM = Silty Sand

TABLE 2-2. CCR ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)	Calcium (mg/kg)	Chloride (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Fluoride (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Sulfate (mg/kg)	Thallium (mg/kg)
GSP Gypsum 1	0-0	01/29/2021	<1.5	<0.51	6.6	<0.51	13	<0.51	--	25	<2	<1	13	0.67	<2.6	<0.1	1.2	<0.51	19000	<0.51
GSP Gypsum 2	0-0	03/09/2021	<3	<1	13	<1	<10	<1	130000	260	<4	<2	7.6	<1	<5	--	<1	<1	15000	<1

Notes:
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method.
-- = data not available
BGS = below ground surface
CCR = coal combustion residuals
ft = feet
mg/kg = milligrams per kilogram

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TABLE 2-3. LEACHATE ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
NE Riser	03/31/2021	<0.003	0.0021	0.046	<0.001	36	0.002	490	1300	<0.004	0.0048	31.9	<0.001	0.16	<0.0002	0.036	7.2	1.41	0.63	10000	0.0016
NE Riser	04/21/2021	<0.003	0.0023	0.041	<0.001	44	0.0022	530	1500	<0.004	0.0064	31.4	<0.001	0.16	<0.0002	0.04	7.3	0.0394	0.61	10000	0.002
NE Riser	05/05/2021	<0.003	0.0024	0.041	<0.001	45	0.0021	530	1600	<0.004	0.0062	31.6	<0.001	0.17	<0.0002	0.039	7.2	0.137	0.55	12000	0.0025
NE Riser	05/18/2021	<0.003	0.0027	0.041	<0.001	45	0.0022	550	1300	<0.004	0.0062	32.5	<0.001	0.18	<0.0002	0.04	7.2	0.609	0.56	12000	0.0019
NE Riser	06/14/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.412	--	--	--
NE Riser	07/27/2021	<0.003	0.0022	0.042	<0.001	41	0.0022	540	1400	<0.004	0.0064	1.66	<0.001	0.18	0.00024	0.041	7.1	0.363	0.52	11000	0.0023

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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)	Chloride (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Fluoride (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Sulfate (mg/kg)	Thallium (mg/kg)
G206D	Fill/Loess Unit	4-16	01/25/2021	<3.6	9.1	65	<1.2	<12	<1.2	46	10	7.7	4.7	4.9	6.8	<0.24	<1.2	<1.2	300	<1.2
G206D	Hagarstown Member	18.8-20	01/25/2021	<3.6	3.1	110	<1.2	<12	<1.2	14	6.2	3	<3	4.8	<6.1	<0.24	<1.2	<1.2	26	<1.2
G206D	Vandalia Till Member	20-31.8	01/25/2021	<3.3	1.3	33	<1.1	<11	<1.1	<11	9.4	4	2.8	5.9	13	<0.22	<1.1	<1.1	<11	<1.1
G206D	Smithboro Till Member	34-52	01/25/2021	<3.6	3.8	89	<1.2	<12	<1.2	<12	11	5.3	3.6	8	11	<0.24	1.4	<1.2	<12	<1.2
G206D	Yarmouth Soil/Lierle Clay	54-58	01/25/2021	<3.6	1.9	160	<1.2	<12	<1.2	<12	11	6.4	7.6	12	8.4	<0.24	<1.2	<1.2	<12	<1.2
SB289	Loess Unit	4-16	01/26/2021	<2.8	<0.95	30	<0.95	<9.5	<0.95	14	4.9	<1.9	3.9	3.8	<4.7	<0.19	<0.95	<0.95	23	<0.95
SB289	Hagarstown Member	18-22	01/26/2021	<2.8	1.3	29	<0.95	<9.5	<0.95	17	6.7	6.8	0.47	5.4	6.8	<0.19	<0.95	<0.95	61	<0.95
SB289	Vandalia Member	22-32.9	01/27/2021	<3	1.8	12	<1	<10	<1	<10	4.8	2.5	<2.5	2.8	5.9	<0.2	<1	<1	16	<1
SB289	Smithboro Member	34-52	01/27/2021	<3	2.6	34	<1	<10	<1	<10	7.6	3.5	3.4	6.3	8.9	<0.2	<1	<1	<10	<1
SB289	Lierle Clay	54-60	01/27/2021	<3	2.8	110	<1	<10	<1	<10	11	4.7	5.7	13	7.1	<0.2	<1	<1	<10	<1

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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G045D	LCU	08/17/2016	623.81	623.81	Top of PVC	620.94	31.88	41.52	589.06	579.42	41.92	578.90	9.6	2	39.064349	-89.396281
G046D	LCU	08/19/2017	625.24	625.24	Top of PVC	621.91	41.61	51.26	580.30	570.65	51.65	569.90	9.7	2	39.060305	-89.398524
G101	UA	02/02/2010	--	627.60	Top of Disk	625.27	15.68	20.32	609.59	604.95	20.89	603.40	4.6	2	39.071386	-89.400107
G102	UA	04/28/2006	--	629.04	Top of Disk	626.18	12.02	16.78	614.16	609.40	17.15	609.00	4.8	2	39.071387	-89.398991
G103	UA	02/15/2010	--	633.80	Top of Disk	627.94	15.88	20.67	612.06	607.27	21.09	606.90	4.8	2	39.070412	-89.399107
G104	UA	02/15/2010	--	632.94	Top of Disk	627.96	14.91	19.61	613.05	608.35	20.08	605.80	4.7	2	39.069451	-89.399104
G105	UA	02/16/2010	--	632.08	Top of Disk	626.86	16.11	20.90	610.75	605.96	21.37	604.40	4.8	2	39.068491	-89.3991
G106	UA	02/16/2010	--	631.15	Top of Disk	625.96	14.37	18.96	611.59	607.00	19.44	605.50	4.6	2	39.06753	-89.399097
G107	UA	02/17/2010	630.22	630.22	Top of Disk	628.20	13.87	18.50	614.33	609.70	19.00	607.50	4.6	2	39.067106	-89.399646
G108	UA	02/12/2010	--	630.22	Top of Disk	625.58	16.82	21.50	608.76	604.08	22.00	603.60	4.7	2	39.066984	-89.400035
G109	UA	02/11/2010	--	629.76	Top of Disk	624.79	15.39	19.93	609.40	604.86	20.50	604.30	4.5	2	39.067045	-89.400423
G110	UA	02/11/2010	--	629.65	Top of Disk	624.81	15.05	19.59	609.76	605.22	20.16	604.70	4.5	2	39.067172	-89.400704
G111	UA	02/11/2010	--	629.90	Top of Disk	625.28	14.61	19.15	610.67	606.13	19.72	605.60	4.5	2	39.067292	-89.40097
G119	UA	02/09/2010	--	631.55	Top of Disk	626.57	17.29	21.83	609.28	604.74	22.38	604.20	4.5	2	39.068986	-89.401213
G120	UA	02/08/2010	--	631.87	Top of Disk	627.21	15.10	19.62	612.11	607.59	20.21	605.10	4.5	2	39.069479	-89.401214
G121	UA	02/04/2010	--	632.83	Top of Disk	627.94	16.79	21.47	611.15	606.47	21.95	603.80	4.7	2	39.069781	-89.401216
G122	UA	02/04/2010	--	632.69	Top of Disk	628.05	16.51	21.05	611.54	607.00	21.66	606.20	4.5	2	39.070098	-89.401218
G123	UA	02/04/2010	--	632.96	Top of Disk	628.12	20.94	25.46	607.18	602.66	26.07	602.10	4.5	2	39.070399	-89.401219
G124	UA	02/03/2010	--	633.39	Top of Disk	628.70	15.98	20.51	612.72	608.19	21.06	606.70	4.5	2	39.070715	-89.40122
G125	UA	02/03/2010	--	633.51	Top of Disk	628.85	17.03	21.56	611.82	607.29	22.04	606.80	4.5	2	39.071003	-89.401221
G126	UA	02/10/2010	--	625.39	Top of Disk	622.96	12.89	17.43	610.07	605.53	18.00	605.00	4.5	2	39.067304	-89.401274
G151	UA	12/19/2011	--	625.93	Top of Disk	622.82	15.34	19.84	607.48	602.98	20.46	602.40	4.5	2	39.0672	-89.40159
G152	UA	12/20/2011	--	626.52	Top of Disk	623.06	13.59	18.09	609.47	604.97	18.57	604.50	4.5	2	39.066275	-89.401289

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G153	UA	12/15/2011	626.35	626.40	Top of Disk	623.23	15.90	20.34	607.33	602.89	20.80	602.50	4.4	2	39.065857	-89.402567
G154	UA	12/16/2011	--	626.35	Top of Disk	623.52	14.26	18.76	609.26	604.76	19.10	603.50	4.5	2	39.067089	-89.403574
G155	UA	12/19/2011	--	625.86	Top of Disk	622.89	15.09	19.58	607.80	603.31	23.23	599.70	4.5	2	39.067493	-89.402659
G200	UA	02/25/2008	--	625.94	Top of Disk	623.27	12.19	16.98	611.08	606.29	17.36	605.30	4.8	2	39.075139	-89.395009
G201	UA	02/25/2008	627.15	627.15	Top of Riser	624.19	13.01	17.80	611.18	606.39	18.15	606.00	4.8	2	39.075141	-89.397829
G205	UA	02/21/2008	--	624.34	Top of Disk	622.10	10.04	14.53	612.06	607.57	15.07	606.10	4.5	2	39.068596	-89.394147
G206	UA	10/14/2010	--	632.82	Top of Disk	630.53	17.51	21.92	613.02	608.61	22.42	606.50	4.4	2	39.067399	-89.398548
G206D	DA	01/25/2021	634.14	634.14	Top of PVC	631.41	49.20	59.00	582.21	572.41	59.39	571.41	9.8	2	39.067428	-89.398493
G207	UA	10/08/2010	--	633.21	Top of Disk	630.61	18.24	22.77	612.37	607.84	23.30	606.60	4.5	2	39.067568	-89.397952
G208	UA	10/07/2010	--	633.16	Top of Disk	630.57	17.53	22.06	613.04	608.51	22.60	606.60	4.5	2	39.067743	-89.397402
G209	UA	10/07/2010	--	632.91	Top of Disk	630.57	17.74	22.28	612.83	608.29	22.81	606.60	4.5	2	39.067923	-89.39685
G210	UA	10/06/2010	--	632.99	Top of Disk	630.48	19.39	23.93	611.09	606.55	24.46	605.50	4.5	2	39.068088	-89.396322
G211	UA	10/11/2010	--	632.64	Top of Disk	630.31	17.34	21.88	612.97	608.43	22.41	606.30	4.5	2	39.068263	-89.395792
G212	UA	10/11/2010	--	632.89	Top of Disk	630.59	16.74	21.29	613.85	609.30	21.81	606.60	4.6	2	39.06843	-89.395318
G213	UA	10/12/2010	--	632.81	Top of Disk	630.34	16.75	21.29	613.59	609.05	21.82	606.30	4.5	2	39.068585	-89.394822
G214	UA	10/14/2010	--	632.85	Top of Disk	630.39	17.75	22.14	612.64	608.25	22.65	606.40	4.4	2	39.068919	-89.393982
G215	UA	10/13/2010	--	633.06	Top of Disk	630.48	19.41	23.80	611.07	606.68	24.31	606.20	4.4	2	39.069309	-89.39394
G216	UA	10/13/2010	--	632.76	Top of Disk	630.28	20.04	24.42	610.24	605.86	24.93	604.30	4.4	2	39.069765	-89.393946
G217	UA	10/12/2010	--	633.10	Top of Disk	630.67	20.49	24.88	610.18	605.79	25.38	604.70	4.4	2	39.07034	-89.393959
G218	UA	10/12/2010	--	633.11	Top of Disk	630.64	20.33	24.77	610.31	605.87	25.27	604.60	4.4	2	39.070876	-89.393956
G270	UA	02/26/2008	--	625.86	Top of Disk	623.73	13.13	17.92	610.60	605.81	18.27	605.50	4.8	2	39.066564	-89.397403
G271	UA	09/10/2009	--	625.57	Top of Disk	622.89	9.96	14.31	612.93	608.58	14.79	606.90	4.4	2	39.065007	-89.395587
G272	UA	09/10/2009	--	623.81	Top of Disk	620.72	9.11	13.98	611.61	606.74	14.32	606.40	4.9	2	39.064989	-89.394785

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G273	UA	09/10/2009	--	623.02	Top of Disk	620.17	9.08	14.56	611.09	605.61	15.10	604.20	5.5	2	39.064985	-89.393973
G274	UA	09/16/2009	--	624.04	Top of Disk	621.67	12.90	17.67	608.77	604.00	18.06	603.60	4.8	2	39.064991	-89.393198
G275	UA	09/16/2009	--	618.26	Top of Disk	616.14	8.22	12.62	607.92	603.52	13.19	603.00	4.4	2	39.065151	-89.392561
G275D	DA	01/14/2021	620.31	620.31	Top of PVC	617.52	49.76	59.55	567.76	557.97	59.89	517.80	9.8	2	39.065121	-89.392595
G276	UA	09/16/2009	--	632.00	Top of Disk	629.14	22.41	27.22	606.73	601.92	27.65	601.10	4.8	2	39.065534	-89.392617
G277	UA	09/14/2009	--	623.08	Top of Disk	620.79	14.29	18.77	606.50	602.02	19.24	600.80	4.5	2	39.065927	-89.392572
G278	UA	09/11/2009	631.19	631.17	Top of Disk	628.85	18.93	23.70	609.92	605.15	24.06	604.80	4.8	2	39.066737	-89.393161
G279	UA	09/10/2009	--	632.04	Top of Disk	629.19	22.40	26.79	606.79	602.40	27.30	601.20	4.4	2	39.067156	-89.392998
G280	UA	02/26/2008	625.35	625.35	Top of Riser	623.11	12.79	17.63	610.32	605.48	17.98	605.10	4.8	2	39.067216	-89.394992
G281	UA	09/08/2015	--	626.36	Top of Disk	623.82	15.51	20.16	608.31	603.66	20.30	603.50	4.7	2	39.065405	-89.399322
G283	LCU	01/14/2021	610.75	610.75	Top of PVC	608.30	8.39	18.17	599.91	590.13	18.36	589.90	9.8	2	39.064645	-89.392119
G284	UA	02/03/2021	618.42	618.42	Top of PVC	615.33	8.08	12.85	607.25	602.48	13.23	601.30	4.8	2	39.065487	-89.390631
G285	LCU	01/25/2021	613.52	613.52	Top of PVC	610.54	13.68	23.45	596.86	587.09	23.83	584.50	9.8	2	39.066513	-89.391474
G286	UA	01/18/2021	613.13	613.13	Top of PVC	609.97	3.37	8.16	606.60	601.81	8.50	600.00	4.8	2	39.067277	-89.391883
G287	UA	01/20/2021	617.45	617.45	Top of PVC	614.34	5.43	10.25	608.91	604.09	10.59	602.50	4.8	2	39.068297	-89.392388
G288	UA	01/19/2021	620.07	620.07	Top of PVC	617.08	7.59	12.26	609.49	604.82	12.75	603.10	4.7	2	39.067834	-89.390082
G301	UA	09/04/2015	--	622.65	Top of Disk	620.88	11.31	15.96	608.96	604.31	16.21	604.10	4.7	2	39.05951	-89.395415
G302	UA	09/04/2015	--	620.04	Top of Disk	618.52	13.21	17.86	604.74	600.09	18.39	599.60	4.7	2	39.059544	-89.393192
G303	UA	08/26/2010	--	622.02	Top of Disk	619.33	10.00	20.00	609.07	599.07	20.40	598.70	10	2	39.057144	-89.391721
G304	UA	08/26/2010	--	626.72	Top of Disk	623.32	10.00	20.00	613.32	603.32	20.40	602.90	10	2	39.057205	-89.395663
G305	UA	05/03/2016	625.67	625.67	Top of PVC	623.23	13.44	18.27	609.10	604.27	18.50	604.10	4.8	2	39.056558	-89.396798
G306	UA	05/03/2016	625.91	625.91	Top of PVC	623.57	13.07	17.68	609.77	605.16	17.90	604.80	4.6	2	39.056494	-89.393556
G307	UA	07/27/2016	624.60	624.60	Top of PVC	624.73	12.96	17.80	609.12	604.28	18.22	603.90	4.8	2	39.057214	-89.395545

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G307D	LCU	01/19/2021	624.88	624.88	Top of PVC	622.51	48.98	58.75	573.53	563.76	59.60	562.50	9.8	2	39.05721	-89.39552
G308	UA	01/18/2021	624.59	624.59	Top of PVC	621.59	10.10	14.89	611.49	606.70	15.24	605.80	4.8	2	39.057379	-89.397134
G309	UA	01/21/2021	625.88	625.88	Top of PVC	622.77	12.97	17.75	609.80	605.02	18.10	604.70	4.8	2	39.058508	-89.397243
G310	UA	02/09/2021	622.87	622.87	Top of PVC	619.89	10.24	15.03	609.65	604.86	15.38	604.00	4.8	2	39.059532	-89.396907
G311	UA	01/13/2021	621.04	621.04	Top of PVC	618.32	9.27	14.04	609.05	604.28	14.40	603.90	4.8	2	39.059513	-89.394363
G311D	LCU	01/12/2021	621.24	621.24	Top of PVC	618.39	50.16	60.10	568.23	558.29	60.58	557.80	9.9	2	39.059513	-89.394312
G312	UA	01/15/2021	619.78	619.78	Top of PVC	616.92	9.79	14.58	607.13	602.34	14.93	601.70	4.8	2	39.059558	-89.391983
G313	UA	02/05/2021	614.30	614.30	Top of PVC	611.51	6.30	11.11	605.21	600.40	11.46	599.50	4.8	2	39.058773	-89.391124
G314	LCU	02/05/2021	613.88	613.88	Top of PVC	611.11	14.56	19.58	596.55	591.53	20.02	591.10	5	2	39.05782	-89.390964
G314D	DA	02/04/2021	613.70	613.70	Top of PVC	610.87	39.34	49.11	571.53	561.76	49.47	510.60	9.8	2	39.057852	-89.390958
G315	UA	01/14/2021	623.52	623.52	Top of PVC	620.94	9.69	14.48	611.25	606.46	14.85	605.00	4.8	2	39.057165	-89.393667
G316	LCU	02/26/2021	602.59	602.59	Top of PVC	599.64	10.02	14.82	589.62	584.82	15.16	583.90	4.8	2	39.057847	-89.389698
G317	UA	02/12/2021	641.93	641.93	Top of PVC	638.85	30.14	34.93	608.71	603.92	35.28	602.90	4.8	2	39.056727	-89.390148
G401	UA	09/14/2015	--	625.57	Top of Disk	623.03	14.36	18.79	608.67	604.24	19.29	603.70	4.4	2	39.060259	-89.395295
G402	UA	08/27/2010	--	613.37	Top of Disk	610.36	10.00	20.00	600.36	590.36	20.40	590.00	10	2	39.060207	-89.391712
G403	UA	09/11/2015	--	626.47	Top of Disk	623.81	13.11	17.78	610.70	606.03	18.15	605.70	4.7	2	39.063167	-89.398779
G404	UA	05/01/2007	--	615.67	Top of Disk	613.57	6.42	11.17	607.15	602.40	11.62	601.60	4.8	2	39.064329	-89.392493
G405	UA	05/01/2007	--	623.63	Top of Disk	621.40	9.01	13.76	612.39	607.64	14.21	607.20	4.8	2	39.064345	-89.396234
G406	UA	08/19/2016	625.36	625.36	Top of PVC	621.86	13.56	18.37	608.30	603.49	18.75	603.10	4.8	2	39.060309	-89.398508
G407	UA	08/16/2016	621.32	621.32	Top of PVC	618.35	13.78	18.61	604.57	599.74	19.04	598.40	4.8	2	39.061574	-89.402004
G410	UA	02/23/2018	--	619.79	Top of Disk	617.21	8.89	13.68	608.32	603.53	14.09	603.10	4.8	2	39.061572	-89.403763
G411	UA	02/22/2018	--	623.25	Top of Disk	620.49	11.21	16.07	609.28	604.42	16.47	604.00	4.9	2	39.063979	-89.404033
MW01D	DA	05/03/2006	609.02	609.02	Top of PVC	607.08	33.29	38.05	573.79	569.03	38.41	567.10	4.8	2	39.067068	-89.402747

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TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
MW02S	UA	05/05/2006	627.12	627.12	Top of PVC	624.16	10.34	15.12	613.82	609.04	15.51	608.70	4.8	2	39.071017	-89.403648
MW02D	LCU	05/05/2006	626.99	626.99	Top of PVC	624.14	22.03	26.83	602.11	597.31	27.22	596.90	4.8	2	39.071031	-89.403649
MW03D	DA	04/27/2006	629.01	629.01	Top of PVC	625.86	52.29	57.06	573.57	568.80	57.40	567.90	4.8	2	39.071386	-89.398976
MW04S	UA	05/11/2006	625.89	625.89	Top of PVC	622.63	9.83	14.26	612.80	608.37	14.77	607.90	4.4	2	39.075356	-89.399232
MW05S	UA	05/17/2006	625.95	625.95	Top of PVC	622.65	12.66	17.41	609.99	605.24	17.71	604.90	4.8	2	39.075866	-89.40333
MW05D	DA	05/17/2006	625.91	625.91	Top of PVC	622.65	45.57	50.33	577.08	572.32	50.72	568.70	4.8	2	39.075863	-89.403313
MW06S	UA	05/04/2006	626.15	626.15	Top of PVC	623.37	11.04	15.62	612.33	607.75	16.08	607.30	4.6	2	39.078189	-89.403644
MW07S	UA	05/09/2006	627.60	627.60	Top of PVC	624.90	9.91	13.79	614.99	611.11	14.39	610.50	3.9	2	39.0786	-89.399383
MW08S	UA	05/10/2006	628.01	628.01	Top of PVC	625.09	11.51	16.00	613.58	609.09	16.60	608.00	4.5	2	39.080234	-89.399079
MW09S	UA	05/03/2006	627.62	627.62	Top of PVC	624.70	11.21	15.62	613.49	609.08	16.20	608.50	4.4	2	39.079954	-89.394899
MW09D	LCU	05/03/2006	627.61	627.61	Top of PVC	624.68	45.81	50.57	578.87	574.11	51.00	570.70	4.8	2	39.07994	-89.394899
MW10S	UA	05/02/2006	624.45	624.45	Top of PVC	621.43	11.28	15.76	610.15	605.67	16.30	605.10	4.5	2	39.07601	-89.394068
MW10D	LCU	05/01/2006	624.47	624.47	Top of PVC	621.33	41.74	46.57	579.59	574.76	47.02	572.60	4.8	2	39.075995	-89.39407
MW11S	UA	04/28/2006	625.27	625.27	Top of PVC	622.04	8.89	13.63	613.15	608.41	14.08	608.00	4.7	2	39.071888	-89.393913
MW11D	LCU	04/28/2006	625.52	625.52	Top of PVC	622.19	28.31	33.04	593.88	589.15	33.50	585.90	4.7	2	39.071888	-89.393894
MW12S	UA	05/10/2006	625.31	625.31	Top of PVC	622.24	10.61	15.18	611.63	607.06	15.61	606.60	4.6	2	39.068514	-89.394199
MW12D	DA	05/10/2006	625.21	625.21	Top of PVC	622.24	42.46	46.99	579.78	575.25	47.47	572.20	4.5	2	39.068501	-89.394199
MW13S	UA	05/09/2006	625.96	625.96	Top of PVC	622.80	11.43	16.23	611.37	606.57	16.62	606.20	4.8	2	39.066297	-89.40118
MW13D	DA	05/09/2006	625.86	625.86	Top of PVC	622.85	49.81	54.60	573.04	568.25	55.00	567.90	4.8	2	39.066293	-89.401163
MW14S	UA	05/02/2006	626.88	626.88	Top of PVC	624.62	12.26	17.02	612.36	607.60	17.38	607.20	4.8	2	39.069153	-89.400442
MW15S	UA	04/25/2006	626.66	626.66	Top of PVC	623.83	14.41	19.16	609.42	604.67	19.62	604.20	4.8	2	39.069772	-89.397088
MW15D	LCU	04/25/2006	626.44	626.44	Top of PVC	623.83	33.68	38.45	590.15	585.38	38.80	585.00	4.8	2	39.06977	-89.397073
MW16S	UA	04/25/2006	629.47	629.47	Top of PVC	626.32	14.59	19.41	611.73	606.91	19.76	606.40	4.8	2	39.073571	-89.397006

TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
MW16D	DA	04/25/2006	629.38	629.38	Top of PVC	626.37	45.90	50.34	580.47	576.03	50.78	575.40	4.4	2	39.073571	-89.397036
MW17S	UA	05/04/2006	630.56	630.56	Top of PVC	627.28	14.02	23.56	613.26	603.72	24.11	603.20	9.5	2	39.07715	-89.396978
MW17D	DA	05/04/2006	630.29	630.29	Top of PVC	627.47	48.82	53.32	578.65	574.15	53.87	573.60	4.5	2	39.077151	-89.396958
MW18S	UA	05/11/2006	628.66	628.66	Top of PVC	625.69	11.31	15.79	614.38	609.90	16.40	609.30	4.5	2	39.077033	-89.401698
MW20S	UA	05/01/2007	622.90	622.90	Top of PVC	620.26	8.41	13.22	611.85	607.04	13.67	604.30	4.8	2	39.064968	-89.394322
R104	UA	10/08/2010	--	632.84	Top of Disk	629.03	14.59	19.32	614.44	609.71	19.85	609.20	4.7	2	39.069474	-89.399109
R201	UA	10/08/2010	--	626.34	Top of Disk	624.02	14.59	19.32	609.43	604.70	19.85	604.20	4.7	2	39.075142	-89.397855
R205	UA	03/20/2017	--	624.52	Top of Disk	621.91	11.32	16.01	610.59	605.90	16.42	605.50	4.7	2	39.068593	-89.394164
T127	UA	02/10/2010	--	630.96	Top of Disk	625.53	17.53	22.07	608.00	603.46	22.64	602.90	4.5	2	39.068119	-89.40121
T128	UA	02/09/2010	631.03	630.93	Top of Disk	626.27	16.53	21.04	609.74	605.23	21.64	602.20	4.5	2	39.068532	-89.401211
T202	UA	10/15/2010	--	628.63	Top of Disk	626.22	12.27	16.65	613.95	609.57	17.21	608.20	4.4	2	39.071776	-89.397705
T408	LCU	08/17/2016	624.08	624.08	Top of PVC	621.09	20.66	25.49	600.43	595.60	25.92	595.20	4.8	2	39.064353	-89.396307
T409	LCU	08/19/2016	625.01	625.01	Top of PVC	621.85	21.79	26.59	600.06	595.26	26.99	594.90	4.8	2	39.0603	-89.398538
TA31	UA	10/28/2014	626.55	626.55	Top of PVC	623.89	15.09	19.57	608.80	604.32	20.19	603.70	4.5	2	39.071368	-89.401366
TA32	UA	10/27/2014	621.42	621.42	Top of PVC	618.93	11.31	15.68	607.62	603.25	16.47	602.50	4.4	2	39.074093	-89.402223
TA33	UA	06/02/2015	625.27	625.27	Top of PVC	622.51	12.23	16.89	610.28	605.62	17.44	605.10	4.7	2	39.071556	-89.403506
TA34	UA	06/03/2015	626.52	626.52	Top of PVC	624.10	10.92	15.41	613.18	608.69	16.10	608.00	4.5	2	39.069631	-89.402759
TR32	UA	07/02/2021	621.68	621.68	Top of PVC	619.28	11.00	15.68	608.28	603.60	16.17	603.11	4.68	2	39.074064	-89.397758
NE Riser	S	--	--	626.13	--	--	--	--	--	--	--	--	--	--	39.071111	-89.393889
SG-02	SW	--	--	605.87	Top of Prot Casing	605.87	--	--	--	--	--	--	--	--	39.059695	-89.391429
SG-03	SW	--	--	594.94	Top of Prot Casing	594.94	--	--	--	--	--	--	--	--	39.059092	-89.390342
SG-04	SW	--	--	599.52	Top of Prot Casing	599.52	--	--	--	--	--	--	--	--	39.064146	-89.390504

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TABLE 3-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
-- = data not available
BGS = below ground surface
DA = deep aquifer
ft = foot or feet
HSU = Hydrostratigraphic Unit
LCU = lower confining unit
PVC = polyvinyl chloride
S = source water
SW = surface water
UA = uppermost aquifer
generated 10/05/2021, 2:12:24 PM CDT

TABLE 3-2. VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

COFFEEN POWER PLANT

GYPSUM MANAGEMENT FACILITY GYPSUM STACK POND

COFFEEN, ILLINOIS

Date	G206 Groundwater Elevation (ft NAVD88)	G206D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	DA (PMP)				
3/29/2021	--	583.94	--	--	--	--
4/20/2021	622.07	585.96	36.11	33.51	1.08	down
5/3/2021	622.60	587.42	35.18	33.51	1.05	down
5/17/2021	622.31	587.81	34.50	33.51	1.03	down
6/9/2021	621.71	584.19	37.52	33.51	1.12	down
6/23/2021	620.54	589.66	30.88	33.51	0.92	down
7/12/2021	622.39	590.72	31.67	33.51	0.95	down
7/26/2021	622.00	591.14	30.86	33.51	0.92	down
			Middle of screen elevation G206			610.8
			Middle of screen elevation G206D			577.3

[O: KLT 6/4/21, C:YMD 6/7/21][U:KLT 8/25/21, C:EDP 8/31/21]

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

DA = deep aquifer

dh = head change

dl = distance change

ft = foot/feet

NAVD88 = North American Vertical Datum of 1988

PMP = potential migration pathway

UA = uppermost aquifer

TABLE 3-3. FIELD HYDRAULIC CONDUCTIVITIES
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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) Hydraulic Conductivity (cm/s)	Rising Head (Slug Out) Hydraulic Conductivity (cm/s)	Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
Uppermost Aquifer											
G206	D	608.61	4.41	SM, s(CL), CL	solid	Kansas Geological Survey	5.0E-04	4.9E-04	2.5E-04	4.0E-03	1.4E-03
G209	D	608.29	4.54	CL	solid	Kansas Geological Survey	- -	2.5E-04			
G212	D	609.30	4.55	SM, s(CL), CL	solid	Kansas Geological Survey	2.1E-03	1.8E-03			
G215	D	606.68	4.39	SM, s(CL), ML	solid	Kansas Geological Survey	4.0E-03	3.5E-03			
G218	D	605.87	4.44	SM, SC, CL	solid	Kansas Geological Survey	2.6E-03	2.4E-03			

[O: KLT, C:EDP 8/31/21]

Notes:
1. All wells are constructed from 2 inch PVC with 0.01 inch slotted screens.
- - = Test not analyzed/performed
cm/s = centimeters per second
D = downgradient
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988
PVC = polyvinyl chloride

USCS = Unified Soil Classification System
CL = Lean Clay
s(CL) = Sandy Lean Clay
ML = Silt
SC = Clayey Sand
SM = Silty Sand

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

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GYPSUM MANAGEMENT FACILITY GYPSUM STACK POND
COFFEEN, ILLINOIS

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

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

Across GMF Gypsum Stack Pond (R104 to G215) [3]

Distance between Wells (ft): 1470
Hydraulic Conductivity (ft/day): 3.96
Effective Porosity (%): 18 Assumes: Sand, Silt, and Clay

Date	R104 Elevation (ft NAVD88)	G215 Elevation (ft NAVD88)	Change in Elevation (ft)	Horizontal Gradient (ft/ft)	Velocity (ft/day)
11/16/2015	621.34	616.38	4.96	0.003	0.07
2/8/2016	624.11	618.31	5.80	0.004	0.09
5/9/2016	624.89	619.45	5.44	0.004	0.08
7/25/2016	623.65	617.10	6.55	0.004	0.10
11/12/2016	623.49	617.91	5.58	0.004	0.08
2/4/2017	624.20	618.34	5.86	0.004	0.09
5/13/2017	622.91	618.16	4.75	0.003	0.07
7/8/2017	624.09	617.01	7.08	0.005	0.10
10/21/2017	619.38	615.48	3.90	0.003	0.06
5/8/2018	622.66	617.80	4.86	0.003	0.07
8/2/2018	621.73	618.00	3.73	0.003	0.05
10/23/2018	621.58	616.26	5.32	0.004	0.08
1/15/2019	622.43	618.03	4.40	0.003	0.06
8/5/2019	623.34	617.55	5.79	0.004	0.09
1/20/2020	625.63	619.51	6.12	0.004	0.09
8/10/2020	624.56	617.11	7.45	0.005	0.11
1/20/2021	623.31	617.19	6.12	0.004	0.09
4/20/2021	624.95	618.83	6.12	0.004	0.09
7/26/2021	625.41	618.79	6.62	0.005	0.10
			Average	0.004	0.08

[O:KLT 8/13/21, C:EDP 8/31/21]

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

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

COFFEEN POWER PLANT

GYPSUM MANAGEMENT FACILITY GYPSUM STACK POND

COFFEEN, ILLINOIS

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 February and March 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 Survey, 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.

[3] The uppermost aquifer was excavated within the footprint of the GMF GSP during construction. Flow calculated between R104 and G215 may not be representative of actual groundwater flow conditions around the GMF GSP.

-- = not calculated

% = percent

ft = foot/feet

ft/day = feet per day

ft/ft = feet per foot

NAVD88 = North American Vertical Datum of 1988

NM = Not Measured

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G102	01/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.6	--	--	--	--	590
G102	04/08/2015	<0.003	<0.001	0.047	<0.001	<0.01	<0.001	62	28	0.016	<0.002	0.4	<0.001	--	0.00028	--	7.1	--	0.0028	86	<0.001	390
G102	07/23/2015	<0.003	0.0014	0.059	<0.001	<0.01	<0.001	--	30	0.0076	<0.002	0.429	0.0017	--	<0.0002	0.0013	7.1	--	0.0027	95	<0.001	420
G102	10/06/2015	<0.003	<0.001	0.058	<0.001	<0.01	<0.001	--	73	0.015	<0.002	0.272	<0.001	--	<0.0002	0.0016	7.1	--	0.0038	110	<0.001	590
G102	11/16/2015	<0.003	<0.001	0.069	<0.001	<0.01	<0.001	78	88	0.015	<0.002	0.291	<0.001	<0.01	<0.0002	<0.001	6.9	1.11	0.0025	140	<0.001	600
G102	02/17/2016	<0.003	<0.001	0.038	<0.001	0.014	<0.001	59	19	<0.004	<0.002	0.328	<0.001	<0.01	<0.0002	<0.001	7.5	1.76	0.0012	64	<0.001	400
G102	05/16/2016	<0.003	<0.001	0.029	<0.001	0.01	<0.001	42	3.8	<0.004	<0.002	0.525	<0.001	<0.01	<0.0002	0.0012	7.2	0.0616	0.0012	53	<0.001	310
G102	08/02/2016	<0.003	<0.001	0.044	<0.001	0.014	<0.001	69	42	<0.004	<0.002	0.383	<0.001	<0.01	<0.0002	<0.001	7.2	2.03	0.0032	86	<0.001	400
G102	11/19/2016	<0.003	<0.001	0.052	<0.001	<0.01	<0.001	77	40	<0.004	<0.002	0.389	<0.001	<0.01	<0.0002	<0.001	7.1	0.86	0.0028	95	<0.001	490
G102	02/09/2017	<0.003	0.0063	0.094	<0.001	0.019	<0.001	62	6.4	0.032	0.0057	0.419	0.0079	0.016	<0.0002	0.0017	7.1	1.16	0.0013	55	<0.001	370
G102	05/22/2017	<0.003	<0.001	0.036	<0.001	<0.01	<0.001	40	4	<0.004	<0.002	0.426	<0.001	<0.01	<0.0002	<0.001	7.2	0.773	<0.001	51	<0.001	300
G102	07/09/2017	<0.003	0.0068	0.11	<0.001	0.017	<0.001	83	45	0.029	0.0058	0.27	0.0097	0.016	<0.0002	0.0013	7.2	0.78	0.003	98	<0.001	440
G102	10/25/2017	--	--	--	--	0.014	--	56	54	--	--	0.366	--	--	--	--	7.1	--	--	130	--	540
G102	01/26/2018	--	--	--	--	--	--	--	46	--	--	<0.25	--	--	--	--	7.1	--	--	--	--	--
G102	05/10/2018	--	--	--	--	<0.01	--	56	14	--	--	0.295	--	--	--	--	7.2	--	--	74	--	330
G102	10/24/2018	--	--	--	--	0.018	--	85	40	--	--	0.322	--	--	--	--	7.0	--	--	130	--	510
G102	01/17/2019	--	--	--	--	0.015	--	78	47	--	--	0.323	--	--	--	--	7.2	--	--	130	--	560
G102	08/12/2019	--	--	--	--	0.022	--	93	22	--	--	0.402	--	--	--	--	7.2	--	--	86	--	420
G102	01/21/2020	--	--	--	--	0.015	--	56	3.4	--	--	0.388	--	--	--	--	7.6	--	--	49	--	330
G102	08/11/2020	--	--	--	--	<0.01	--	75	30	--	--	0.265	--	--	--	--	7.3	--	--	120	--	470
G102	01/26/2021	--	--	--	--	0.017	--	55	12	--	--	0.365	--	--	--	--	7.1	--	--	70	--	410
G103	01/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.6	--	--	--	--	420

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G103	04/08/2015	<0.003	0.0011	0.079	<0.001	<0.01	<0.001	80	56	0.0075	<0.002	0.4	<0.001	--	<0.0002	--	7.2	--	<0.001	54	<0.001	450
G103	07/23/2015	<0.003	0.0017	0.12	<0.001	<0.01	<0.001	--	55	0.0054	<0.002	0.262	0.0011	--	<0.0002	0.0029	7.2	--	<0.001	76	<0.001	390
G103	10/06/2015	<0.003	0.0012	0.1	<0.001	<0.01	<0.001	--	66	0.019	<0.002	<0.25	<0.001	--	<0.0002	0.0034	7.3	--	<0.001	69	<0.001	470
G105	01/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3	--	--	--	--	620
G105	04/08/2015	<0.003	0.0015	0.081	<0.001	0.098	<0.001	87	35	<0.004	<0.002	0.4	<0.001	--	<0.0002	--	7.0	--	0.0015	130	<0.001	550
G105	07/23/2015	<0.003	<0.001	0.068	<0.001	0.069	<0.001	--	34	<0.004	<0.002	0.336	<0.001	--	<0.0002	0.0023	7.1	--	<0.001	110	<0.001	540
G105	10/06/2015	<0.003	0.0013	0.078	<0.001	0.13	<0.001	--	37	0.0046	<0.002	0.304	0.0011	--	<0.0002	0.0028	7.0	--	0.0011	110	<0.001	560
G106	01/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.5	--	--	--	--	440
G106	04/08/2015	<0.003	<0.001	0.057	<0.001	<0.01	<0.001	84	28	0.012	<0.002	0.47	<0.001	--	<0.0002	--	7.1	--	0.0025	56	<0.001	480
G106	07/23/2015	<0.003	<0.001	0.059	<0.001	<0.01	<0.001	--	27	<0.004	<0.002	0.378	<0.001	--	<0.0002	0.0019	7.2	--	0.0017	55	<0.001	460
G106	10/06/2015	<0.003	<0.001	0.06	<0.001	0.016	<0.001	--	25	0.013	<0.002	0.343	<0.001	--	<0.0002	0.0031	7.3	--	<0.001	55	<0.001	420
G106	11/17/2015	<0.003	<0.001	0.06	<0.001	<0.01	<0.001	80	26	<0.004	<0.002	0.394	<0.001	<0.01	<0.0002	0.0018	7.1	0.815	0.002	56	<0.001	380
G106	02/17/2016	<0.003	<0.001	0.054	<0.001	<0.01	<0.001	82	30	<0.004	<0.002	0.371	<0.001	<0.01	<0.0002	0.0021	7.2	0.701	0.0019	56	<0.001	440
G106	05/16/2016	<0.003	<0.001	0.055	<0.001	<0.01	<0.001	84	25	<0.004	<0.002	0.528	<0.001	<0.01	<0.0002	0.0019	7.1	0.244	0.0019	58	<0.001	380
G106	08/04/2016	<0.003	<0.001	0.056	<0.001	<0.01	<0.001	80	27	<0.004	<0.002	0.504	<0.001	<0.01	<0.0002	0.0025	7.0	0.4	0.0019	58	<0.001	420
G106	11/19/2016	<0.003	0.0013	0.067	<0.001	<0.01	<0.001	86	29	<0.004	<0.002	0.465	<0.001	<0.01	<0.0002	<0.001	7.0	0.923	<0.001	43	<0.001	440
G106	02/09/2017	<0.003	0.0011	0.057	<0.001	0.012	<0.001	73	28	<0.004	<0.002	0.462	<0.001	<0.01	<0.0002	0.0024	7.0	1.2	<0.001	63	<0.001	420
G106	05/22/2017	<0.003	0.0015	0.078	<0.001	<0.01	<0.001	68	30	<0.004	0.0038	0.44	<0.001	<0.01	<0.0002	0.0028	7.1	0.533	<0.001	67	<0.001	380
G106	07/09/2017	<0.003	0.0012	0.052	<0.001	<0.01	<0.001	84	29	<0.004	<0.002	0.366	<0.001	<0.01	<0.0002	0.0018	7.0	1.93	<0.001	60	<0.001	380
G106	10/25/2017	--	--	--	--	<0.01	--	72	48	--	--	0.47	--	--	--	--	7.3	--	--	45	--	410
G106	05/10/2018	--	--	--	--	<0.01	--	73	38	--	--	0.516	--	--	--	--	7.0	--	--	88	--	420
G106	08/09/2018	--	--	--	--	--	--	--	--	--	--	0.46	--	--	--	--	7.0	--	--	--	--	--

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G106	10/24/2018	--	--	--	--	0.014	--	85	35	--	--	0.441	--	--	--	--	6.8	--	--	75	--	480
G106	01/17/2019	--	--	--	--	0.058	--	110	35	--	--	0.453	--	--	--	--	6.9	--	--	78	--	480
G106	08/13/2019	--	--	--	--	0.029	--	94	44	--	--	0.468	--	--	--	--	6.9	--	--	36	--	520
G106	01/21/2020	--	--	--	--	0.04	--	100	48	--	--	0.398	--	--	--	--	7.3	--	--	98	--	560
G106	08/11/2020	--	--	--	--	0.016	--	87	39	--	--	0.36	--	--	--	--	7.0	--	--	69	--	490
G106	01/26/2021	--	--	--	--	0.045	--	100	59	--	--	0.399	--	--	--	--	7.5	--	--	140	--	600
G106	06/29/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2	--	--	--	--	--
G200	01/20/2015	--	0.0022	--	--	<0.01	<0.001	100	80	--	--	--	0.004	--	--	--	7.4	--	--	100	--	570
G200	04/10/2015	<0.003	0.0017	0.1	<0.001	<0.01	<0.001	110	87	<0.004	<0.002	0.303	0.0033	--	<0.0002	--	7.0	--	0.0079	87	<0.001	580
G200	07/22/2015	<0.003	0.0087	0.18	<0.001	<0.01	<0.001	--	96	0.017	0.0088	0.301	0.017	--	<0.0002	<0.001	7.0	--	0.0084	88	<0.001	630
G200	10/05/2015	<0.003	0.038	0.78	0.0038	0.048	0.0012	--	85	0.086	0.053	0.346	0.082	--	<0.0002	0.0039	7.1	--	0.013	90	<0.001	660
G200	11/23/2015	<0.003	0.007	0.17	<0.001	0.39	<0.001	100	75	0.012	0.0068	0.337	0.01	0.019	<0.0002	0.0017	7.2	1.65	0.0041	94	<0.001	520
G200	02/12/2016	<0.003	0.0082	0.24	0.0013	0.014	<0.001	150	93	0.013	0.0074	0.415	0.018	0.021	<0.0002	<0.001	7.2	3.84	0.0097	97	<0.001	540
G200	05/10/2016	<0.003	0.0025	0.13	<0.001	<0.01	<0.001	100	96	0.0041	<0.002	0.389	0.0058	<0.01	<0.0002	<0.001	7.1	0.849	0.0071	100	<0.001	480
G200	07/30/2016	<0.003	<0.001	0.059	<0.001	<0.01	<0.001	88	82	0.0049	<0.002	0.384	0.0012	<0.01	<0.0002	<0.001	7.1	0.662	0.0032	100	<0.001	520
G200	11/18/2016	<0.003	<0.001	0.053	<0.001	0.01	<0.001	88	75	<0.004	<0.002	0.431	<0.001	<0.01	<0.0002	<0.001	7.2	0.29	0.0032	110	<0.001	520
G200	02/10/2017	<0.003	<0.001	0.074	<0.001	<0.01	<0.001	85	82	0.0052	<0.002	0.305	0.0013	<0.01	<0.0002	<0.001	7.1	0.534	0.0067	100	<0.001	700
G200	05/18/2017	<0.003	<0.001	0.063	<0.001	0.01	<0.001	84	96	<0.004	<0.002	0.3	<0.001	<0.01	<0.0002	<0.001	7.0	1.01	0.0062	90	<0.001	620
G200	07/13/2017	<0.003	<0.001	0.057	<0.001	<0.01	<0.001	87	88	<0.004	<0.002	0.299	<0.001	<0.01	<0.0002	<0.001	7.1	0.906	0.0034	110	<0.001	540
G200	10/28/2017	--	--	--	--	0.34	--	81	65	--	--	0.328	--	--	--	--	7.2	--	--	100	--	520
G200	01/25/2018	--	--	--	--	--	--	--	71	--	--	0.303	--	--	--	--	7.2	--	--	--	--	--
G200	05/11/2018	--	--	--	--	<0.01	--	90	85	--	--	<0.25	--	--	--	--	7.0	--	--	100	--	460

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TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G200	11/02/2018	--	--	--	--	0.011	--	95	61	--	--	0.391	--	--	--	--	7.0	--	--	100	--	480
G200	01/16/2019	--	--	--	--	0.048	--	350	54	--	--	0.386	--	--	--	--	7.1	--	--	110	--	700
G200	08/12/2019	--	--	--	--	<0.01	--	92	58	--	--	0.405	--	--	--	--	7.0	--	--	110	--	540
G200	01/21/2020	--	--	--	--	<0.01	--	110	100	--	--	0.302	--	--	--	--	7.2	--	--	120	--	520
G200	08/11/2020	--	--	--	--	<0.01	--	85	63	--	--	0.427	--	--	--	--	7.2	--	--	110	--	530
G200	01/29/2021	--	--	--	--	0.014	--	81	53	--	--	0.36	--	--	--	--	7.3	--	--	110	--	580
G200	03/29/2021	<0.003	<0.001	0.044	<0.001	0.04	<0.001	82	50	<0.004	<0.002	0.32	<0.001	<0.02	<0.0002	<0.001	7.3	0.345	0.0019	100	<0.001	460
G200	04/21/2021	<0.003	<0.001	0.047	<0.001	0.035	<0.001	88	63	<0.004	<0.002	0.435	<0.001	<0.02	<0.0002	<0.001	7.2	0.0349	0.0022	95	<0.001	570
G200	05/06/2021	<0.003	0.0035	0.08	<0.001	0.012	<0.001	140	73	0.0096	0.0029	<0.25	0.0033	<0.02	<0.0002	0.002	7.1	0.0892	0.0035	100	<0.001	570
G200	05/17/2021	<0.003	<0.001	0.055	<0.001	<0.01	<0.001	91	78	<0.004	<0.002	0.342	<0.001	<0.02	<0.0002	<0.001	7.2	0.182	0.0023	110	<0.001	560
G200	06/14/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	--	--	--	--
G200	07/28/2021	<0.003	<0.001	0.044	<0.001	0.11	<0.001	83	51	<0.004	<0.002	0.255	<0.001	<0.02	<0.0002	<0.001	7.0	0.239	0.0028	100	<0.001	500
G206	01/21/2015	--	<0.001	--	--	<0.01	<0.001	84	28	--	--	--	<0.001	--	--	--	7.3	--	--	130	--	480
G206	04/09/2015	<0.003	<0.001	0.052	<0.001	0.026	<0.001	92	29	<0.004	<0.002	0.411	<0.001	--	<0.0002	--	7.0	--	<0.001	130	<0.001	480
G206	07/22/2015	<0.003	<0.001	0.094	<0.001	<0.01	<0.001	--	24	<0.004	<0.002	0.39	<0.001	--	<0.0002	0.0025	7.0	--	0.0068	32	<0.001	380
G206	10/07/2015	<0.003	0.0028	0.065	<0.001	0.042	<0.001	--	34	<0.004	<0.002	0.284	<0.001	--	<0.0002	0.0016	6.8	--	<0.001	110	<0.001	480
G206	11/18/2015	<0.003	0.0039	0.062	<0.001	<0.01	<0.001	79	32	0.0041	<0.002	0.433	<0.001	<0.01	<0.0002	<0.001	7.1	0.317	<0.001	95	<0.001	460
G206	02/24/2016	<0.003	<0.001	0.056	<0.001	0.033	<0.001	78	26	<0.004	<0.002	0.507	<0.001	<0.01	<0.0002	0.0014	6.7	0.292	<0.001	150	<0.001	500
G206	06/27/2016	<0.003	0.0012	0.062	<0.001	<0.01	<0.001	94	25	<0.004	<0.002	0.469	<0.001	<0.01	<0.0002	0.0025	6.2	0.647	<0.001	130	<0.001	420
G206	08/06/2016	<0.003	0.002	0.064	<0.001	<0.01	<0.001	90	27	0.0042	<0.002	0.449	0.0022	<0.01	<0.0002	0.0024	7.1	0.857	<0.001	130	<0.001	420
G206	11/22/2016	<0.003	<0.001	0.048	<0.001	0.11	<0.001	63	30	<0.004	<0.002	0.463	<0.001	<0.01	<0.0002	0.0015	7.1	--	<0.001	130	<0.001	480
G206	12/07/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.62	--	--	--	--

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G206	02/11/2017	<0.003	<0.001	0.052	<0.001	<0.01	<0.001	70	29	<0.004	<0.002	0.547	<0.001	<0.01	<0.0002	0.0013	7.2	1.2	<0.001	150	<0.001	680
G206	05/18/2017	<0.003	<0.001	0.043	<0.001	<0.01	<0.001	66	29	<0.004	<0.002	<0.25	<0.001	<0.01	<0.0002	0.0011	7.0	0.555	<0.001	120	<0.001	460
G206	07/15/2017	<0.003	0.0019	0.055	<0.001	<0.01	<0.001	61	31	<0.004	<0.002	0.453	<0.001	<0.01	<0.0002	<0.001	7.1	1.33	<0.001	100	<0.001	480
G206	10/30/2017	--	--	--	--	<0.01	--	90	30	--	--	0.472	--	--	--	--	7.2	--	--	120	--	460
G206	05/15/2018	--	--	--	--	0.032	--	73	26	--	--	0.48	--	--	--	--	7.0	--	--	130	--	450
G206	11/02/2018	--	--	--	--	<0.01	--	85	25	--	--	0.36	--	--	--	--	7.0	--	--	120	--	440
G206	01/17/2019	--	--	--	--	<0.01	--	81	27	--	--	0.458	--	--	--	--	7.1	--	--	110	--	480
G206	08/14/2019	--	--	--	--	0.013	--	120	22	--	--	0.506	--	--	--	--	7.1	--	--	120	--	470
G206	01/21/2020	--	--	--	--	<0.01	--	84	24	--	--	0.389	--	--	--	--	7.5	--	--	120	--	470
G206	05/05/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.5	--	--	--	--	--
G206	08/13/2020	--	--	--	--	0.015	--	81	23	--	--	0.391	--	--	--	--	7.4	--	--	130	--	500
G206	01/27/2021	--	--	--	--	<0.01	--	65	22	--	--	0.426	--	--	--	--	7.1	--	--	130	--	480
G206D	03/30/2021	<0.003	0.0039	0.14	<0.001	0.13	<0.001	140	70	0.0095	0.003	0.666	0.0031	<0.02	<0.0002	0.033	7.1	0.451	<0.001	590	<0.001	1300
G206D	04/22/2021	<0.003	0.0032	0.089	<0.001	0.12	<0.001	120	67	<0.004	<0.002	0.774	0.0025	<0.02	<0.0002	0.029	7.2	0.14	<0.001	600	<0.001	1300
G206D	05/05/2021	<0.003	0.0039	0.12	<0.001	0.11	<0.001	130	56	<0.004	<0.002	0.766	<0.001	<0.02	<0.0002	0.03	7.1	0.147	<0.001	510	<0.001	1200
G206D	05/18/2021	<0.003	0.0052	0.12	<0.001	0.13	<0.001	130	52	<0.004	<0.002	0.499	<0.001	<0.02	<0.0002	0.029	7.2	0.247	<0.001	250	<0.001	1200
G206D	06/14/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.142	--	--	--	--
G206D	07/27/2021	<0.003	0.0024	0.079	<0.001	0.12	<0.001	110	42	<0.004	<0.002	0.99	<0.001	<0.02	<0.0002	0.027	7.5	0.952	<0.001	400	<0.001	1100
G207	01/21/2015	--	<0.001	--	--	<0.01	<0.001	61	56	--	--	--	<0.001	--	--	--	7.7	--	--	72	--	360
G207	04/09/2015	<0.003	0.0017	0.11	<0.001	0.03	<0.001	65	55	0.0072	<0.002	0.466	0.0019	--	<0.0002	--	7.1	--	0.0012	69	<0.001	370
G207	07/22/2015	<0.003	0.0026	0.11	<0.001	<0.01	<0.001	--	62	<0.004	<0.002	0.512	0.0032	--	<0.0002	0.0016	7.2	--	<0.001	16	<0.001	440
G207	10/07/2015	<0.003	0.004	0.12	<0.001	0.021	<0.001	--	60	<0.004	<0.002	0.444	0.0011	--	<0.0002	0.0016	7.2	--	<0.001	21	<0.001	--

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G208	01/21/2015	--	<0.001	--	--	<0.01	<0.001	58	25	--	--	--	<0.001	--	--	--	7.6	--	--	36	--	340
G208	04/09/2015	<0.003	<0.001	0.1	<0.001	<0.01	<0.001	62	24	<0.004	<0.002	0.47	<0.001	--	<0.0002	--	7.2	--	0.0044	35	<0.001	300
G208	07/22/2015	<0.003	<0.001	0.062	<0.001	<0.01	<0.001	--	27	<0.004	<0.002	0.396	<0.001	--	<0.0002	<0.001	7.1	--	<0.001	110	<0.001	530
G208	10/07/2015	<0.003	<0.001	0.091	<0.001	0.022	<0.001	--	23	<0.004	<0.002	0.387	<0.001	--	<0.0002	0.0017	7.2	--	0.0033	33	<0.001	370
G209	01/21/2015	--	<0.001	--	--	0.011	<0.001	150	73	--	--	--	<0.001	--	--	--	7.4	--	--	310	--	940
G209	04/09/2015	<0.003	0.0019	0.1	<0.001	<0.01	<0.001	180	69	0.0063	0.0025	0.409	0.0029	--	<0.0002	--	6.9	--	0.0022	280	<0.001	910
G209	07/22/2015	<0.003	0.0075	0.13	<0.001	<0.01	<0.001	--	69	0.017	0.0095	0.422	0.0099	--	<0.0002	0.0035	7.0	--	0.002	270	<0.001	970
G209	10/07/2015	0.004	0.0085	0.11	0.0042	0.025	0.0041	--	59	0.035	0.0072	0.328	0.007	--	0.00027	0.0077	7.1	--	0.0047	270	0.0035	940
G209	11/18/2015	<0.003	0.0021	0.072	<0.001	<0.01	<0.001	160	67	<0.004	<0.002	0.398	<0.001	<0.01	<0.0002	0.0023	7.0	0.469	0.0036	280	<0.001	810
G209	02/23/2016	<0.003	<0.001	0.066	<0.001	<0.01	<0.001	150	70	<0.004	<0.002	0.475	<0.001	<0.01	<0.0002	0.0015	7.0	0.903	<0.001	280	<0.001	760
G209	05/11/2016	<0.003	<0.001	0.061	<0.001	<0.01	<0.001	160	59	<0.004	<0.002	0.461	<0.001	<0.01	<0.0002	0.0015	7.1	1.48	<0.001	280	<0.001	800
G209	08/06/2016	<0.003	0.0017	0.065	<0.001	0.014	<0.001	160	67	<0.004	<0.002	0.468	<0.001	<0.01	<0.0002	0.0018	7.2	0.673	<0.001	270	<0.001	760
G209	11/22/2016	<0.003	0.0022	0.045	<0.001	0.015	<0.001	100	70	<0.004	<0.002	0.42	<0.001	<0.01	<0.0002	<0.001	7.1	0.832	<0.001	270	<0.001	750
G209	02/11/2017	<0.003	<0.001	0.07	<0.001	<0.01	<0.001	120	60	<0.004	<0.002	0.358	<0.001	<0.01	<0.0002	0.0027	7.0	0.103	<0.001	260	<0.001	960
G209	05/18/2017	<0.003	0.0029	0.077	<0.001	<0.01	<0.001	130	63	<0.004	<0.002	0.263	0.0012	<0.01	<0.0002	0.0019	7.2	1.31	<0.001	240	0.001	820
G209	07/15/2017	<0.003	0.0057	0.063	<0.001	0.012	<0.001	120	72	<0.004	<0.002	0.437	<0.001	<0.01	<0.0002	<0.001	7.3	0.602	<0.001	120	<0.001	780
G209	10/31/2017	--	--	--	--	0.012	--	150	63	--	--	0.519	--	--	--	--	7.1	--	--	95	--	730
G209	01/25/2018	--	--	--	--	--	--	120	--	--	--	0.456	--	--	--	--	7.0	--	--	--	--	--
G209	05/15/2018	--	--	--	--	0.019	--	140	65	--	--	0.428	--	--	--	--	7.2	--	--	250	--	760
G209	11/02/2018	--	--	--	--	0.013	--	160	59	--	--	0.41	--	--	--	--	7.2	--	--	240	--	740
G209	01/17/2019	--	--	--	--	0.011	--	150	68	--	--	0.426	--	--	--	--	7.1	--	--	250	--	860
G209	05/03/2019	--	--	--	--	--	--	150	--	--	--	--	--	--	--	--	7.7	--	--	--	--	--

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G209	08/14/2019	--	--	--	--	0.011	--	160	61	--	--	0.586	--	--	--	--	7.2	--	--	240	--	830
G209	01/22/2020	--	--	--	--	0.017	--	150	59	--	--	0.406	--	--	--	--	6.9	--	--	250	--	730
G209	05/05/2020	--	--	--	--	--	--	140	--	--	--	--	--	--	--	--	7.2	--	--	--	--	--
G209	08/13/2020	--	--	--	--	0.018	--	150	65	--	--	0.474	--	--	--	--	7.2	--	--	270	--	800
G209	01/27/2021	--	--	--	--	<0.01	--	120	77	--	--	0.401	--	--	--	--	7.1	--	--	250	--	810
G210	01/21/2015	--	<0.001	--	--	<0.01	<0.001	73	55	--	--	--	<0.001	--	--	--	7.6	--	--	99	--	500
G210	04/09/2015	<0.003	<0.001	0.04	<0.001	0.055	<0.001	78	52	<0.004	<0.002	0.422	<0.001	--	<0.0002	--	7.0	--	0.0024	91	<0.001	490
G210	07/22/2015	<0.003	<0.001	0.037	<0.001	<0.01	<0.001	--	55	<0.004	<0.002	0.46	<0.001	--	<0.0002	<0.001	7.1	--	0.0014	84	<0.001	540
G210	10/07/2015	<0.003	<0.001	0.033	<0.001	0.013	<0.001	--	49	0.011	<0.002	0.368	<0.001	--	<0.0002	0.0018	7.2	--	<0.001	87	<0.001	500
G211	01/21/2015	--	<0.001	--	--	<0.01	<0.001	77	48	--	--	--	<0.001	--	--	--	7.6	--	--	80	--	490
G211	04/09/2015	<0.003	<0.001	0.081	<0.001	<0.01	<0.001	84	54	<0.004	<0.002	0.366	<0.001	--	<0.0002	--	7.1	--	0.0015	87	<0.001	480
G211	07/22/2015	<0.003	<0.001	0.087	<0.001	<0.01	<0.001	--	44	<0.004	<0.002	0.409	<0.001	--	<0.0002	<0.001	7.1	--	0.0025	74	<0.001	540
G211	10/07/2015	<0.003	<0.001	0.092	<0.001	0.014	<0.001	--	41	<0.004	<0.002	0.31	<0.001	--	<0.0002	<0.001	7.3	--	0.0013	78	<0.001	500
G212	01/21/2015	--	0.0021	--	--	0.019	<0.001	62	39	--	--	--	0.0035	--	--	--	7.5	--	--	59	--	400
G212	04/09/2015	<0.003	<0.001	0.056	<0.001	<0.01	<0.001	60	44	<0.004	<0.002	0.346	<0.001	--	<0.0002	--	7.0	--	0.0046	66	<0.001	410
G212	07/22/2015	<0.003	<0.001	0.057	<0.001	<0.01	<0.001	--	38	<0.004	<0.002	0.396	<0.001	--	<0.0002	0.0036	7.0	--	0.0042	56	<0.001	460
G212	10/07/2015	<0.003	<0.001	0.057	<0.001	0.026	<0.001	--	43	0.0043	<0.002	<0.25	<0.001	--	<0.0002	0.0035	7.0	--	0.0044	65	<0.001	410
G212	11/18/2015	<0.003	<0.001	0.052	<0.001	<0.01	<0.001	55	38	<0.004	<0.002	0.34	<0.001	<0.01	<0.0002	0.0015	7.2	0.132	0.0037	54	<0.001	380
G212	02/19/2016	<0.003	<0.001	0.05	<0.001	<0.01	<0.001	58	41	<0.004	<0.002	0.339	<0.001	<0.01	<0.0002	<0.001	7.3	0.582	0.0048	59	<0.001	380
G212	05/11/2016	<0.003	<0.001	0.05	<0.001	<0.01	<0.001	58	37	<0.004	<0.002	0.421	<0.001	<0.01	<0.0002	<0.001	7.3	0.759	0.0041	59	<0.001	400
G212	08/06/2016	<0.003	<0.001	0.059	<0.001	0.016	<0.001	59	37	0.004	<0.002	0.369	0.0016	<0.01	<0.0002	0.0012	7.3	0.992	0.004	55	<0.001	330
G212	11/23/2016	<0.003	<0.001	0.049	<0.001	<0.01	<0.001	51	42	<0.004	<0.002	0.399	<0.001	<0.01	<0.0002	<0.001	7.1	--	0.0043	54	<0.001	340

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G212	12/07/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.64	--	--	--	--
G212	02/15/2017	<0.003	0.001	0.058	<0.001	<0.01	<0.001	53	37	<0.004	<0.002	0.369	0.001	<0.01	<0.0002	<0.001	7.1	0.488	0.0041	55	<0.001	420
G212	05/22/2017	<0.003	<0.001	0.061	<0.001	<0.01	<0.001	46	39	<0.004	<0.002	0.372	<0.001	<0.01	<0.0002	0.0011	7.0	0.729	0.0039	57	<0.001	360
G212	07/15/2017	<0.003	<0.001	0.052	<0.001	<0.01	<0.001	46	44	<0.004	<0.002	0.377	<0.001	<0.01	<0.0002	<0.001	7.6	0.654	0.0046	53	<0.001	430
G212	10/31/2017	--	--	--	--	<0.01	--	50	42	--	--	0.326	--	--	--	--	7.3	--	--	55	--	340
G212	05/14/2018	--	--	--	--	0.014	--	51	40	--	--	0.407	--	--	--	--	7.2	--	--	52	--	350
G212	11/02/2018	--	--	--	--	<0.01	--	53	43	--	--	0.289	--	--	--	--	7.3	--	--	49	--	600
G212	01/16/2019	--	--	--	--	<0.01	--	56	43	--	--	0.394	--	--	--	--	7.3	--	--	53	--	440
G212	08/14/2019	--	--	--	--	<0.01	--	53	43	--	--	0.437	--	--	--	--	7.3	--	--	51	--	380
G212	01/22/2020	--	--	--	--	0.012	--	61	42	--	--	0.283	--	--	--	--	7.2	--	--	58	--	340
G212	08/13/2020	--	--	--	--	<0.01	--	54	42	--	--	0.323	--	--	--	--	7.3	--	--	53	--	430
G212	01/26/2021	--	--	--	--	0.032	--	56	41	--	--	<0.25	--	--	--	--	6.8	--	--	55	--	400
G212	06/29/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4	--	--	--	--	--
G213	01/21/2015	--	<0.001	--	--	<0.01	<0.001	66	44	--	--	--	<0.001	--	--	--	7.5	--	--	55	--	390
G213	04/09/2015	<0.003	<0.001	0.064	<0.001	<0.01	<0.001	70	47	<0.004	<0.002	0.35	0.0017	--	<0.0002	--	7.0	--	0.0024	57	<0.001	420
G213	07/22/2015	<0.003	0.0072	0.16	<0.001	<0.01	<0.001	--	42	0.026	0.01	0.41	0.016	--	<0.0002	0.0012	7.0	--	0.0035	50	<0.001	440
G213	10/07/2015	<0.003	0.0045	0.1	0.002	0.014	0.0018	--	40	0.026	0.0057	0.314	0.008	--	<0.0002	0.004	7.0	--	0.0038	51	0.0014	400
G214	01/21/2015	--	<0.001	--	--	<0.01	<0.001	81	100	--	--	--	<0.001	--	--	--	7.5	--	--	68	--	480
G214	04/09/2015	<0.003	<0.001	0.1	<0.001	<0.01	<0.001	88	110	<0.004	<0.002	0.417	<0.001	--	<0.0002	--	7.0	--	0.0011	73	<0.001	500
G214	07/22/2015	<0.003	<0.001	0.092	<0.001	<0.01	<0.001	--	82	<0.004	<0.002	0.446	<0.001	--	<0.0002	0.0011	7.1	--	<0.001	68	<0.001	530
G214	10/07/2015	<0.003	<0.001	0.089	<0.001	0.011	<0.001	--	67	0.0067	<0.002	0.324	<0.001	--	<0.0002	0.0019	7.2	--	<0.001	76	<0.001	540
G215	01/21/2015	--	0.0064	--	--	0.033	<0.001	110	60	--	--	--	<0.001	--	--	--	7.3	--	--	170	--	640

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G215	04/09/2015	<0.003	0.046	0.17	<0.001	0.041	<0.001	120	53	<0.004	<0.002	0.418	<0.001	--	<0.0002	--	6.8	--	<0.001	140	<0.001	620
G215	07/22/2015	<0.003	0.053	0.17	<0.001	0.023	<0.001	--	45	<0.004	<0.002	0.345	0.0017	--	<0.0002	<0.001	6.9	--	<0.001	110	<0.001	660
G215	10/07/2015	<0.003	0.04	0.15	<0.001	0.035	<0.001	--	46	<0.004	<0.002	0.321	0.0015	--	<0.0002	<0.001	6.8	--	<0.001	110	<0.001	550
G215	11/24/2015	<0.003	0.11	0.23	<0.001	0.037	<0.001	110	47	<0.004	0.0028	0.34	0.0039	<0.01	<0.0002	0.0011	7.2	2.42	<0.001	110	<0.001	500
G215	02/18/2016	<0.003	0.0034	0.095	<0.001	0.027	<0.001	100	52	<0.004	<0.002	0.359	<0.001	<0.01	<0.0002	<0.001	7.2	0.852	<0.001	130	<0.001	520
G215	05/11/2016	0.0045	0.0068	0.088	<0.001	0.026	<0.001	89	43	<0.004	<0.002	0.463	<0.001	<0.01	<0.0002	<0.001	6.9	0.468	0.0024	110	<0.001	460
G215	07/30/2016	<0.003	0.013	0.096	<0.001	0.015	<0.001	89	47	<0.004	<0.002	0.432	<0.001	<0.01	<0.0002	<0.001	6.9	0.0216	<0.001	110	<0.001	480
G215	11/23/2016	<0.003	0.0086	0.082	<0.001	0.023	<0.001	68	48	<0.004	<0.002	0.429	<0.001	<0.01	<0.0002	<0.001	6.9	--	<0.001	100	<0.001	500
G215	12/07/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.58	--	--	--	--
G215	02/18/2017	<0.003	0.012	0.095	<0.001	0.021	<0.001	86	46	<0.004	<0.002	0.369	<0.001	<0.01	<0.0002	<0.001	7.3	0.344	<0.001	110	<0.001	510
G215	05/22/2017	<0.003	0.036	0.15	<0.001	0.024	<0.001	82	42	<0.004	<0.002	<0.25	<0.001	<0.01	<0.0002	<0.001	7.4	1.24	<0.001	100	<0.001	470
G215	07/15/2017	<0.003	0.044	0.13	<0.001	0.027	<0.001	79	55	<0.004	<0.002	0.423	<0.001	<0.01	<0.0002	<0.001	7.0	1.01	<0.001	110	<0.001	550
G215	10/31/2017	--	--	--	--	0.025	--	90	48	--	--	0.42	--	--	--	--	7.2	--	--	110	--	470
G215	05/15/2018	--	--	--	--	0.063	--	130	70	--	--	0.329	--	--	--	--	6.9	--	--	220	--	660
G215	11/02/2018	--	--	--	--	0.088	--	120	55	--	--	0.314	--	--	--	--	6.8	--	--	170	--	480
G215	01/16/2019	--	--	--	--	0.097	--	120	61	--	--	0.379	--	--	--	--	6.9	--	--	180	--	800
G215	08/14/2019	--	--	--	--	0.085	--	100	49	--	--	0.458	--	--	--	--	7.0	--	--	120	--	520
G215	01/22/2020	--	--	--	--	0.064	--	99	48	--	--	0.35	--	--	--	--	7.1	--	--	130	--	460
G215	08/13/2020	--	--	--	--	0.051	--	110	70	--	--	0.366	--	--	--	--	7.2	--	--	210	--	710
G215	01/26/2021	--	--	--	--	0.36	--	180	120	--	--	<0.25	--	--	--	--	6.8	--	--	490	--	1100
G215	06/29/2021	--	--	--	--	--	--	180	110	--	--	--	--	--	--	--	7.1	--	--	470	--	950
G216	01/21/2015	--	0.0029	--	--	0.014	<0.001	100	78	--	--	--	<0.001	--	--	--	7.3	--	--	230	--	740

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G216	04/10/2015	<0.003	0.0064	0.18	<0.001	0.018	<0.001	140	66	<0.004	<0.002	0.385	0.0013	--	<0.0002	--	6.9	--	<0.001	210	<0.001	720
G216	07/22/2015	<0.003	0.0037	0.17	<0.001	0.021	<0.001	--	67	<0.004	<0.002	0.313	<0.001	--	<0.0002	0.0026	7.0	--	<0.001	220	<0.001	800
G216	10/07/2015	<0.003	0.002	0.16	<0.001	0.042	<0.001	--	85	<0.004	<0.002	0.295	<0.001	--	<0.0002	0.013	7.0	--	<0.001	210	<0.001	740
G217	01/21/2015	--	<0.001	--	--	<0.01	<0.001	110	82	--	--	--	<0.001	--	--	--	7.2	--	--	140	--	670
G217	04/10/2015	<0.003	<0.001	0.088	<0.001	<0.01	<0.001	130	77	<0.004	<0.002	0.401	<0.001	--	<0.0002	--	6.8	--	<0.001	130	<0.001	700
G217	07/22/2015	<0.003	0.0053	0.16	<0.001	<0.01	<0.001	--	78	0.011	0.012	0.31	0.0067	--	<0.0002	0.0014	7.0	--	<0.001	130	<0.001	750
G217	10/07/2015	<0.003	0.0019	0.11	<0.001	0.013	<0.001	--	76	0.0086	0.0032	0.295	0.0019	--	<0.0002	0.0013	7.1	--	<0.001	130	<0.001	660
G218	01/21/2015	--	0.0013	--	--	<0.01	<0.001	94	100	--	--	--	<0.001	--	--	--	7.2	--	--	110	--	660
G218	04/10/2015	<0.003	0.0011	0.14	<0.001	<0.01	<0.001	120	93	<0.004	<0.002	0.381	<0.001	--	<0.0002	--	6.8	--	<0.001	99	<0.001	640
G218	07/22/2015	<0.003	<0.001	0.15	<0.001	<0.01	<0.001	--	98	<0.004	<0.002	0.308	<0.001	--	<0.0002	<0.001	6.8	--	<0.001	97	<0.001	690
G218	10/07/2015	<0.003	<0.001	0.14	<0.001	<0.01	<0.001	--	96	0.03	<0.002	0.27	<0.001	--	<0.0002	0.0022	7.0	--	<0.001	95	<0.001	620
G218	11/24/2015	<0.003	0.0084	0.17	<0.001	<0.01	<0.001	120	99	0.01	<0.002	0.3	<0.001	<0.01	<0.0002	0.0015	7.1	1.23	<0.001	94	<0.001	620
G218	02/19/2016	<0.003	0.0018	0.15	<0.001	<0.01	<0.001	120	100	<0.004	<0.002	0.311	<0.001	<0.01	<0.0002	<0.001	7.0	1.28	<0.001	110	<0.001	560
G218	05/10/2016	<0.003	0.0015	0.14	<0.001	0.011	<0.001	110	97	<0.004	<0.002	0.439	<0.001	<0.01	<0.0002	<0.001	7.0	0.601	<0.001	140	<0.001	600
G218	07/30/2016	<0.003	0.0011	0.15	<0.001	<0.01	<0.001	130	100	<0.004	<0.002	0.382	<0.001	<0.01	<0.0002	<0.001	7.0	0.543	<0.001	120	<0.001	620
G218	11/23/2016	<0.003	0.0014	0.13	<0.001	<0.01	<0.001	92	97	<0.004	<0.002	0.373	<0.001	<0.01	<0.0002	<0.001	7.1	--	<0.001	130	<0.001	620
G218	12/07/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.85	--	--	--	--
G218	02/18/2017	<0.003	0.0011	0.13	<0.001	<0.01	<0.001	110	88	<0.004	<0.002	0.308	<0.001	<0.01	<0.0002	<0.001	7.2	0.779	<0.001	130	<0.001	630
G218	05/22/2017	<0.003	<0.001	0.15	<0.001	<0.01	<0.001	100	84	<0.004	<0.002	<0.25	<0.001	<0.01	<0.0002	<0.001	7.1	0.975	<0.001	140	<0.001	600
G218	07/17/2017	<0.003	<0.001	0.14	<0.001	<0.01	<0.001	120	81	<0.004	<0.002	0.357	<0.001	<0.01	<0.0002	<0.001	7.1	0.704	<0.001	140	<0.001	720
G218	10/31/2017	--	--	--	--	<0.01	--	110	91	--	--	0.437	--	--	--	--	6.9	--	--	140	--	660
G218	01/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--	--	--	--	--

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
G218	05/15/2018	--	--	--	--	0.014	--	110	91	--	--	0.413	--	--	--	--	7.0	--	--	140	--	640
G218	11/02/2018	--	--	--	--	<0.01	--	130	84	--	--	0.375	--	--	--	--	6.9	--	--	140	--	280
G218	01/17/2019	--	--	--	--	<0.01	--	120	82	--	--	0.361	--	--	--	--	7.0	--	--	140	--	600
G218	08/14/2019	--	--	--	--	<0.01	--	130	81	--	--	0.449	--	--	--	--	7.0	--	--	150	--	660
G218	01/22/2020	--	--	--	--	0.011	--	130	83	--	--	0.379	--	--	--	--	7.1	--	--	170	--	560
G218	08/13/2020	--	--	--	--	<0.01	--	120	84	--	--	0.34	--	--	--	--	7.1	--	--	220	--	720
G218	01/26/2021	--	--	--	--	0.017	--	120	81	--	--	0.276	--	--	--	--	7.0	--	--	210	--	710
MW16S	04/09/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.2	--	--	--	--	410
R104	01/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.8	--	--	--	--	460
R104	04/08/2015	<0.003	0.0015	0.065	<0.001	<0.01	<0.001	66	47	0.0043	<0.002	0.4	<0.001	--	<0.0002	--	7.4	--	0.0074	72	<0.001	500
R104	07/23/2015	<0.003	<0.001	0.067	<0.001	<0.01	<0.001	--	45	<0.004	<0.002	0.349	0.0023	--	<0.0002	0.0044	7.4	--	0.0072	73	<0.001	450
R104	10/06/2015	<0.003	<0.001	0.063	<0.001	<0.01	<0.001	--	56	0.0044	<0.002	0.304	<0.001	--	<0.0002	0.0045	7.6	--	0.0062	72	<0.001	480
R104	11/17/2015	<0.003	<0.001	0.067	<0.001	<0.01	<0.001	69	51	0.0052	<0.002	0.358	0.0012	<0.01	<0.0002	0.0041	7.4	0.565	0.0063	77	<0.001	420
R104	02/17/2016	<0.003	<0.001	0.06	<0.001	0.012	<0.001	67	58	<0.004	<0.002	0.314	<0.001	<0.01	<0.0002	0.0042	8.1	0.363	0.0064	77	<0.001	440
R104	05/16/2016	<0.003	<0.001	0.062	<0.001	<0.01	<0.001	65	49	<0.004	<0.002	0.473	<0.001	<0.01	<0.0002	0.0038	7.4	0.145	0.006	74	<0.001	420
R104	08/03/2016	<0.003	<0.001	0.064	<0.001	<0.01	<0.001	68	50	<0.004	<0.002	0.372	<0.001	<0.01	<0.0002	0.0042	7.3	0.798	0.006	76	<0.001	460
R201	01/20/2015	--	<0.001	--	--	<0.01	<0.001	110	53	--	--	--	<0.001	--	--	--	7.2	--	--	210	--	750
R201	04/10/2015	<0.003	<0.001	0.084	<0.001	<0.01	<0.001	130	66	<0.004	<0.002	0.353	<0.001	--	<0.0002	--	6.8	--	<0.001	220	<0.001	760
R201	07/22/2015	<0.003	0.0011	0.099	<0.001	<0.01	<0.001	--	78	<0.004	<0.002	0.28	<0.001	--	<0.0002	<0.001	6.9	--	<0.001	250	<0.001	930
R201	10/05/2015	<0.003	<0.001	0.081	<0.001	<0.01	<0.001	--	74	<0.004	<0.002	0.353	<0.001	--	<0.0002	<0.001	7.0	--	<0.001	210	<0.001	840
R201	11/23/2015	<0.003	<0.001	0.078	<0.001	<0.01	0.0012	85	37	<0.004	<0.002	0.377	<0.001	<0.01	<0.0002	0.0069	7.3	0.202	<0.001	150	<0.001	560
R201	02/12/2016	<0.003	0.01	0.084	0.0067	0.014	<0.001	120	75	<0.004	<0.002	0.398	<0.001	<0.01	<0.0002	0.001	7.0	0.543	0.0091	240	<0.001	740

RAMBOLL

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
R201	05/10/2016	<0.003	<0.001	0.084	<0.001	<0.01	<0.001	120	85	<0.004	<0.002	0.447	<0.001	<0.01	<0.0002	<0.001	7.0	1.12	<0.001	260	<0.001	840
R201	07/30/2016	<0.003	0.0031	0.092	<0.001	<0.01	<0.001	120	85	<0.004	<0.002	0.368	<0.001	<0.01	<0.0002	<0.001	7.1	0.697	<0.001	260	<0.001	750
R201	11/18/2016	<0.003	0.0013	0.058	<0.001	<0.01	<0.001	81	39	<0.004	<0.002	0.494	<0.001	<0.01	<0.0002	<0.001	7.2	0.055	<0.001	160	<0.001	580
R201	02/11/2017	<0.003	0.0028	0.086	<0.001	<0.01	<0.001	100	79	<0.004	<0.002	0.285	<0.001	<0.01	<0.0002	<0.001	7.1	1.02	<0.001	230	<0.001	900
R201	05/18/2017	<0.003	0.0023	0.087	<0.001	0.011	<0.001	120	74	<0.004	<0.002	0.354	<0.001	<0.01	<0.0002	<0.001	7.2	1.51	<0.001	300	<0.001	820
R201	07/13/2017	<0.003	0.0037	0.17	<0.001	0.01	<0.001	120	81	<0.004	<0.002	0.284	<0.001	<0.01	<0.0002	<0.001	7.0	2.75	<0.001	250	<0.001	780
R201	10/28/2017	--	--	--	--	0.017	--	93	30	--	--	0.38	--	--	--	--	7.1	--	--	89	--	660
R201	01/25/2018	--	--	--	--	--	--	--	31	--	--	0.338	--	--	--	--	7.0	--	--	--	--	--
R201	05/11/2018	--	--	--	--	<0.01	--	87	54	--	--	0.306	--	--	--	--	7.1	--	--	190	--	640
R201	11/02/2018	--	--	--	--	<0.01	--	82	24	--	--	0.419	--	--	--	--	7.1	--	--	110	--	470
R201	01/16/2019	--	--	--	--	<0.01	--	100	48	--	--	0.341	--	--	--	--	7.1	--	--	150	--	790
R201	08/12/2019	--	--	--	--	<0.01	--	120	71	--	--	0.466	--	--	--	--	7.1	--	--	220	--	760
R201	01/21/2020	--	--	--	--	0.01	--	130	66	--	--	0.309	--	--	--	--	7.2	--	--	210	--	770
R201	08/11/2020	--	--	--	--	<0.01	--	120	87	--	--	0.364	--	--	--	--	6.9	--	--	240	--	790
R201	01/29/2021	--	--	--	--	0.01	--	94	46	--	--	<0.25	--	--	--	--	7.0	--	--	160	--	710
R201	03/29/2021	<0.003	0.0017	0.073	<0.001	0.019	<0.001	97	55	<0.004	<0.002	0.45	<0.001	<0.02	<0.0002	<0.001	7.0	0.272	<0.001	190	<0.001	660
R201	04/21/2021	<0.003	0.0013	0.071	<0.001	0.019	<0.001	100	63	<0.004	<0.002	0.359	<0.001	<0.02	<0.0002	<0.001	6.9	0.561	<0.001	200	<0.001	810
R201	05/06/2021	<0.003	0.0027	0.078	<0.001	<0.01	<0.001	110	67	0.0043	<0.002	<0.25	<0.001	<0.02	<0.0002	0.0011	7.2	0.742	<0.001	210	<0.001	730
R201	05/17/2021	<0.003	0.0025	0.078	<0.001	<0.01	<0.001	110	76	<0.004	<0.002	0.265	<0.001	<0.02	<0.0002	<0.001	7.0	1.19	<0.001	210	<0.001	770
R201	06/14/2021	<0.003	0.0028	0.082	<0.001	0.016	<0.001	120	68	<0.004	<0.002	0.332	<0.001	<0.02	<0.0002	<0.001	7.0	0.123	<0.001	230	<0.001	820
R201	06/29/2021	<0.003	0.01	0.13	<0.001	0.014	<0.001	140	81	0.0067	0.0037	0.356	0.0059	<0.02	<0.0002	0.002	7.1	1.17	<0.001	220	<0.001	560
R201	07/13/2021	<0.003	0.0022	0.069	<0.001	<0.01	<0.001	97	58	<0.004	<0.002	0.261	<0.001	<0.02	<0.0002	<0.001	7.0	0.581	<0.001	170	<0.001	710

TABLE 4-1. GROUNDWATER ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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
R201	07/28/2021	<0.003	0.0019	0.081	<0.001	0.011	<0.001	110	79	<0.004	<0.002	0.504	<0.001	<0.02	0.0011	0.044	7.2	0.744	<0.001	370	<0.001	750

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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G102	01/20/2015	--	--	7.6	691	--	--
G102	04/08/2015	--	--	7.1	746	--	--
G102	07/23/2015	--	--	7.1	723	--	--
G102	10/06/2015	--	--	7.1	857	--	--
G102	11/16/2015	0.42	160	6.9	1040	12.6	3.9
G102	02/17/2016	1.10	152	7.5	682	11.3	--
G102	05/16/2016	0	136	7.2	575	16.1	30
G102	08/02/2016	0	96	7.2	648	18.0	30.6
G102	11/19/2016	0	74	7.1	782	13.8	20.5
G102	02/09/2017	0	72	7.1	820	14.5	45.5
G102	05/22/2017	0	61	7.2	1040	15.3	40.5
G102	07/09/2017	0	96	7.2	640	17.0	29.6
G102	10/25/2017	0	94	7.1	665	13.1	28.7
G102	01/26/2018	0	-96	7.1	690	11.1	19.7
G102	05/10/2018	0	94	7.2	661	14.4	16.7
G102	10/24/2018	0	87	7.0	693	14.5	14.8
G102	01/17/2019	0	99	7.2	652	12.3	28.6
G102	08/12/2019	0	98	7.2	700	16.8	27.7
G102	01/21/2020	6.10	148	7.6	599.2	9.9	101
G102	08/11/2020	1.10	129	7.3	949.2	18.3	0
G102	01/26/2021	2.10	141	7.1	685	11.3	3.42
G103	01/20/2015	--	--	7.6	555	--	--
G103	04/08/2015	--	--	7.2	761	--	--
G103	07/23/2015	--	--	7.2	815	--	--
G103	10/06/2015	--	--	7.3	896	--	--
G105	01/20/2015	--	--	7.3	700	--	--
G105	04/08/2015	--	--	7.0	897	--	--
G105	07/23/2015	--	--	7.1	912	--	--
G105	10/06/2015	--	--	7.0	1037	--	--
G106	01/20/2015	--	--	7.5	330	--	--
G106	04/08/2015	--	--	7.1	771	--	--
G106	07/23/2015	--	--	7.2	790	--	--
G106	10/06/2015	--	--	7.3	825	--	--
G106	11/17/2015	0	116	7.1	804	16.6	132
G106	02/17/2016	5.40	167	7.2	800	11.6	--
G106	05/16/2016	7.22	162	7.1	758	16.1	46
G106	08/04/2016	0	126	7.0	697	17.3	33.9
G106	11/19/2016	0	105	7.0	812	13.6	24.4
G106	02/09/2017	0	99	7.0	800	14.9	29.5
G106	05/22/2017	0	94	7.1	849	15.2	22.8
G106	07/09/2017	0	121	7.0	705	17.0	45
G106	10/25/2017	0	107	7.3	738	13.3	14.5
G106	05/10/2018	0	106	7.0	728	13.0	24.8
G106	08/09/2018	0	120	7.0	695	14.9	30.4
G106	10/24/2018	0	127	6.8	662	13.9	36.1
G106	01/17/2019	0	123	6.9	695	12.2	20.8

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G106	08/13/2019	0	121	6.9	712	17.4	29.8
G106	01/21/2020	1.00	81.4	7.3	951.1	10.8	25.4
G106	08/11/2020	0.41	-145	7.0	915.6	18.1	0
G106	01/26/2021	1.40	49.3	7.5	1223	11.4	4.95
G106	06/29/2021	1.70	-41.3	7.2	869.6	19.8	0
G200	01/20/2015	--	--	7.4	382	--	--
G200	04/10/2015	--	--	7.0	939	--	--
G200	07/22/2015	--	--	7.0	1024	--	--
G200	10/05/2015	--	--	7.1	984	--	--
G200	11/23/2015	7.18	29	7.2	948	15.7	844
G200	02/12/2016	10.00	134	7.2	1060	9.3	1000
G200	05/10/2016	0	-33	7.1	1010	18.3	1000
G200	07/30/2016	0	-62	7.1	990	19.2	1000
G200	11/18/2016	0	-76	7.2	874	16.3	1000
G200	02/10/2017	0	-72	7.1	852	15.7	1000
G200	05/18/2017	0	-66	7.0	904	15.4	1000
G200	07/13/2017	0	-63	7.1	940	18.1	1000
G200	10/28/2017	0	-65	7.2	1004	13.0	1000
G200	01/25/2018	0	-77	7.2	890	12.1	99
G200	05/11/2018	0	-55	7.0	1010	13.2	1000
G200	11/02/2018	0	-58	7.0	1020	13.8	1000
G200	01/16/2019	0	-61	7.1	980	12.3	1000
G200	08/12/2019	0	-63	7.0	967	17.0	1000
G200	01/21/2020	4.90	183	7.2	1039	10.4	42.6
G200	08/11/2020	1.80	104	7.2	929	19.1	21.8
G200	01/29/2021	2.70	43.6	7.3	914	9.1	98.3
G200	03/29/2021	1.80	28.1	7.3	886	12.8	115
G200	04/21/2021	0.76	92.7	7.2	898	10.6	13.2
G200	05/06/2021	1.40	10.8	7.1	917	11.9	2.71
G200	05/17/2021	0.22	34	7.2	933	14.2	189
G200	07/28/2021	0.77	-23.5	7.0	829.5	19.3	9.98
G206	01/21/2015	--	--	7.3	578	--	--
G206	04/09/2015	--	--	7.0	773	--	--
G206	07/22/2015	--	--	7.0	758	--	--
G206	10/07/2015	--	--	6.8	747	--	--
G206	11/18/2015	0	-165	7.1	830	16.6	65.4
G206	02/24/2016	1.50	22	6.7	769	12.9	19
G206	06/27/2016	0	-31	6.2	838	23.5	--
G206	08/06/2016	0	103	7.1	920	19.3	40.8
G206	11/22/2016	0	91	7.1	964	14.9	28.4
G206	02/11/2017	0	123	7.2	905	15.0	47
G206	05/18/2017	0	93	7.0	987	15.7	54.9
G206	07/15/2017	0	85	7.1	931	18.5	58.9
G206	10/30/2017	0	105	7.2	1010	12.8	31.8
G206	05/15/2018	0	91	7.0	938	15.5	43.3
G206	11/02/2018	0	98	7.0	872	15.1	40.6

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G206	01/17/2019	0	101	7.1	922	12.4	47
G206	08/14/2019	0	99	7.1	904	17.0	22.6
G206	01/21/2020	2.90	16.8	7.5	782.6	13.0	2.57
G206	05/05/2020	4.60	176	7.5	781	13.0	3.98
G206	08/13/2020	1.40	202	7.4	819	17.8	0.3
G206	01/27/2021	2.10	39.1	7.1	799	12.0	0.71
G206D	03/30/2021	0.69	-9.6	7.1	2027	15.4	226
G206D	04/22/2021	2.00	44.2	7.2	1892	15.4	54.5
G206D	05/05/2021	4.80	97.6	7.1	1764	18.8	33.5
G206D	05/18/2021	0.23	-48.4	7.2	1843	14.5	2.97
G206D	07/27/2021	2.00	78	7.5	924.3	20.6	20
G207	01/21/2015	--	--	7.7	444	--	--
G207	04/09/2015	--	--	7.1	607	--	--
G207	07/22/2015	--	--	7.2	693	--	--
G207	10/07/2015	--	--	7.2	672	--	--
G208	01/21/2015	--	--	7.6	396	--	--
G208	04/09/2015	--	--	7.2	531	--	--
G208	07/22/2015	--	--	7.1	638	--	--
G208	10/07/2015	--	--	7.2	743	--	--
G209	01/21/2015	--	--	7.4	1004	--	--
G209	04/09/2015	--	--	6.9	1280	--	--
G209	07/22/2015	--	--	7.0	1030	--	--
G209	10/07/2015	--	--	7.1	1086	--	--
G209	11/18/2015	0	-98	7.0	1024	16.5	149
G209	02/23/2016	0.07	76	7.0	1350	12.2	2.6
G209	05/11/2016	0	144	7.1	1400	19.0	30
G209	08/06/2016	0	149	7.2	1478	19.3	31.2
G209	11/22/2016	0	138	7.1	1610	15.1	36.4
G209	02/11/2017	0	-109	7.0	1490	14.5	69.4
G209	05/18/2017	0	-99	7.2	1420	15.5	62.2
G209	07/15/2017	0	161	7.3	1220	17.9	22
G209	10/31/2017	0	140	7.1	1450	12.9	26.4
G209	01/25/2018	0	101	7.0	1410	11.1	30.2
G209	05/15/2018	0	117	7.2	1480	13.5	28.5
G209	11/02/2018	0	148	7.2	1580	13.8	24.1
G209	01/17/2019	0	141	7.1	1490	12.9	30.6
G209	05/03/2019	0	159	7.7	1240	14.5	37
G209	08/14/2019	0	151	7.2	1490	17.1	29.3
G209	01/22/2020	1.10	-69	6.9	1310	11.6	22.6
G209	05/05/2020	0.88	-34.5	7.2	1182	13.0	0.7
G209	08/13/2020	1.50	-60.3	7.2	1285	18.6	5.4
G209	01/27/2021	3.20	47.8	7.1	1315	9.1	4.36
G210	01/21/2015	--	--	7.5	611	--	--
G210	04/09/2015	--	--	7.0	836	--	--
G210	07/22/2015	--	--	7.1	918	--	--
G210	10/07/2015	--	--	7.2	813	--	--

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G211	01/21/2015	--	--	7.6	604	--	--
G211	04/09/2015	--	--	7.1	819	--	--
G211	07/22/2015	--	--	7.1	855	--	--
G211	10/07/2015	--	--	7.3	926	--	--
G212	01/21/2015	--	--	7.5	525	--	--
G212	04/09/2015	--	--	7.0	712	--	--
G212	07/22/2015	--	--	7.0	744	--	--
G212	10/07/2015	--	--	7.0	825	--	--
G212	11/18/2015	0	-63	7.2	706	16.4	38.4
G212	02/19/2016	2.20	128	7.3	721	13.9	--
G212	05/11/2016	2.11	141	7.3	732	16.7	25
G212	08/06/2016	0	130	7.3	795	18.0	41.2
G212	11/23/2016	0	126	7.1	924	13.7	50.1
G212	02/15/2017	0	114	7.1	890	15.0	51.2
G212	05/22/2017	0	102	7.0	915	15.6	40.2
G212	07/15/2017	0	130	7.6	838	17.0	33.7
G212	10/31/2017	0	139	7.3	821	12.6	40.3
G212	05/14/2018	0	122	7.2	832	13.8	43.2
G212	11/02/2018	0	121	7.3	890	14.7	30.8
G212	01/16/2019	0	131	7.3	832	12.3	29.8
G212	08/14/2019	0	128	7.3	815	17.0	35.6
G212	01/22/2020	2.80	154	7.2	728.6	11.7	7.72
G212	08/13/2020	3.20	150	7.3	655	18.7	1.7
G212	01/26/2021	2.30	152	6.8	728	11.4	3.14
G212	06/29/2021	1.80	29.9	7.4	703.2	17.9	0
G213	01/21/2015	--	--	7.5	504	--	--
G213	04/09/2015	--	--	7.0	654	--	--
G213	07/22/2015	--	--	7.0	642	--	--
G213	10/07/2015	--	--	7.0	679	--	--
G214	01/21/2015	--	--	7.5	666	--	--
G214	04/09/2015	--	--	7.0	841	--	--
G214	07/22/2015	--	--	7.1	938	--	--
G214	10/07/2015	--	--	7.2	923	--	--
G215	01/21/2015	--	--	7.3	741	--	--
G215	04/09/2015	--	--	6.8	948	--	--
G215	07/22/2015	--	--	6.9	782	--	--
G215	10/07/2015	--	--	6.8	838	--	--
G215	11/24/2015	8.90	-59	7.2	907	16.0	909
G215	02/18/2016	0	-2	7.2	963	12.9	--
G215	05/11/2016	0	5	6.9	945	16.9	285
G215	07/30/2016	0	56	6.9	1020	18.3	161
G215	11/23/2016	0	61	6.9	1060	15.9	135
G215	02/18/2017	0	71	7.3	970	14.5	102
G215	05/22/2017	0	84	7.4	1030	15.2	91
G215	07/15/2017	0	61	7.0	992	17.5	1000
G215	10/31/2017	0	129	7.2	868	13.3	36.5

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G215	05/15/2018	0	42	6.9	1020	15.2	132
G215	11/02/2018	0	52	6.8	1050	14.2	179
G215	01/16/2019	0	61	6.9	1022	12.6	123
G215	08/14/2019	0	56	7.0	998	17.2	1000
G215	01/22/2020	0.46	0.5	7.1	938.6	11.1	31.8
G215	08/13/2020	0.20	-35.2	7.2	1086	20.3	13.8
G215	01/26/2021	0.17	-2.9	6.8	1493	12.0	45.9
G215	06/29/2021	0.20	-34.2	7.1	1689	19.1	70.4
G216	01/21/2015	--	--	7.3	817	--	--
G216	04/10/2015	--	--	6.9	1070	--	--
G216	07/22/2015	--	--	7.0	1093	--	--
G216	10/07/2015	--	--	7.0	981	--	--
G217	01/21/2015	--	--	7.2	802	--	--
G217	04/10/2015	--	--	6.8	1049	--	--
G217	07/22/2015	--	--	7.0	1135	--	--
G217	10/07/2015	--	--	7.1	1219	--	--
G218	01/21/2015	--	--	7.2	817	--	--
G218	04/10/2015	--	--	6.8	1038	--	--
G218	07/22/2015	--	--	6.8	1002	--	--
G218	10/07/2015	--	--	7.0	980	--	--
G218	11/24/2015	8.30	-22	7.1	1080	15.8	623
G218	02/19/2016	0	28	7.0	1130	13.6	--
G218	05/10/2016	0	-7	7.0	1130	19.8	18
G218	07/30/2016	0	72	7.0	1040	18.5	62.4
G218	11/23/2016	0	76	7.1	945	14.6	40.9
G218	02/18/2017	0	57	7.2	1100	14.7	37.2
G218	05/22/2017	0	62	7.1	1150	15.8	32.4
G218	07/17/2017	0	59	7.1	990	20.0	52.7
G218	10/31/2017	0	69	6.9	1080	13.5	51.9
G218	01/26/2018	0	71	6.9	990	11.9	40.2
G218	05/15/2018	0	81	7.0	1030	15.4	52.1
G218	11/02/2018	0	61	6.9	1080	14.5	51.8
G218	01/17/2019	0	73	7.0	1061	12.5	51.8
G218	08/14/2019	0	69	7.0	1028	16.9	70.6
G218	01/22/2020	1.20	33.9	7.1	1125	13.2	23.2
G218	08/13/2020	0.70	9.6	7.1	1132	20.2	1.3
G218	01/26/2021	1.40	10.5	7.0	1162	12.2	108
MW16S	04/09/2015	--	--	7.2	659	--	--
R104	01/20/2015	--	--	7.8	591	--	--
R104	04/08/2015	--	--	7.4	793	--	--
R104	07/23/2015	--	--	7.4	724	--	--
R104	10/06/2015	--	--	7.6	659	--	--
R104	11/17/2015	8.20	149	7.4	820	17.1	7.6
R104	02/17/2016	7.30	166	8.1	839	10.9	--
R104	05/16/2016	2.67	169	7.4	776	17.6	5.8
R104	08/03/2016	0	119	7.3	695	19.1	15.2

TABLE 4-2. GROUNDWATER FIELD PARAMETERS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
R201	01/20/2015	--	--	7.2	445	--	--
R201	04/10/2015	--	--	6.8	1212	--	--
R201	07/22/2015	--	--	6.9	1102	--	--
R201	10/05/2015	--	--	7.0	1165	--	--
R201	11/23/2015	0	-69	7.3	985	15.6	80
R201	02/12/2016	11.00	101	7.0	1390	10.3	4.8
R201	05/10/2016	0	-106	7.0	1420	15.5	55
R201	07/30/2016	0	-96	7.1	1520	16.9	57.7
R201	11/18/2016	0	-78	7.2	1350	15.3	45
R201	02/11/2017	0	-57	7.1	1292	15.0	50.2
R201	05/18/2017	0	-59	7.2	1150	14.8	57.5
R201	07/13/2017	0	-98	7.0	1495	17.0	59
R201	10/28/2017	0	-99	7.1	1300	12.6	60.5
R201	01/25/2018	0	56	7.0	1500	11.5	55.9
R201	05/11/2018	0	-88	7.1	1490	13.9	53.9
R201	11/02/2018	0	-91	7.1	1590	14.0	68.7
R201	01/16/2019	0	-94	7.1	1500	12.7	65.8
R201	08/12/2019	0	-93	7.1	1483	17.4	49.6
R201	01/21/2020	0.82	-115	7.2	1198	9.0	5.76
R201	08/11/2020	1.80	-80.1	6.9	1390	18.4	120
R201	01/29/2021	0.27	-32.1	7.0	1106	8.5	65.9
R201	03/29/2021	0.39	-56.5	7.0	1164	13.3	9.32
R201	04/21/2021	0.69	-44.5	6.9	1043	11.0	8.93
R201	05/06/2021	4.80	-42.4	7.2	1236	11.9	119
R201	05/17/2021	0.06	-109	7.0	1278	13.7	4.34
R201	06/14/2021	0.04	-120	7.0	1353	19.9	1.43
R201	06/29/2021	0.06	-116	7.1	1339	23.3	130
R201	07/13/2021	0.38	-27.1	7.0	1145	15.8	14.4
R201	07/28/2021	0.23	-122	7.2	1226	20.0	8.99

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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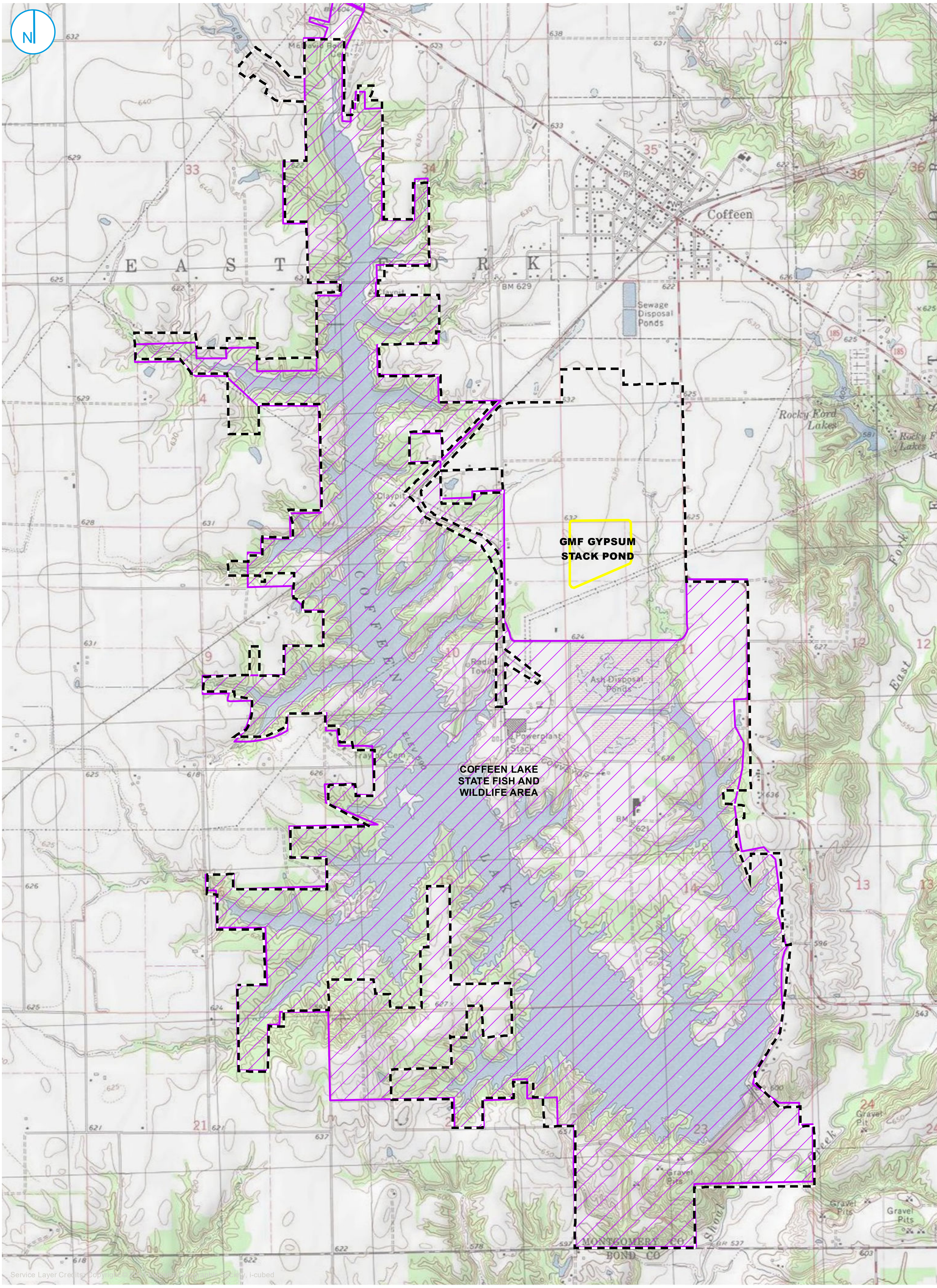
FIGURES



PART 845 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY
COFFEEN LAKE STATE FISH AND WILDLIFE AREA

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

COAL MINE SHAFT
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550 Feet

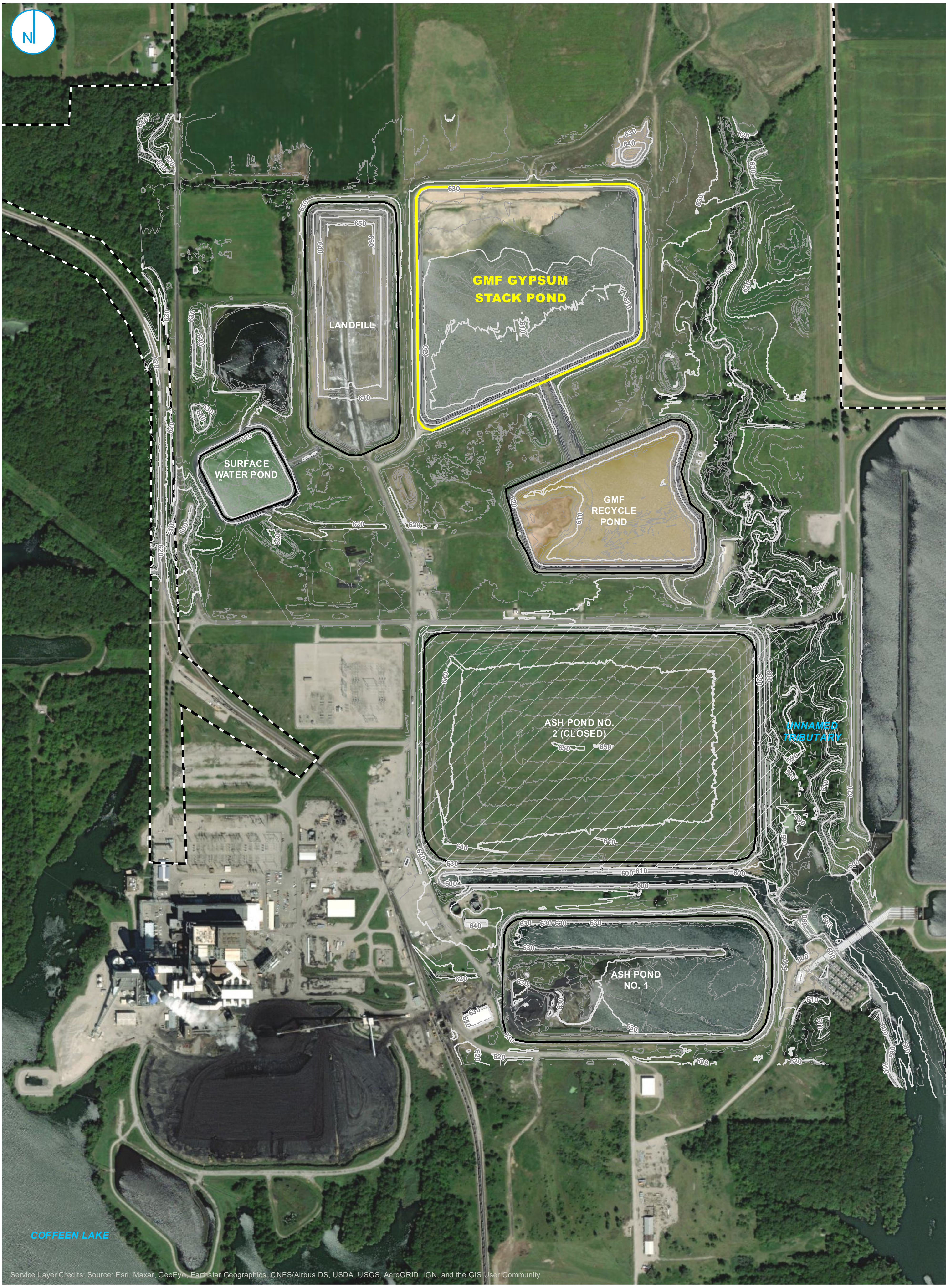
SITE MAP

FIGURE 1-2

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



10-FT ELEVATION CONTOUR
2-FT ELEVATION CONTOUR
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550 Feet

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

SOURCE
INGENAE SURVEY, 2021

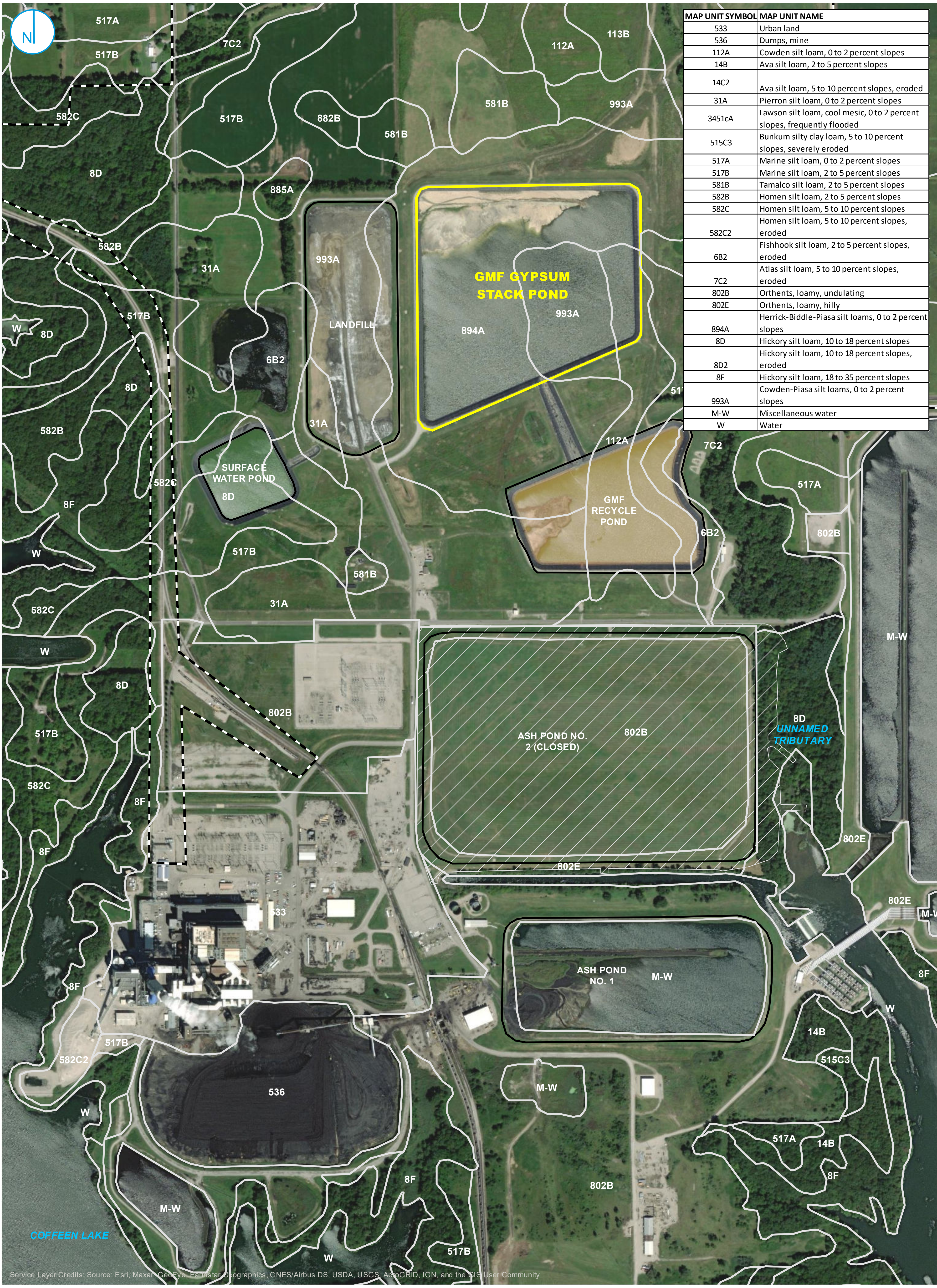
SITE TOPOGRAPHIC MAP

FIGURE 2-1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL



MAP UNIT SYMBOL	MAP UNIT NAME
533	Urban land
536	Dumps, mine
112A	Cowden silt loam, 0 to 2 percent slopes
14B	Ava silt loam, 2 to 5 percent slopes
14C2	Ava silt loam, 5 to 10 percent slopes, eroded
31A	Pierron silt loam, 0 to 2 percent slopes
3451cA	Lawson silt loam, cool mesic, 0 to 2 percent slopes, frequently flooded
515C3	Bunkum silty clay loam, 5 to 10 percent slopes, severely eroded
517A	Marine silt loam, 0 to 2 percent slopes
517B	Marine silt loam, 2 to 5 percent slopes
581B	Tamalco silt loam, 2 to 5 percent slopes
582B	Homen silt loam, 2 to 5 percent slopes
582C	Homen silt loam, 5 to 10 percent slopes
582C2	Homen silt loam, 5 to 10 percent slopes, eroded
6B2	Fishhook silt loam, 2 to 5 percent slopes, eroded
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded
802B	Orthents, loamy, undulating
802E	Orthents, loamy, hilly
894A	Herrick-Biddle-Piasa silt loams, 0 to 2 percent slopes
8D	Hickory silt loam, 10 to 18 percent slopes
8D2	Hickory silt loam, 10 to 18 percent slopes, eroded
8F	Hickory silt loam, 18 to 35 percent slopes
993A	Cowden-Piasa silt loams, 0 to 2 percent slopes
M-W	Miscellaneous water
W	Water

PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY
NRCS SOIL SURVEY MAP UNIT BOUNDARY

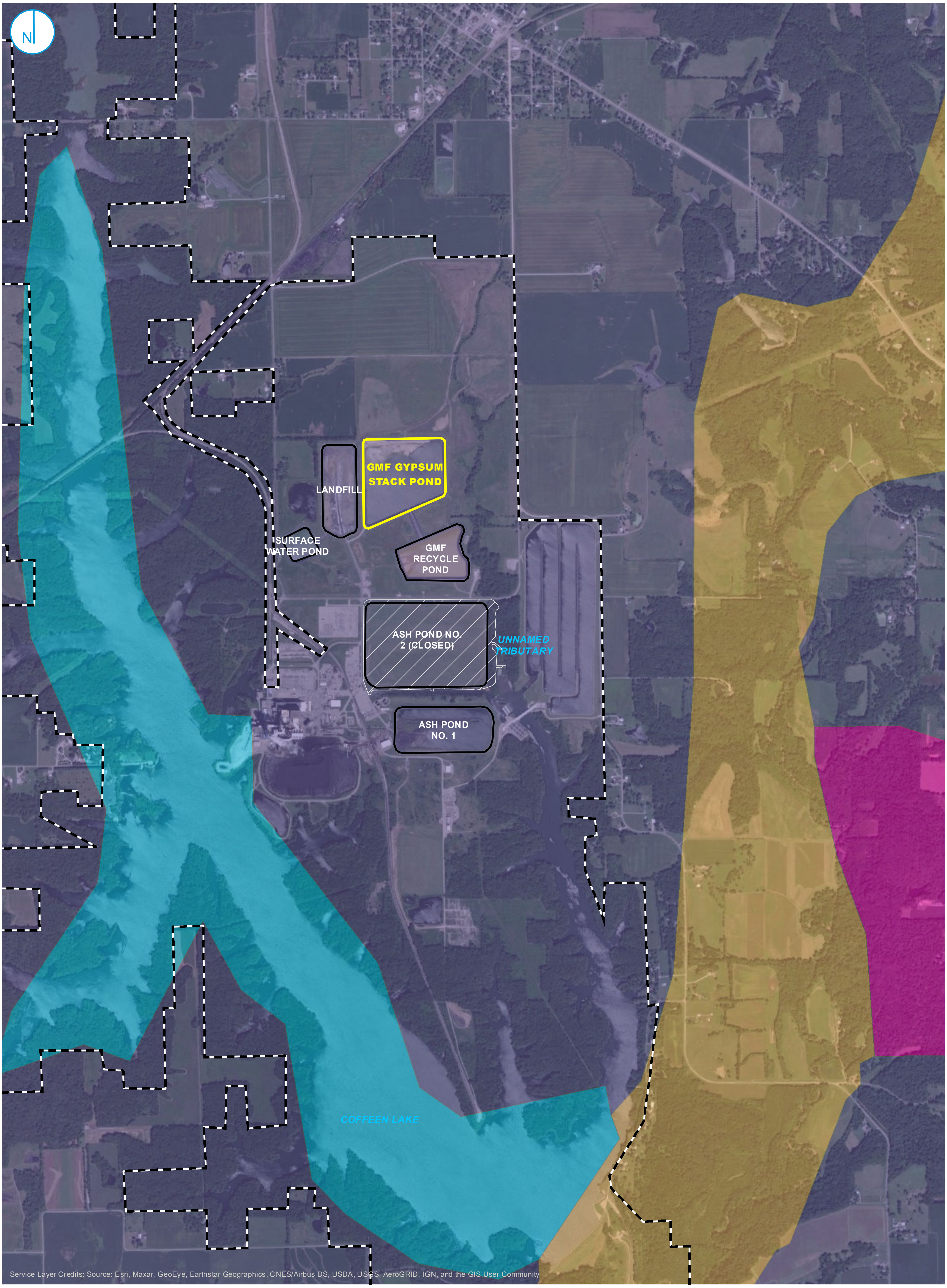
0 275 550
Feet

SOIL SURVEY MAP

FIGURE 2-2

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY
CAHOKIA ALLUVIUM (INCLUDES ALLUVIAL FAN FACIES)
HAGARSTOWN MEMBER
VANDALIA TILL MEMBER
WATER

0 750 1,500 Feet

SOURCE
ILLINOIS STATE GEOLOGICAL SURVEY (ISGS)

SURFICIAL GEOLOGIC DEPOSITS

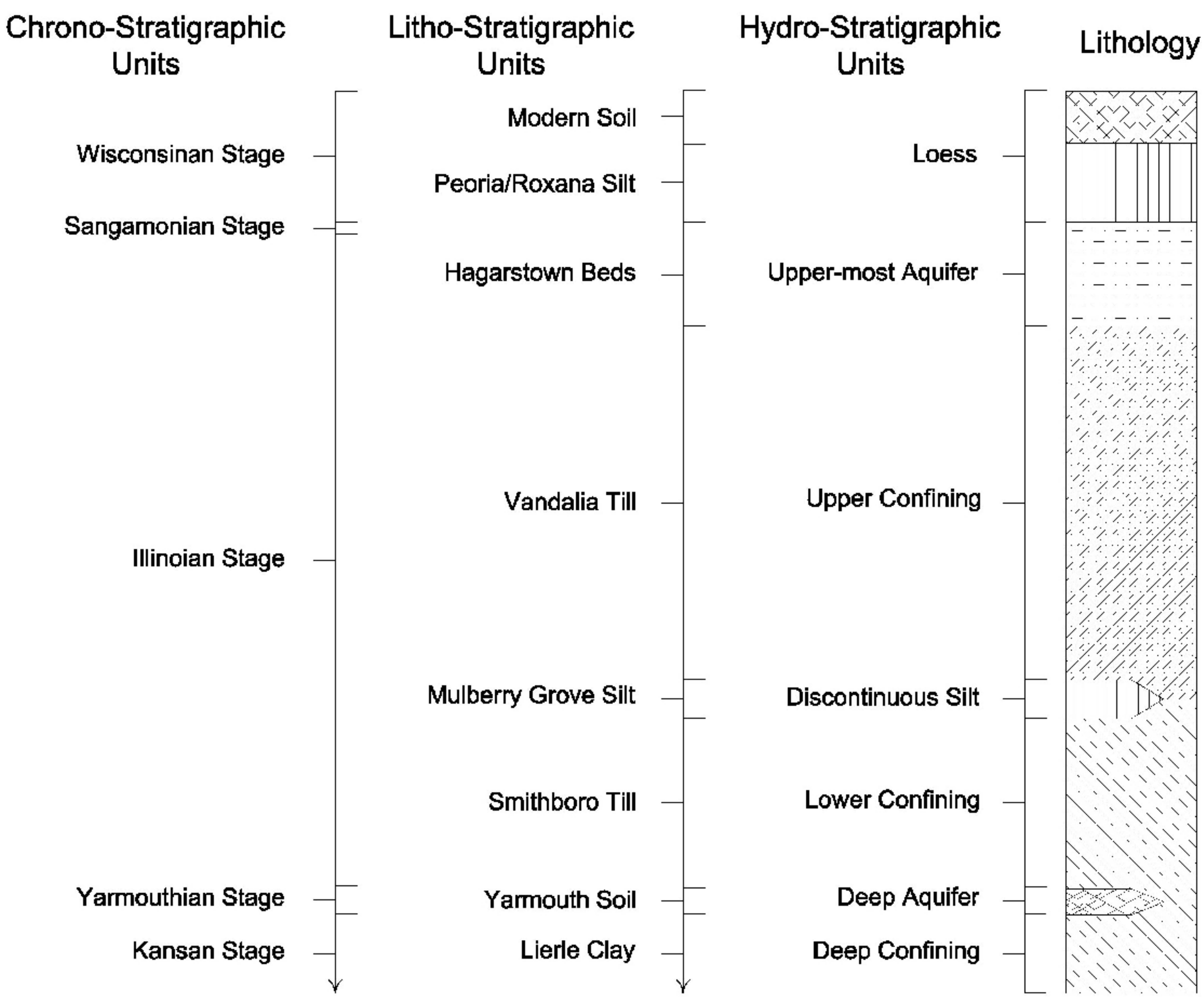
FIGURE 2-3

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Coffeen\GMF_GSP\Figure 2-4_Generalize Stratigraphic Column GSP.mxd

PROJECT: 169000XXXX | DATED: 10/12/2021 | DESIGNER: HOTCALD



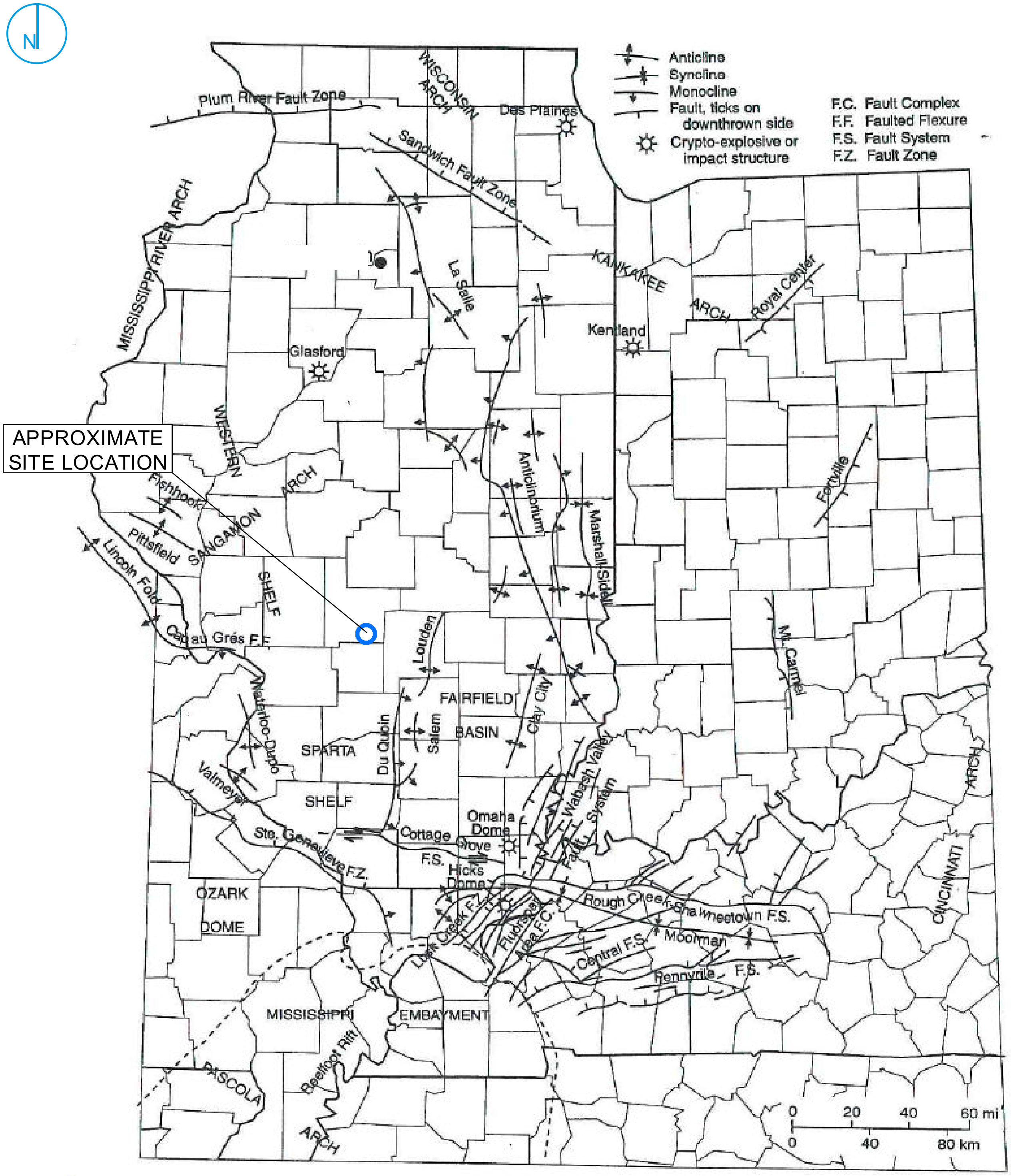
Service Layer Credits:

GENERALIZED STRATIGRAPHIC COLUMN

FIGURE 2-4

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



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\Coffeen\GMF_GSP\Figure 2-5_Major Structural Features of Illinois GSP.mxd

PROJECT: 169000XXXX | DATED: 10/12/2021 | DESIGNER: HOTCALD

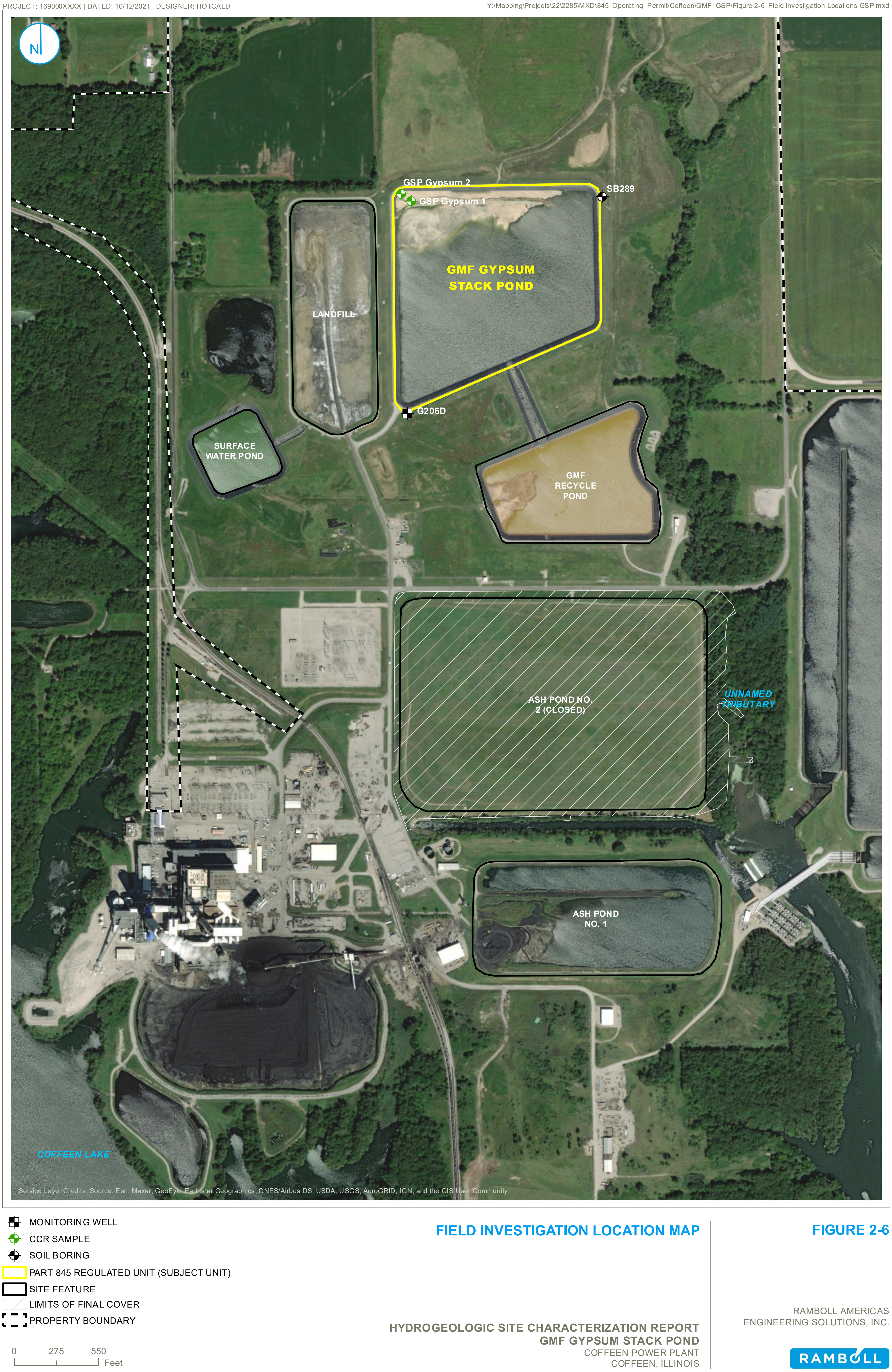
MAJOR STRUCTURAL FEATURES OF ILLINOIS

FIGURE 2-5

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

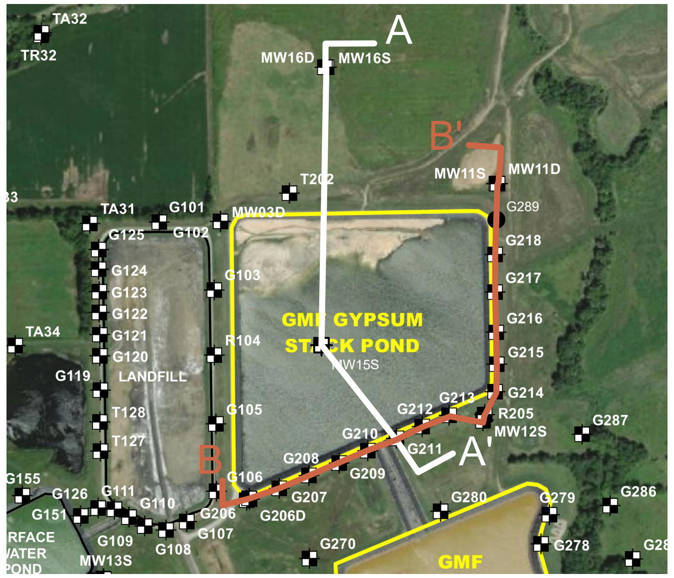


FIELD INVESTIGATION LOCATION MAP

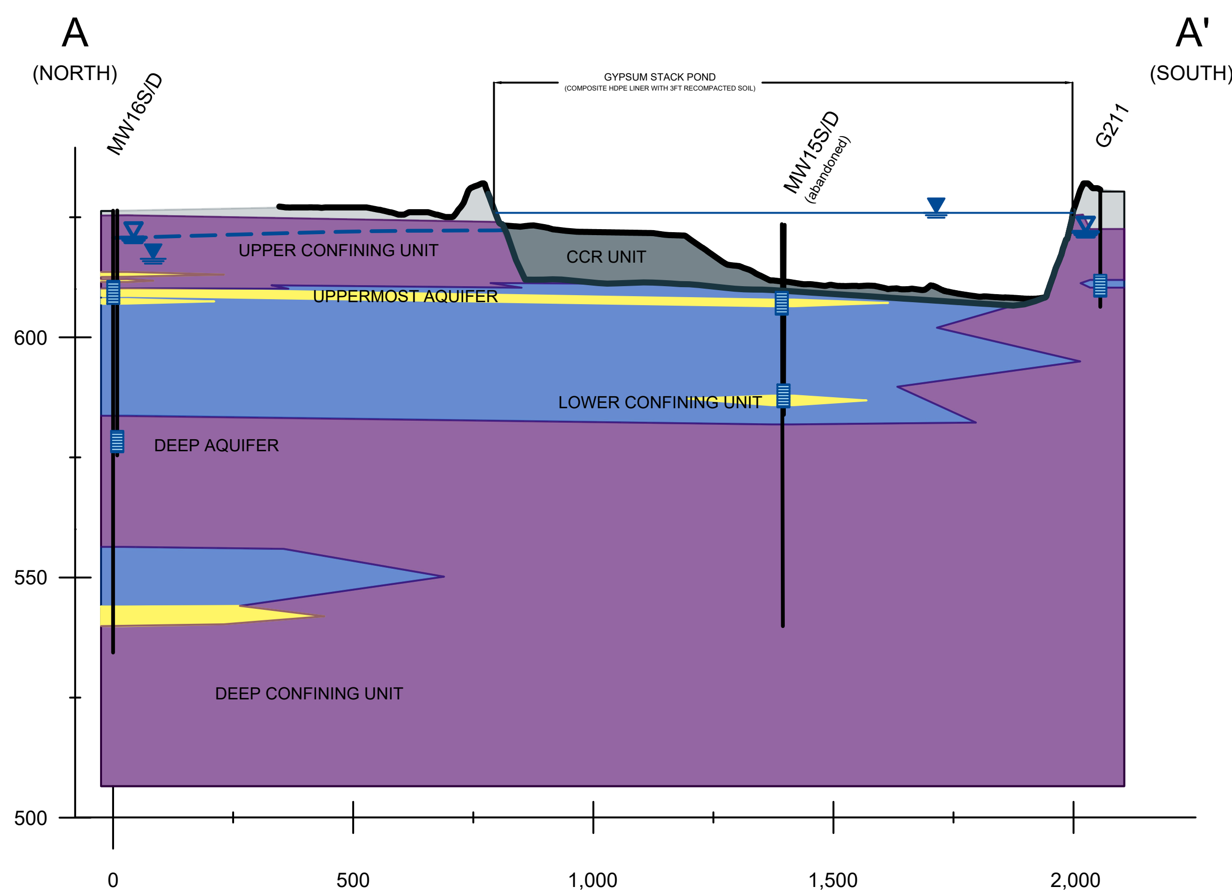
FIGURE 2-6

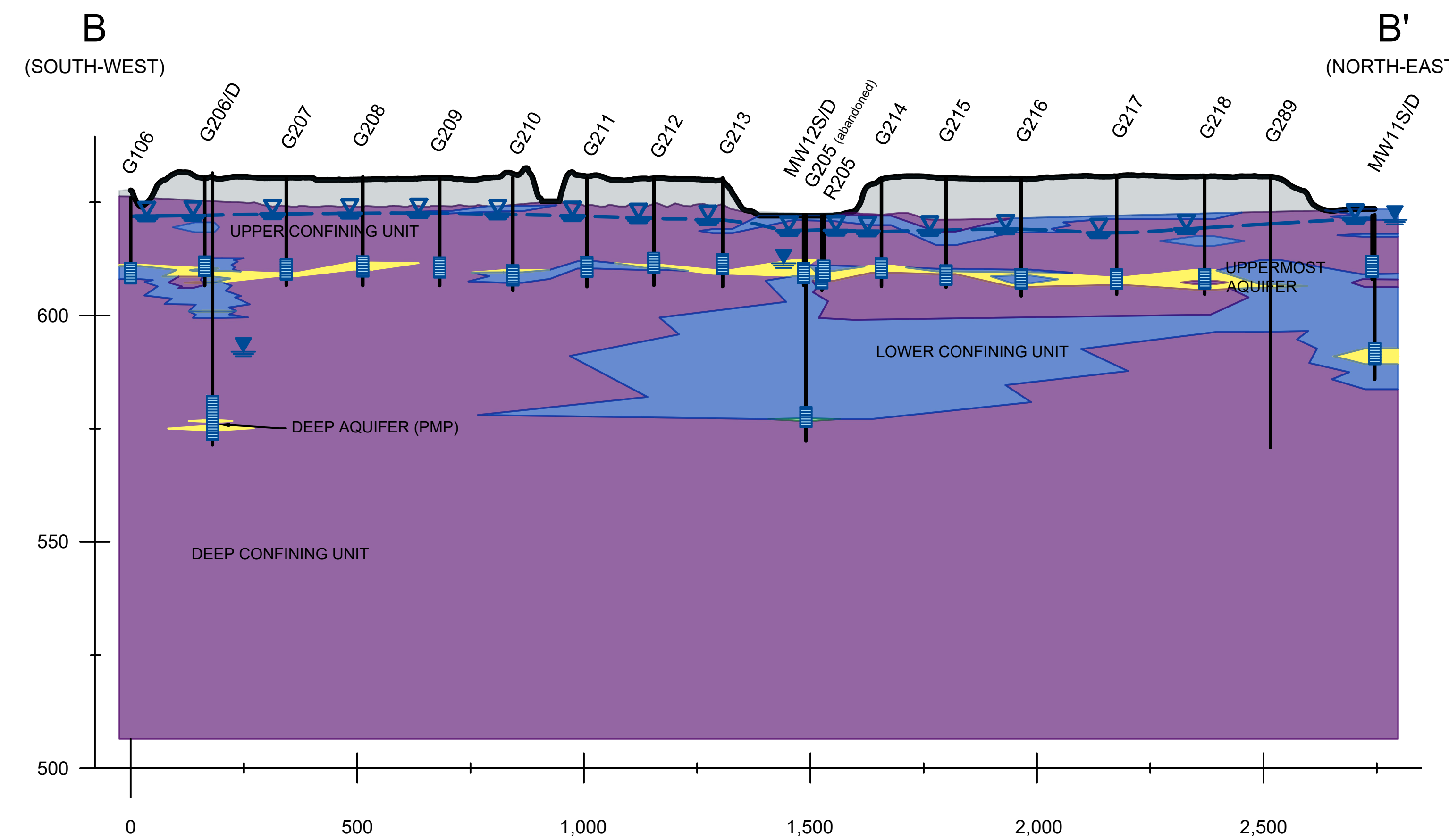
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



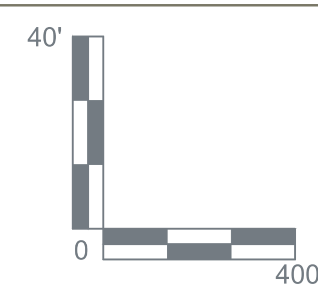
NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Groundwater elevations measured on July 26, 2021.





LEGEND

COAL COMBUSTION RESIDUALS (CCR)
FILL
CLAY (CL/CH)
SILT (ML)
SAND (SP/SM/SW)
PEAT
WELL SCREEN INTERVAL
UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
UPPERMOST AQUIFER GROUNDWATER ELEVATION
BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)
SURFACE WATER



GEOLOGIC CROSS SECTIONS
A-A' & B-B'

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 2-7

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

10 FOOT HISTORIC ELEVATION CONTOUR
2 FOOT HISTORIC ELEVATION CONTOUR
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

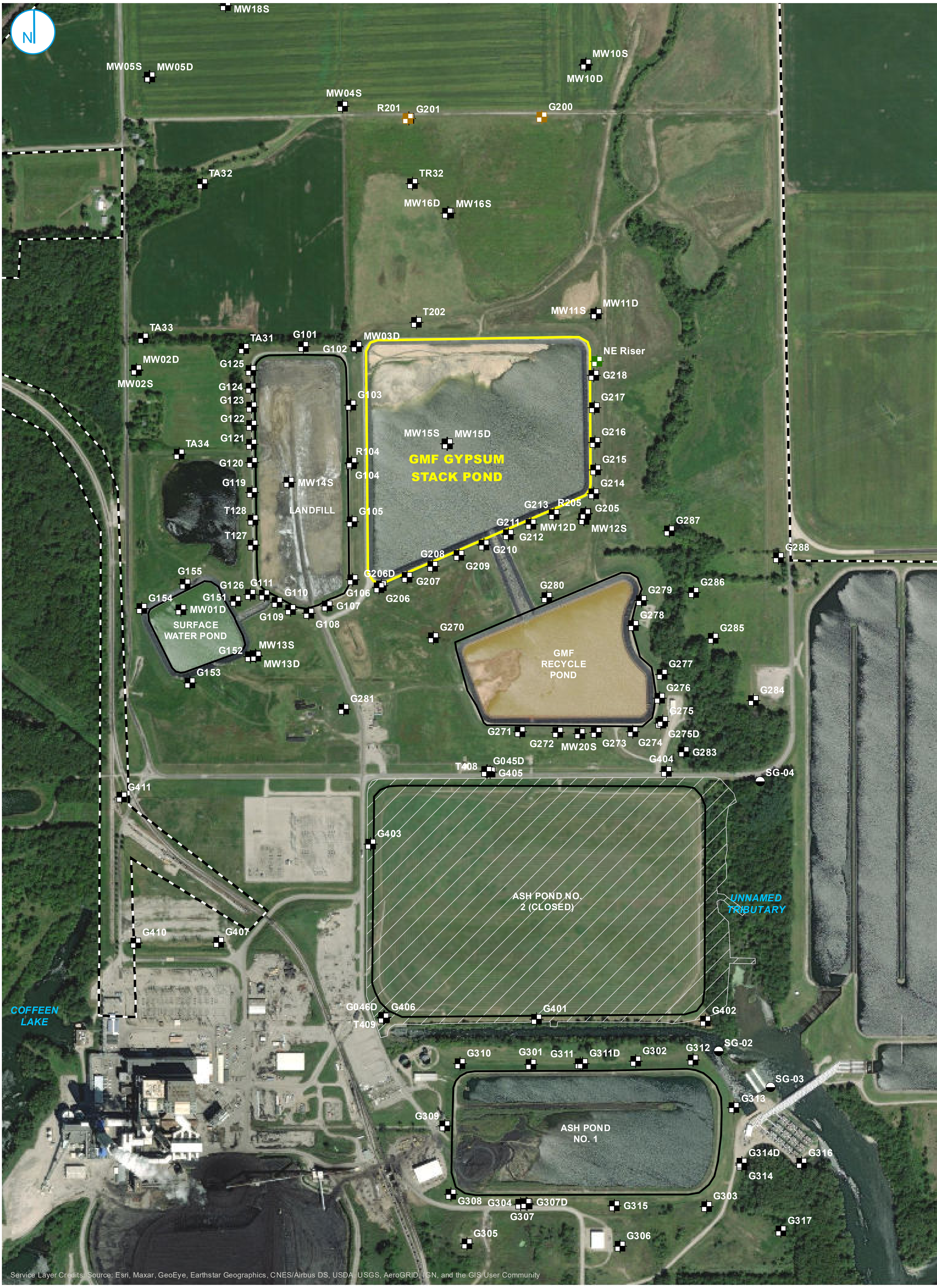
0 275 550 Feet

BOTTOM OF CCR MAP

FIGURE 2-8

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550
Feet

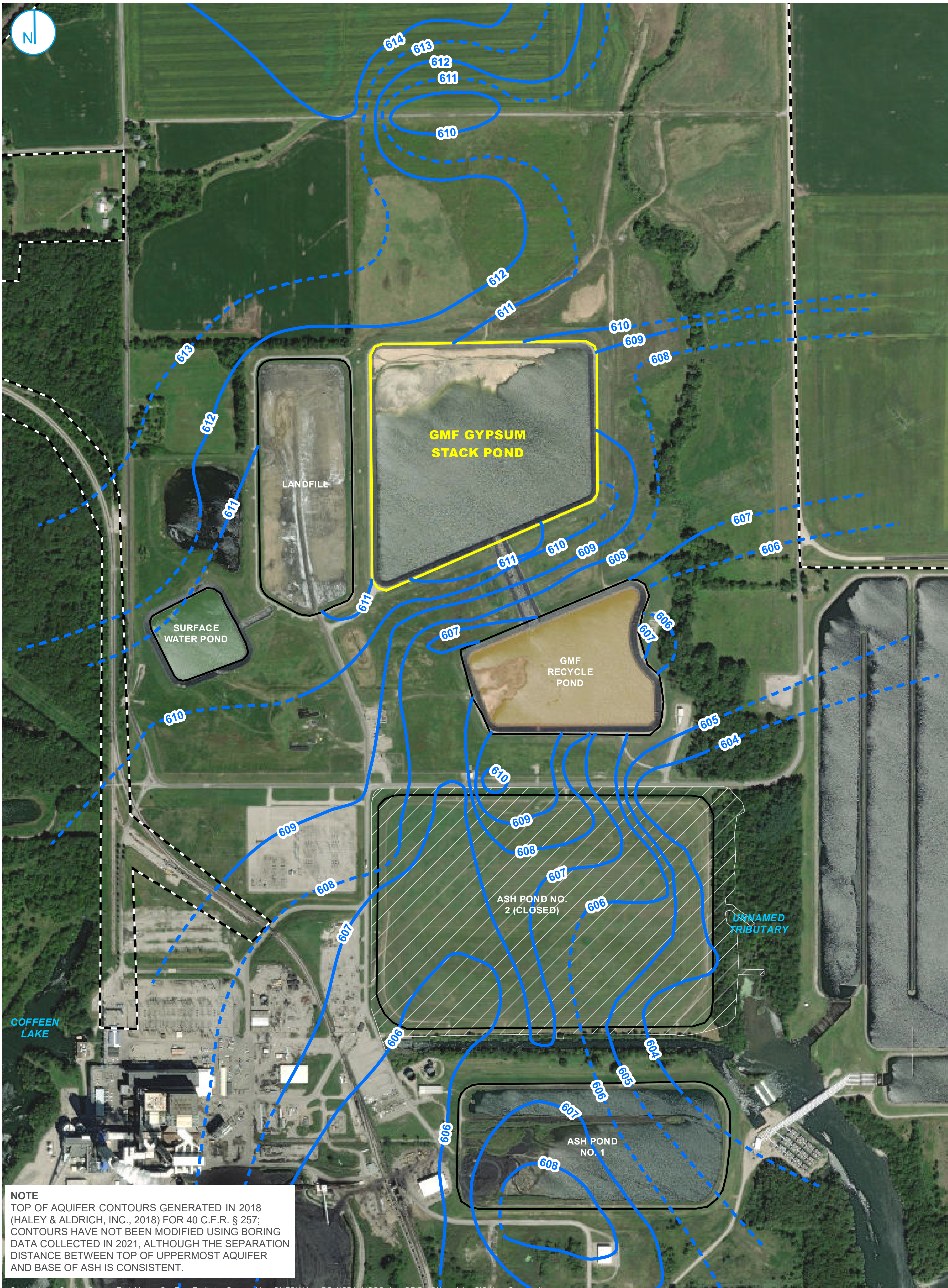
MONITORING WELL LOCATION MAP

FIGURE 3-1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



HAGARSTOWN MEMBER ELEVATION CONTOUR (1-FT INTERVAL, NAVD88)
INFERRED HAGARSTOWN MEMBER ELEVATION CONTOUR
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

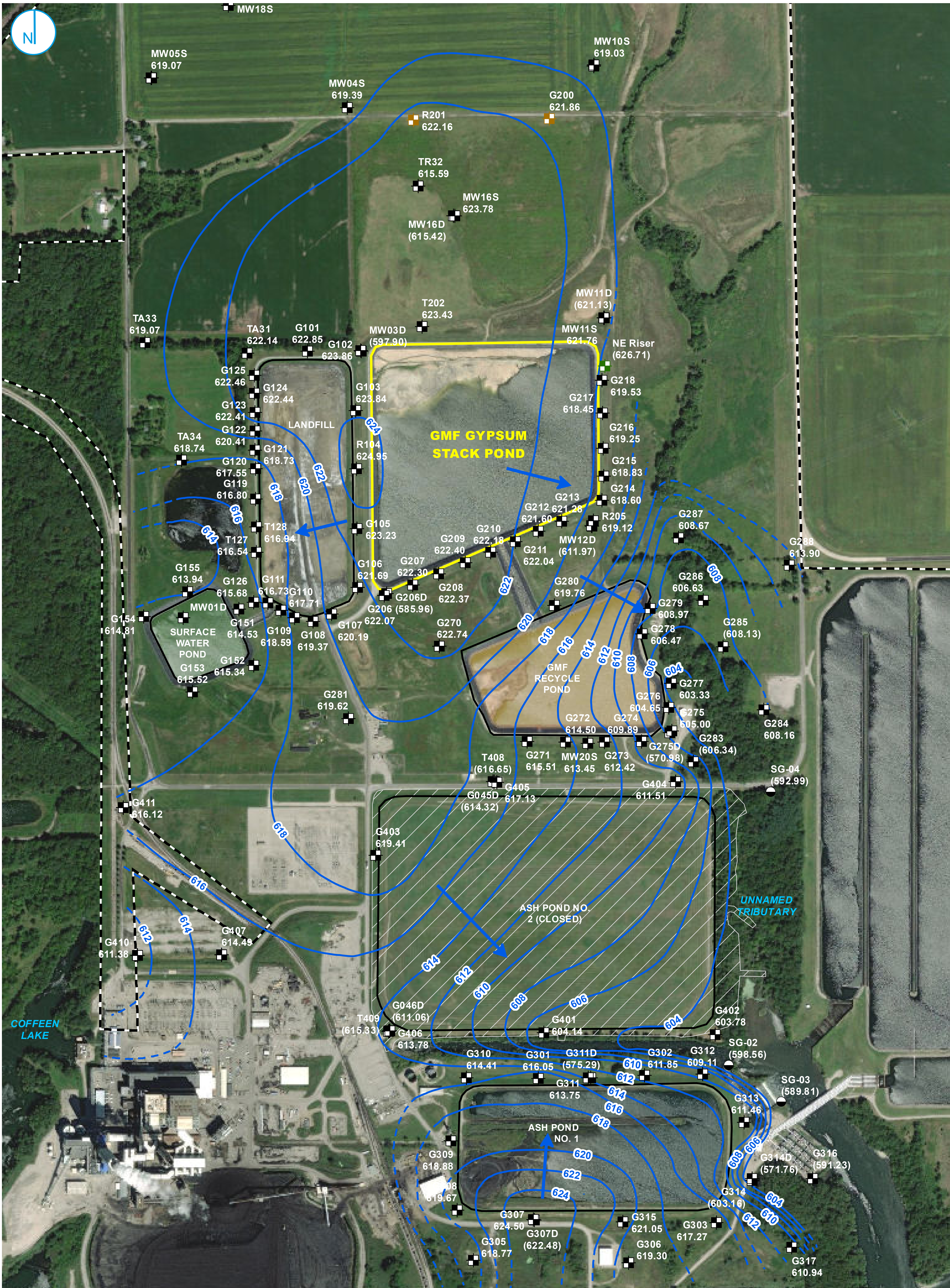
0 275 550 Feet

TOP OF UPPERMOST AQUIFER

FIGURE 3-2

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.



BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 275 550 Feet

PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTE:
ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

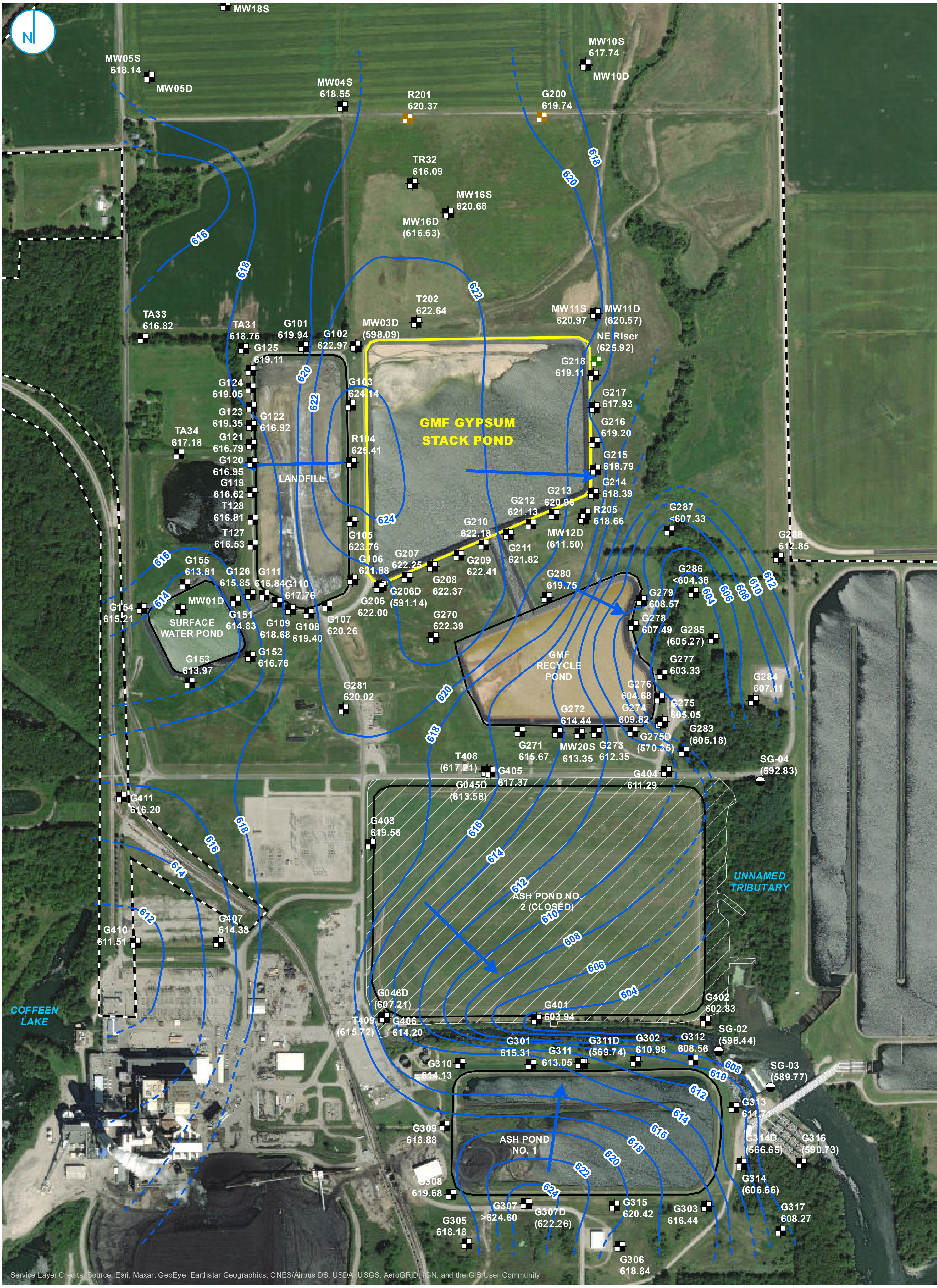
UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS APRIL 20, 2021

FIGURE 3-3

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL



BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550 Feet

NOTE:
ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS
JULY 26, 2021

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 3-4

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

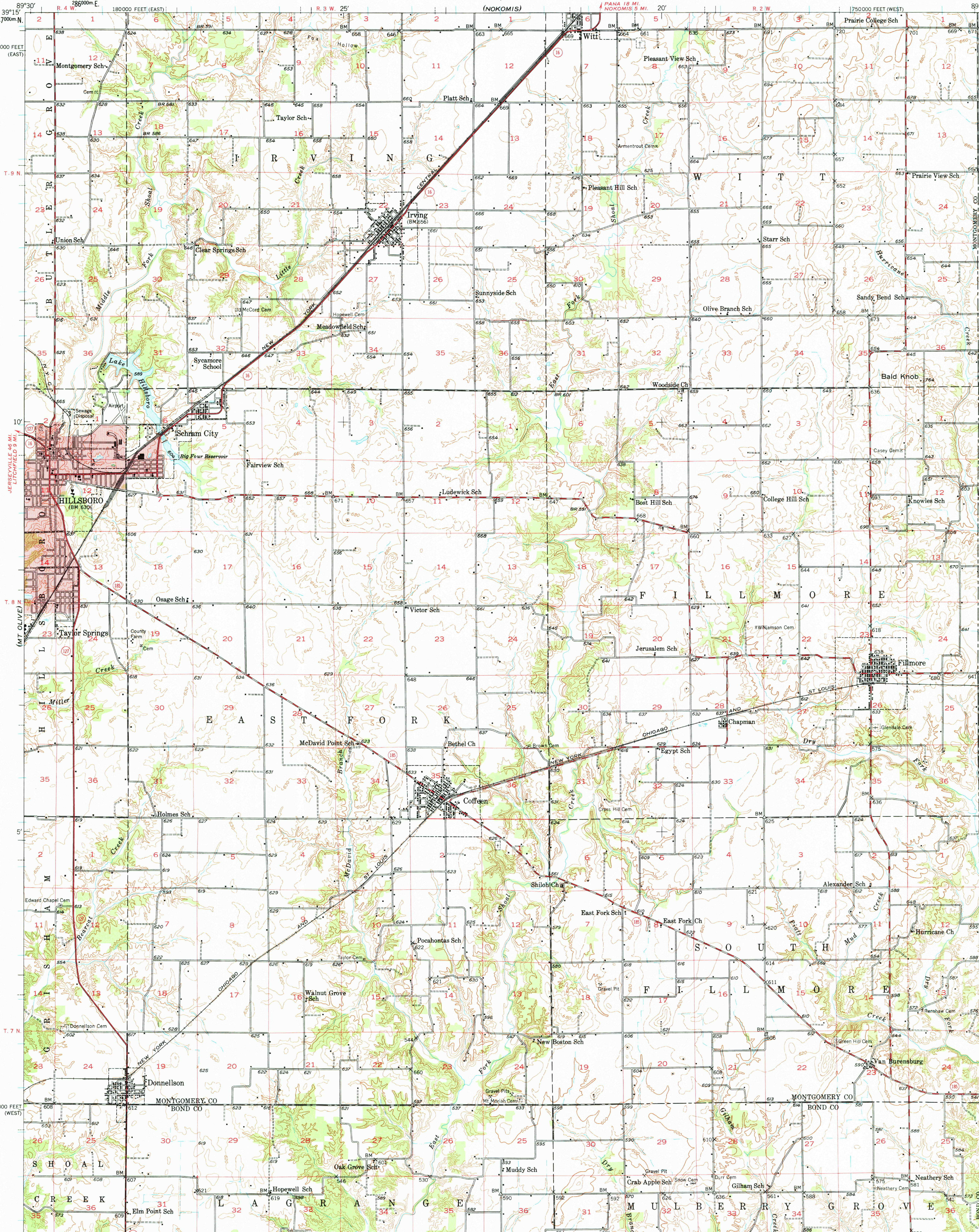
APPENDICES

APPENDIX A
HISTORIC TOPOGRAPHIC MAP

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION
GEOLOGICAL SURVEY DIVISION
URBANA, ILLINOIS

HILLSBORO QUADRANGLE
ILLINOIS
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey
Control by USGS and USC&GS
Culture and drainage in part compiled from aerial photographs taken 1938
Topography by plane-table methods 1947
Polyconic projection. 1927 North American datum
10,000-foot grids based on Illinois coordinate system, east and west zones
Red tint indicates area in which only landmark buildings are shown
1000-meter Universal Transverse Mercator grid ticks, zone 16, shown in blue

APPROXIMATE MEAN DECLINATION, 1947

SCALE 1:62500

CONTOUR INTERVAL 20 FEET
DASHED LINES REPRESENT HALF-INTERVAL CONTOURS
DATUM IS MEAN SEA LEVEL

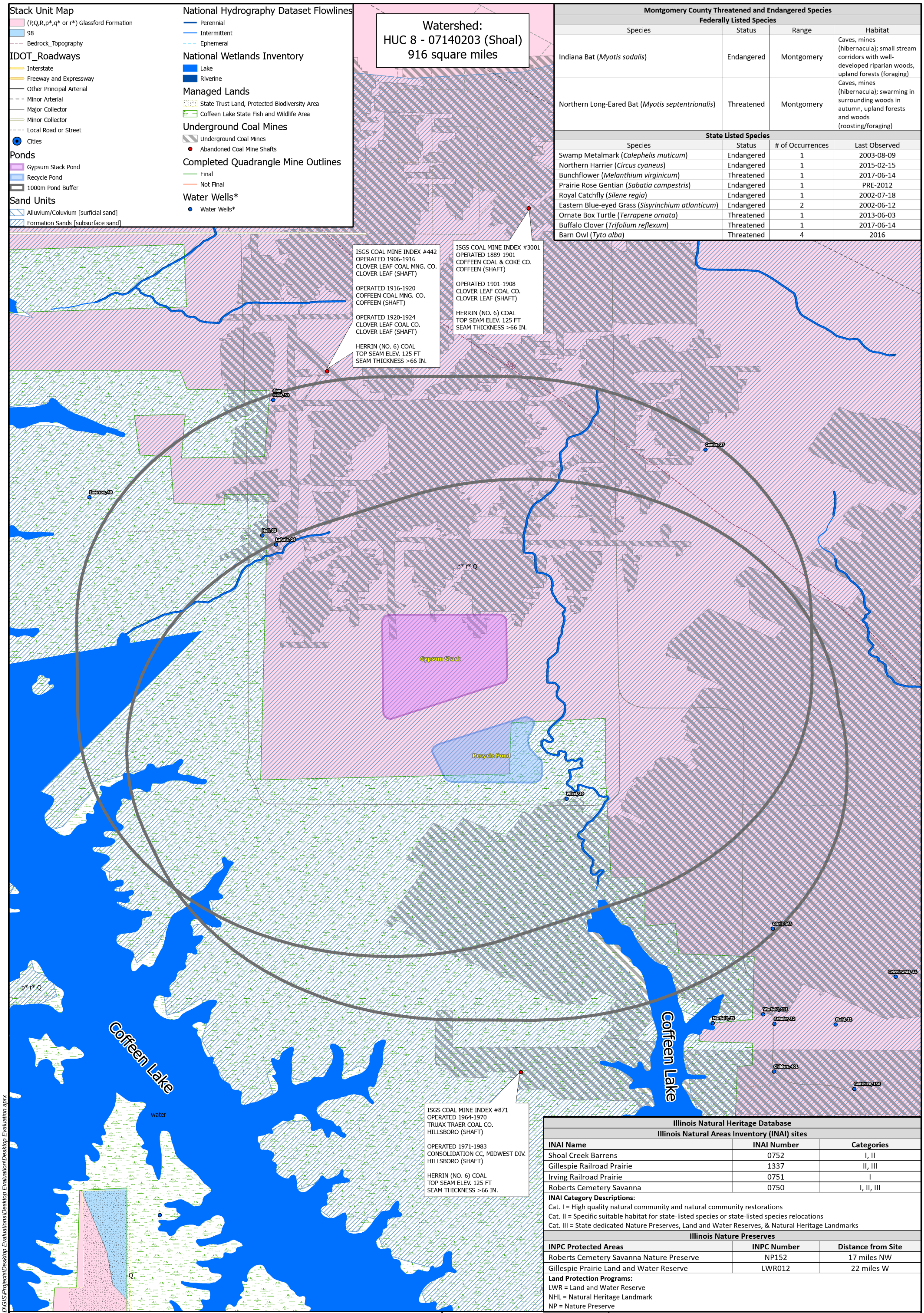
ROAD CLASSIFICATION
1963
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
State Route

QUADRANGLE LOCATION

HILLSBORO, ILL.
N3900—W8915/15
1947

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
AND BY THE STATE GEOLOGICAL SURVEY, URBANA, ILLINOIS
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

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



Montgomery County Threatened and Endangered Species

Federally Listed Species

Species	Status	Range	Habitat
Indiana Bat (*Myotis sodalis*)	Endangered	Montgomery	Caves, mines (hibernacula); small stream corridors with well-developed riparian woods, upland forests (foraging)
Northern Long-Eared Bat (*Myotis septentrionalis*)	Threatened	Montgomery	Caves, mines (hibernacula); swarming in surrounding woods in autumn, upland forests and woods (roosting/foraging)

State Listed Species

Species	Status	# of Occurrences	Last Observed
Swamp Metalmark (*Calephelis muticum*)	Endangered	1	2003-08-09
Northern Harrier (*Circus cyaneus*)	Endangered	1	2015-02-15
Bunchflower (*Melanthium virginicum*)	Threatened	1	2017-06-14
Prairie Rose Gentian (*Sabatia campestris*)	Endangered	1	PRE-2012
Royal Catchfly (*Silene regia*)	Endangered	1	2002-07-18
Eastern Blue-eyed Grass (*Sisyrinchium atlanticum*)	Endangered	2	2002-06-12
Ornate Box Turtle (*Terrapene ornata*)	Threatened	1	2013-06-03
Buffalo Clover (*Trifolium reflexum*)	Threatened	1	2017-06-14
Barn Owl (*Tyto alba*)	Threatened	4	2016

Illinois Natural Heritage Database

Illinois Natural Areas Inventory (INAI) sites

INAI Name	INAI Number	Categories
Shoal Creek Barrens	0752	I, II
Gillespie Railroad Prairie	1337	II, III
Irving Railroad Prairie	0751	I
Roberts Cemetery Savanna	0750	I, II, III

INAI Category Descriptions:
Cat. I = High quality natural community and natural community restorations
Cat. II = Specific suitable habitat for state-listed species or state-listed species relocations
Cat. III = State dedicated Nature Preserves, Land and Water Reserves, & Natural Heritage Landmarks

Illinois Nature Preserves

INPC Protected Areas	INPC Number	Distance from Site
Roberts Cemetery Savanna Nature Preserve	NP152	17 miles NW
Gillespie Prairie Land and Water Reserve	LWR012	22 miles W

Land Protection Programs:
LWR = Land and Water Reserve
NHL = Natural Heritage Landmark
NP = Nature Preserve

*(ISGS Water Well locations are provided by the original well driller to the nearest quarter, quarter section, and may not accurately represent the actual location of the well)

0 300 600 1,200 1,800 2,400 3,000 3,600 US Feet

1 inch = 1,200 US feet

N

No public water supply wells or intakes in mapped area.

\\hanson.dom\DFS\dfsvirt\20jobs\20E0111A\CAD\GIS\Projects\Desktop Evaluations\Desktop Evaluation\Desktop Evaluation.aprx

HANSON®
Hanson Professional Services Inc.

Gypsum Management Facility

Work Plan Desktop Evaluation
Coffeen Power Station
Coffeen, Montgomery Co., Illinois

Job Number: 20E0111A

Sheet 1

WATER WELL SURVEY

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
clay	0	26
Total Depth		**26**

Casing: 30" CONCRETE from 1' to 26'

Water from clay at 0' to 0'.

Driller's Log filed

Owner Address: ,

Location source: Location from permit

Permit Date: **Permit #:**

COMPANY Bekemeyer, Gust

FARM Lafuria, Mick

DATE DRILLED February 4, 1971 **NO.**

ELEVATION 0 **COUNTY NO.** 01725

LOCATION NW SE SE

LATITUDE 39.07411 **LONGITUDE** -89.402784

COUNTY Montgomery **API 121350172500** **3 - 7N - 3W**

ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
brown top soil	0	1
yellow clay	1	7
yellow clay & sand	7	12
yellow gravel & sand	12	14
gray clay & sand	14	35
Total Depth		**35**

Casing: 36" CONCRETE from -1' to 35'

Grout: CONCRETE from 0 to 10.

Grout: GRAVEL from 10 to 35.

Size hole below casing: 0"

Water from gravel & sand at 13' to 14'.

Owner Address: R.R. #1 Box #121 Coffeen, IL

Location source: Location from permit

Permit Date: September 22, 1983 **Permit #:** 109475

COMPANY Kohnen, Clarence

FARM Hull, Steve

DATE DRILLED October 17, 1983 **NO.**

ELEVATION 0 **COUNTY NO.** 22828

LOCATION 210'N line, 190'W line of SE SE

LATITUDE 39.074433 **LONGITUDE** -89.403283

COUNTY Montgomery **API 121352282800** **3 - 7N - 3W**

ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
brown top soil	0	1
yellow clay	1	8
yellow clay & sand	8	18
yellow gravel & sand	18	30
yellow sand & gravel	30	39
Total Depth		**39**

Casing: 36" CONCRETE from -1' to 39'
" from 0' to 0'

Grout: CONCRETE from 0 to 10.

Grout: GRAVEL from 10 to 39.

Size hole below casing: 0"

Water from at 22' to 39'.
Permanent pump installed at 38'
on December 1, 1981, with a capacity of 10 gpm

Owner Address: 109 Laredo Ave. St. Louis, MO
Location source: Location from permit

Permit Date: November 13, 1981 **Permit #:** 102105

COMPANY Kohnen, Clarence
FARM Wibel, William
DATE DRILLED November 30, 1981 **NO.**
ELEVATION 0 **COUNTY NO.** 22832
LOCATION 115'S line, 102'W line of SE SE NW
LATITUDE 39.064493 **LONGITUDE** -89.391801
COUNTY Montgomery API 121352283200 11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
clay	0	3
silt	3	33
clay	33	35
Total Depth		**35**

Casing: 2" SCH 40 PVC from 0' to 23'
Screen: 10' of 2" diameter .01 slot
Grout: CEMENT/BENT from 0 to 19.

Size hole below casing: 7.87"

Water from at 0' to 10'.
Static level 12' below casing top which is 2' above GL

Owner Address: % White & Brewer Landfill Coffeen, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM White & Brewer
DATE DRILLED November 18, 1993 **NO.** PZ-2
ELEVATION 621GL **COUNTY NO.** 23615
LOCATION 1470'S line, 300'W line of NE
LATITUDE 39.068212 **LONGITUDE** -89.388821
COUNTY Montgomery API 121352361500 11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
sandy clay	0	3
silty lcay	3	22
sandy, silty clay	22	23
Total Depth		**23**

Casing: 2" SCH 40 PVC from 0' to 12'
Screen: 10' of 2" diameter .01 slot
Grout: CEMENT/BENT 5% from 0 to 12.

Size hole below casing: 7.87"

Water from at 0' to 8'.
Static level 10' below casing top which is 2' above GL

Owner Address: % White & Brewer Landfill Coffeen, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM White & Brewer
DATE DRILLED **NO.** PZ-12
ELEVATION 624GL **COUNTY NO.** 23618
LOCATION 910'N line, 530'E line of section
LATITUDE 39.068862 **LONGITUDE** -89.382456
COUNTY Montgomery **API 121352361800** **11 - 7N - 3W**

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
silty clay	0	10
silty sand	10	14
sandy silt	14	29
silty clay	29	33
clayey silt	33	40
Total Depth		**40**

Casing: 2" SCH 5 STAINLESS STL from 0' to 30'
Screen: 10' of 2" diameter .01 slot
Grout: CEMENT/BENT 5% from 0 to 27.

Size hole below casing: 7.87"

Water from at 0' to 5'.
Static level 7' below casing top which is 2' above GL

Owner Address: % White & Brewer Landfill Coffeen, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM White & Brewer
DATE DRILLED **NO.** G-119A
ELEVATION 623GL **COUNTY NO.** 23619
LOCATION 1060'N line, 730'E line of section
LATITUDE 39.068452 **LONGITUDE** -89.383158
COUNTY Montgomery API 121352361900 11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
clayey silt	0	1
silty clay	1	10
silty sand	10	14
sandy silt	14	20
Total Depth		**20**

Casing: 2" SCH 40 PVC from 0' to 9'
Screen: 10' of 2" diameter .01 slot
Grout: CEMENT/BENT 5% from 0 to 4.

Size hole below casing: 7.87"

Water from at 0' to 3'.
Static level 9' below casing top which is 2' above GL

Owner Address: % White & Brewer Landfill Coffeen, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM White & Brewer
DATE DRILLED **NO.** G119B
ELEVATION 622GL **COUNTY NO.** 23620
LOCATION 1080'N line, 750'E line of section
LATITUDE 39.068397 **LONGITUDE** -89.383229
COUNTY Montgomery API 121352362000 11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Monitoring	Top	Bottom
clayey silt	0	4
silty clay	4	18
sandy silt	18	25
sand	25	31
clayey silt	31	33
Total Depth		**33**

Casing: 2" SCH 5 STAINLESS STL from 0' to 21'
Screen: 10' of 2" diameter .01 slot
Grout: CEMENT/BENT 5% from 0 to 16.

Size hole below casing: 7.87"

Water from at 0' to 2'.
Static level 4' below casing top which is 2' above GL

Owner Address: % White & Brewer Landfill Coffeen, IL
Location source: Location from the driller

Permit Date: **Permit #:** none

COMPANY Fox Drilling
FARM White & Brewer
DATE DRILLED **NO.** G-120A
ELEVATION 623GL **COUNTY NO.** 23621
LOCATION 1990'N line, 730'E line of section
LATITUDE 39.065884 **LONGITUDE** -89.38313
COUNTY Montgomery API 121352362100 11 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
black dirt	0	1
clay	1	3
gravelly clay	3	13
hardpacked gravelly clay & layered gvl	13	19
layered gray gravelly sand & gry gvly cl	19	27
Total Depth		**27**

Casing: 6" ASTM F480 SDR 21 from 0' to 11'
36" CONCRETE from 11' to 27'

Grout: BENTONITE PLUG from 10 to 11.

Water from gravelly clay at 11' to 13'.
Static level 12' below casing top which is 1' above GL

Owner Address: 1756 Red Ball Trail Coffeen, IL

Address of well: same as above

Location source: Location from permit

Permit Date: June 25, 1998 **Permit #:** 135-001

COMPANY Walters, Steven

FARM Combs, Jack

DATE DRILLED July 15, 1998 **NO.**

ELEVATION 0 **COUNTY NO.** 23873

LOCATION NE NW SE

LATITUDE 39.077695 **LONGITUDE** -89.386518

COUNTY Montgomery API 121352387300 2 - 7N - 3W

ILLINOIS STATE GEOLOGICAL SURVEY

Semi-Private Water Well	Top	Bottom
coal mine mat coal, concrete, wood, slag	0	5
yellow & gray clay mix	5	7
yellow & gray sandy clay	7	10
gravelly clay	10	17
hardpacked gravelly clay	17	21
gray gravelly clay	21	30
layered gray sand & gray gravelly clay	30	38
gray gravelly clay	38	53
Total Depth		**53**

Casing: 6" ASTM F480 SDR 21 from 0' to 12'
36" CONCRETE from 0' to 53'

Grout: CONCRETE from 9 to 12.

Grout: BENT HOLE PLUG from 11 to 12.

Water from gravelly clay at 13' to 17'.
Static level 16' below casing top which is 3' above GL

Owner Address: % Fairmont Minerals 796 CIPS Trail Coffeen, IL

Address of well: same as above

Location source: Location from permit

Permit Date: June 9, 1999 **Permit #:** 135-001

COMPANY Walters, Steven

FARM Stan Blast Abrasives

DATE DRILLED June 14, 1999 **NO.** 1

ELEVATION 0 **COUNTY NO.** 23908

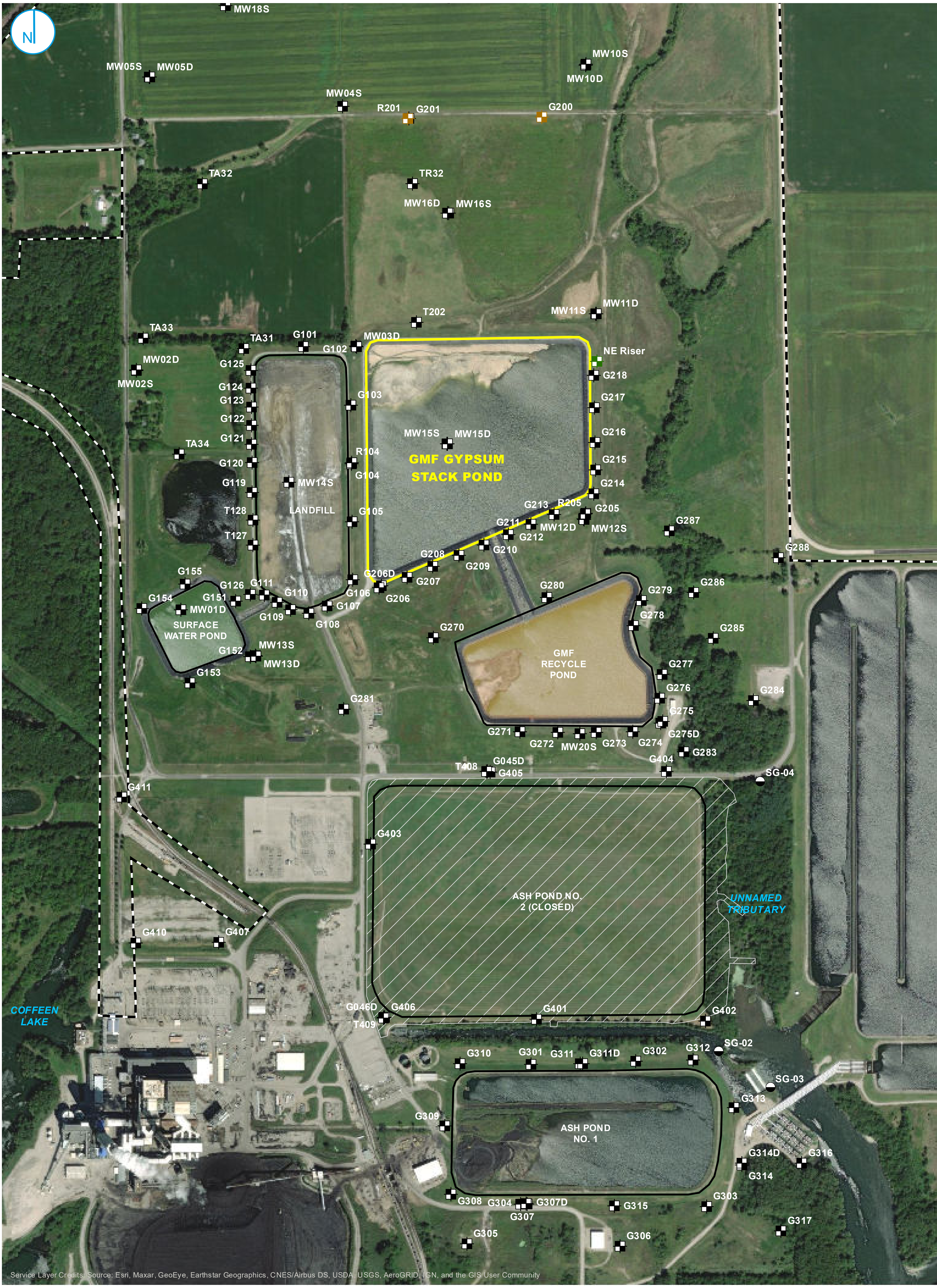
LOCATION SW SE NE

LATITUDE 39.079557 **LONGITUDE** -89.402861

COUNTY Montgomery **API 121352390800** **3 - 7N - 3W**

APPENDIX C
BORING AND WELL CONSTRUCTION LOGS

BORING AND WELL LOCATIONS MAP



BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550 Feet

MONITORING WELL LOCATION MAP

FIGURE C1

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

BORING LOGS

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/16/2016
Finish: 8/17/2016
WEATHER: Cloudy, rain, (hi-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G405D
Well ID: G45D
Surface Elev: 620.94 ft. MSL
Completion: 42.00 ft. BGS
Station: 873,998.03N
2,515,322.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

WATER LEVEL INFORMATION:
▼ = 16.00 - During Drilling
▼ =
▽ =

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	0/60 *0%*	BD					0–2.3	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)		620	
							2.3–5	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY		618	
	0/60 *0%*	BD					5–5.9	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand		616	
							5.9–6.5	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND			
							6.5–8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		614	
							8–10.7	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel		612	
	0/48 *0%*	BD					10.7–11.3	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		610	
							11.3–11.9	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel			
							11.9–12.1	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND			
							12.1–12.2	Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel		608	
							12.2–13.9	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND			
							13.9–14	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel			
1A	24/24 *100%*	SS	*6-23 37-44* N=60	11		*1.50*	14–18	Dark gray (10YR4/1), moist, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.		606	
2A	23/24 *96%*	SS	*14-32 41-45* N=73	7		*4.50*	▼ 16			604	
3A	14/17 *82%*	SS	*16-47 50/5"*	7		*4.50*	18–20	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.		602	

NOTE(S): G45D installed in boring.
Boring was blind drilled to 14.0 feet bgs. Blind drill lithologies from boring G405.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/16/2016
Finish: 8/17/2016
WEATHER: Cloudy, rain, (hi-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G405D
Well ID: G45D
Surface Elev: 620.94 ft. MSL
Completion: 42.00 ft. BGS
Station: 873,998.03N
2,515,322.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

WATER LEVEL INFORMATION:
▼ = 16.00 - 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
								Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.	
4A	19/24 *79%*	SS	*15-36 32-36* N=68	8		*4.50*		Dark gray (10YR4/1), moist, dense, fine- to coarse-grained SAND.	600
5A	19/24 *79%*	SS	*10-18 30-33* N=48	8		*4.50*	22	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.	598
6A	11/24 *46%*	SS	*22-42 34-36* N=76	8		*4.50*	24		596
7A	11/24 *46%*	SS	*28-26 23-26* N=49	11		*4.50*	26	Dark gray (10YR4/1) with 5% light brownish gray (10YR6/2) mottles, dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.	594
8A	23/24 *96%*	SS	*7-11 16-25* N=27	10		*4.50*	28	Dark gray (10YR4/1) with 5% light brownish gray (10YR6/2) and dark greenish gray (10YR4/2) mottles, dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.	592
9A	17/24 *71%*	SS	*7-14 12-12* N=26	16			30	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.	
9B				14				Dark gray (10YR4/1), dry, very stiff, SILT with some very fine-grained SAND.	590
9C				9				Very dark gray (10YR3/1), moist, very stiff, CLAY with few silt and little medium-grained sand.	
10A	24/24 *100%*	SS	*2-5 8-13* N=13	15		*3.25*	32	Very dark gray (10YR3/1), moist, very stiff, CLAY with little silt and little medium-grained sand.	588
11-1	22/24 *92%*	SH					34		
11-2				15					586
11-3									
11-4									
12A	24/24 *100%*	SS	*2-5 8-10* N=13	16		*2.00*	36	Very dark gray (10YR3/1), moist, very stiff, CLAY with little silt, little medium-grained sand, and trace small gravel.	584
13A	22/24 *92%*	SS	*2-5 7-8* N=12	16		*2.00*	38	Very dark gray (10YR3/1) with 5% black (10YR2/1) mottles, moist, very stiff, CLAY with little silt, little medium-grained sand, and trace small gravel.	582
							40		

Borehole Detail | Remarks

NOTE(S): G45D installed in boring.
Boring was blind drilled to 14.0 feet bgs. Blind drill lithologies from boring G405.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/16/2016
Finish: 8/17/2016
WEATHER: Cloudy, rain, (hi-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G405D
Well ID: G45D
Surface Elev: 620.94 ft. MSL
Completion: 42.00 ft. BGS
Station: 873,998.03N
2,515,322.23E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

WATER LEVEL INFORMATION:
▼ = 16.00 - During Drilling
▼ =
▽ =

SAMPLE: Number	SAMPLE: Recov / Total (in) / *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* / N - Value / **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Qp* (tsf) / Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
14A	23/24 *96%*	SS	*1-3* *7-7* N=10	16		*3.50*		Very dark gray (10YR3/1) with 5% black (10YR2/1) mottles, moist, very stiff, CLAY with little silt, little medium-grained sand, and trace small gravel. *[Continued from previous page]*		580	
							42	**End of Boring = 42.0 ft. BGS**			

NOTE(S): G45D installed in boring.
Boring was blind drilled to 14.0 feet bgs. Blind drill lithologies from boring G405.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 5/1/2007
Finish: 5/1/2007
WEATHER: Partly sunny, warm

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" Hollow stem auger with split spoon sampler
FIELD STAFF: Driller: A. Rachford
Helper: M. Brown
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB21 Formerly MW21S
Well ID: G405
Surface Elev: 620.90 ft. MSL
Completion: 14.21 ft. BGS
Station: 873,996.79N
2,515,335.70E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

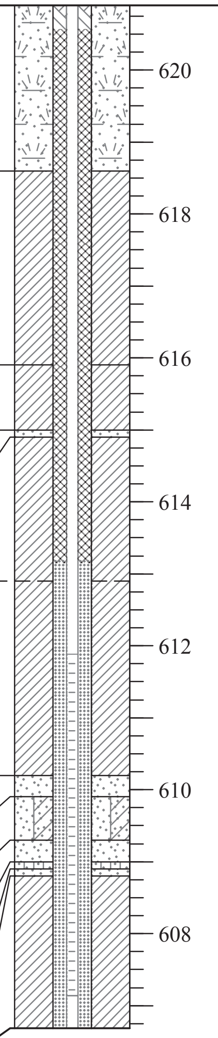
WATER LEVEL INFORMATION:
▼ = 1.28 - 05/10/2007
▼ =
▽ =

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	19/24 *79%*	SS		43		0.78 B
1B				26		1.94 B
2A	12/12 *100%*	SS		27		2.52 BSh
3A	24/24 *100%*	SS		24		3.92 BSh
3B				24		2.33 BSh
4A	24/24 *100%*	SS		20		2.33 BSh
5A	24/24 *100%*	SS		24		1.55 BSh
6A	24/24 *100%*	SS		19		
6B				18		
7A	24/24 *100%*	SS		9		7.42 BSh

Depth ft. BGS	Lithologic Description
0 – ~2.3	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)
~2.3 – ~5.0	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY
~5.0 – ~5.9	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand
~5.9 – ~6.5	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND
~6.5 – 8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel
8 – ~10.7	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel
~10.7 – ~11.3	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
~11.3 – ~11.9	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel
~11.9 – ~12.6	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
~12.6 – ~13.2	Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel
~13.2 – ~13.9	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
~13.9 – 14.2	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel

End of Boring = 14.2 ft. BGS

Borehole Detail



Elevation ft. MSL

Remarks

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
1A	18/24 *75%*	SS	*4-3 4-6* N=7	11		*1.50*
1B				15		*3.00*
2A	12/24 *50%*	SS	*4-6 3-3* N=9	12		*2.50*
2B				18		*2.00*
3A	3/24 *13%*	SS	*3-3 4-7* N=7	24		
4A	20/24 *83%*	SS	*2-3 4-5* N=7	21		*1.25*
5A	19/24 *79%*	SS	*1-3 4-6* N=7	18		*1.75*
6A	23/24 *96%*	SS	*2-2 4-5* N=6	18		*2.50*
7A	21/24 *88%*	SS	*1-3 4-5* N=7	16		*1.00*
8A	23/24 *96%*	SS	*1-2 2-2* N=4	18		*0.75*
8B				17		*0.75*
9A	22/24 *92%*	SS	*4-13 27-23* N=40	8		
9B				8		
10A	17/24 *71%*	SS	*13-31 33-42* N=64	7		*4.50*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
	Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.	
2	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.	620
	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay.	
4	Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.	618
	Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.	
6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt and trace fine- to medium-grained sand.	616
8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt, little fine- to medium-grained sand and trace small gravel.	614
10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.	612
12	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.	610
14	Gray (10YR6/1) with 10% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with some fine- to medium-grained sand, little silt, and trace small gravel.	608
16	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, wet, loose, fine-grained SAND with some clay.	606
	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.	
18	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel.	604
20		602

Borehole Detail | Remarks

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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	Elevation ft. MSL	Remarks
11-1	3/3 *100%*	SH								
	8/24 *33%*	DS					22	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel. *[Continued from previous page]*	600	
12-1										
13-1										
13-2	24/24 *100%*	DS								
13-3							24		598	
13-4										
14A				19				Pale brown (10YR6/3), wet, loose, fine-grained SAND.		
14B	21/21 *100%*	SS	*7-30* *32-20* N=62	7				Pale brown (10YR6/3), wet, loose, fine-grained SAND and small GRAVEL.		
14C				8		*4.50*		Gray (10YR5/1), dry, hard, SILT with some clay, trace fine- to coarse-grained sand and trace small gravel.		
							26		596	
15A	12/24 *50%*	SS	*15-16* *10-11* N=26	10		*4.50*		Dark gray (10YR4/1), dry, hard, CLAY with some silt, trace fine- to coarse-grained sand and trace small gravel.		
							28		594	
16A	17/24 *71%*	SS	*2-5* *7-11* N=12	16		*3.00*		Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.		
							30		592	
17A	17/24 *71%*	SS	*2-5* *7-12* N=12	15		*2.50*				
							32	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small to large gravel.	590	
18A	12/24 *50%*	SS	*3-7* *12-20* N=19	17		*2.50*		Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.		
							34		588	
19A	23/24 *96%*	SS	*4-4* *6-9* N=10	25		*1.00*		Dark gray (10YR4/1) with 5% very dark gray (10YR3/1) and brown (10YR5/3) mottles, moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.		
							36	Gray (10YR5/1) with 5% very dark gray (10YR3/1) and brown (10YR5/3) mottles, moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	586	
20A	22/24 *92%*	SS	*2-2* *5-7* N=7	17		*1.00*				
							38	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	584	
21A	24/24 *100%*	SS	*2-3* *4-6* N=7	17		*1.00*				
							40		582	

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
22A	24/24 100%	SS	1-3 5-6 N=8	17		1.50	42	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel. [Continued from previous page]	580	
23-1 23-2 23-3 23-4	24/24 100%	SH		16			44		578	
24A	24/24 100%	SS	3-4 6-7 N=10	17		1.50	46		576	
25A	24/24 100%	SS	2-2 5-7 N=7	18		1.25	48		574	
26A	24/24 100%	SS	2-5 6-8 N=11	17		1.75	50		572	
27A	23/24 96%	SS	2-3 9-12 N=12	15		3.50	52		570	

End of Boring = 52.0 ft. BGS

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/2/2010
Finish: 2/2/2010
WEATHER: Overcast, cold (lo-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G101
Well ID: G101
Surface Elev: 625.27 ft. MSL
Completion: 21.92 ft. BGS
Station: 876,551.76N
2,514,214.31E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.50 - While drilling
▼ = 12.38 - Upon Completion
▽ = 7.31 - 3/1/2010

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	18/24 *75%*	SS	*1-1 2-3* N=3	24		
2A	18/24 *75%*	SS	*1-3 3-5* N=6	30		
3A	19/24 *79%*	SS	*2-3 4-4* N=7	26		
4A	19/24 *79%*	SS	*1-3 4-3* N=7	21		
5A	22/24 *92%*	SS	*1-3 3-4* N=6	23		
6A	20/24 *83%*	SS	*1-2 2-3* N=4	24		
7A	22/24 *92%*	SS	*1-2 3-2* N=5	17		
8A 8B	14/24 *58%*	SS	*1-2 5-8* N=7	15 13		
9A	16/24 *67%*	SS	*2-5 15-25* N=20	16		
10A 10B	17/24 *71%*	SS	*19-20 22-18* N=42	14 8		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	TOPSOIL - Brown (10YR5/3), moist, soft, silty CLAY with slight trace sand and gravel, roots.			
	Dark grayish brown (10YR4/2), moist, soft, silty CLAY with slight trace sand, trace roots.		624	
2	Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/4) mottles, moist, medium, silty CLAY, slight trace roots.			
	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/4) mottles, moist, medium, silty CLAY, slight trace roots.		622	
4	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY, slight trace roots.		620	
6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		618	
8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		616	
10	Gray (10YR6/1) with 35% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.		614	
12	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, very moist, medium, silty, sandy CLAY with trace gravel.		612	
14	Brown (10YR5/3), very moist, medium, silty, clayey, very fine- to coarse-grained SAND with slight trace gravel.			
	Brown (10YR5/3), very moist, loose, silty, very fine- to coarse-grained SAND with slight trace gravel.		610	
16	Brown (10YR5/3), very moist, medium dense, silty, very fine- to coarse-grained SAND with slight trace gravel.		608	
18	Brown (10YR5/3), very moist, dense, silty, very fine- to coarse-grained SAND with slight trace gravel.		606	
20				

NOTE(S): G101 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/2/2010
Finish: 2/2/2010
WEATHER: Overcast, cold (lo-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G101
Well ID: G101
Surface Elev: 625.27 ft. MSL
Completion: 21.92 ft. BGS
Station: 876,551.76N
2,514,214.31E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.50 - While drilling
▼ = 12.38 - Upon Completion
▽ = 7.31 - 3/1/2010

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
11A	16/23 *70%*	SS	*2-16* *42-60/5"* N=58	8				Brown (10YR5/3), slightly moist, hard, clayey SILT with slight trace sand and gravel. Dark gray (10YR4/1), slightly moist, hard, clayey SILT with slight trace sand and slight trace gravel.		604	

End of Boring = 21.9 ft. BGS

NOTE(S): G101 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/28/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 4¼" HSA (blind drill)
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03a
Well ID: G102 (MW3S)
Surface Elev: 625.70 ft. MSL
Completion: 17.15 ft. BGS
Station: 876,554.77N
2,514,531.48E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - 6/1/06
▽ =

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	Elevation ft. MSL	Remarks
1A 1B 1C	20/24 *83%*	SS	*2-2* *4-6* N=6	17 20 26		2.07 SP 3.30 B		Very dark grayish brown (10YR3/2), lean CLAY Grayish brown (10YR5/2), lean CLAY, trace sand Yellowish brown (10YR5/6), lean CLAY, trace sand	624	
2A	17/24 *71%*	SS	*2-3* *4-5* N=7	25		3.05 B	2	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand	622	
3A	20/24 *83%*	SS	*2-3* *3-5* N=6	16		1.96 B	4	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel	620	
4A	24/24 *100%*	SS	*4-3* *5-6* N=8	21		2.27 B	6	Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel	618	
5A 5B	21/24 *88%*	SS	*1-3* *3-4* N=6	20 19		2.18 B	8	Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel Dark gray (10YR4/1), sandy CLAY, trace gravel	616	
6A	18/24 *75%*	SS	*1-2* *2-4* N=4	24		0.87 B	10	Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel	614	
7A 7B	23/24 *96%* 16/24 *67%*	SH SS	*3-2* *2-4* N=4	19 12			12		612	
8A 8B 8C	23/24 *96%*	SS	*3-12* *29-50* N=41	13 13 12			14	Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet	610	
9A	12/12 *100%*	SS	*8-82*	10		6.98 B	16	Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel Yellowish brown (10YR5/6), silty SAND, trace gravel, wet Yellowish brown (10YR5/4), clayey SILT, trace sand and gravel		

End of Boring = 17.15 ft. BGS

NOTE(S): G102 (MW03S) installed in blind-drilled borehole within 10 ft of SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	20/24 *83%*	SS	*2-2 4-6* N=6	17		2.07 *SP*		Very dark grayish brown (10YR3/2), lean CLAY		
1B				20				Grayish brown (10YR5/2), lean CLAY, trace sand		
1C				26		3.30 *B*	2	Yellowish brown (10YR5/6), lean CLAY, trace sand	624	
2A	17/24 *71%*	SS	*2-3 4-5* N=7	25		3.05 *B*	4	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand	622	
3A	20/24 *83%*	SS	*2-3 3-5* N=6	16		1.96 *B*	6	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel	620	
4A	24/24 *100%*	SS	*4-3 5-6* N=8	21		2.27 *B*	8	Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel	618	
5A	21/24 *88%*	SS	*1-3 3-4* N=6	20		2.18 *B*		Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel	616	
5B				19			10	Dark gray (10YR4/1), sandy CLAY, trace gravel		
6A	18/24 *75%*	SS	*1-2 2-4* N=4	24		0.87 *B*	12	Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel	614	Shelby tube taken from shallow well borehole at indicated depth.
7A	23/24 *96%*	SH		19						
7B	16/24 *67%*	SS	*3-2 2-4* N=4	12			14		612	
8A	23/24 *96%*	SS	*3-12 29-50* N=41	13				Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet		
8B				13				Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet	610	
8C				12			16	Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel		
9A	14/24 *58%*	SS	*8-82 85-72* N=167	10		6.98 *B*		Yellowish brown (10YR5/6), silty SAND, trace gravel, wet		
9B				13		6.18 *BSh*	18	Yellowish brown (10YR5/4), clayey SILT, trace sand and gravel	608	
10A	18/24 *75%*	SS	*6-21 32-49* N=53	8		11.95 *Sh*	20	Gray (10YR5/1), sandy SILT, trace gravel	606	

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	19/24 *79%*	SS	*3-20 35-29* N=55	10		5.36 *Sh*	22	Gray (10YR5/1), sandy SILT, trace gravel *[Continued from previous page]*	604	Wood fragments
12A	20/24 *83%*	SS	*15-25 89-69* N=114	8		13.00 *Sh*	24		602	
13A	23/24 *96%*	SS	*14-19 24-22* N=43	9				Yellowish brown (10YR5/4), lean CLAY, trace sand and gravel		
13B				13		6.98 *BSh*	26		600	
14A	24/24 *100%*	SS	*19-21 26-32* N=47	15		7.01 *BSh*		Gray (10YR4/1), clayey SILT, trace sand and gravel	598	
15A	21/24 *88%*	SS	*10-25 25-23* N=50	12			28	Light gray (10YR6/1), SILT, trace sand		
15B				13		8.53 *BSh*	30		596	
16A	24/24 *100%*	SS	*7-12 19-30* N=31	13		9.16 *BSh*	32		594	
17A				14		6.59 *B*		Gray (10YR4/1), lean CLAY, trace sand and gravel		
17B	24/24 *100%*	SS	*29-35 39-42* N=74	14		3.49 *Sh*	34		592	
18A	23/24 *96%*	SS	*6-8 11-17* N=19	13		7.21 *BSh*	36		590	
19A	24/24 *100%*	SS	*19-21 31-31* N=52	13		6.98 *BSh*	38	Gray (10YR4/1), clayey SILT, trace sand and gravel	588	
20A	24/24 *100%*	SS	*6-10 15-24* N=25	14		6.76 *BSh*	40	Gray (10YR4/1), lean CLAY, trace sand and gravel	586	

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
21A	19/24 *79%*	SS	*4-10 16-23* N=26	13		8.04 *BSh*	40–42	Gray (10YR4/1), lean CLAY, trace sand and gravel *[Continued from previous page]*	584	
22A	21/24 *88%*	SS	*19-27 28-32* N=55	13		7.56 *BSh*	42–48	Gray (10YR4/1), clayey SILT, trace sand and gravel	582	
23A	23/24 *96%*	SS	*4-9 14-18* N=23	14		6.98 *BSh*			580	
24A	24/24 *100%*	SS	*20-26 30-33* N=56	14		6.59 *BSh*			578	
25A	24/24 *100%*	SS	*6-10 13-12* N=23	20		3.30 *BSh*	48–53.3	Gray (10YR4/1), lean CLAY, trace sand and gravel	576	
26A	24/24 *100%*	SS	*4-7 6-7* N=13	22		2.91 *BSh*			574	
27A	24/24 *100%*	SS	*7-18 37-85* N=55	16		4.05 *BSh*	53.3–54	Gray (10Y4/1), silty, fine to medium SAND, wet	572	
27B				13			54–55.6	Gray (10YR4/1), silty, fine SAND, trace clay, wet		
28A	23/24 *96%*	SS	*15-34 34-19* N=68	11		3.22 *SP*			570	
28B				13		5.82 *B*	55.6–58	Very dark gray (10YR3/1), lean CLAY, trace sand and gravel		
29A	24/24 *100%*	SS	*19-22 28-18* N=50	20		4.36 *BSh*			568	

End of Boring = 58.0 ft. BGS

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/15/2010
Finish: 2/15/2010
WEATHER: Cold, snowy (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G103
Well ID: G103
Surface Elev: 627.94 ft. MSL
Completion: 18.03 ft. BGS
Station: 876,199.48N
2,514,501.19E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 16.99 - 3/1/2010

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	20/24 *83%*	SS	*5-4 5-7* N=9	16		
2A	16/24 *67%*	SS	*3-4 6-7* N=10	25		
3A	17/24 *71%*	SS	*3-5 7-8* N=12	21		
4A	16/24 *67%*	SS	*2-3 5-6* N=8	24		
5A	24/24 *100%*	SS	*3-4 4-4* N=8	22		
6A	20/24 *83%*	SS	*1-1 3-3* N=4	23		
7A	22/24 *92%*	SS	*1-2 2-4* N=4	26		
8A	20/24 *83%*	SS	*1-2 3-3* N=5	22		
9A	22/24 *92%*	SS	*1-10 21-33* N=31	14		
9B				10		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0–4.8	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.		
4.8–6	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.		
6–8.3	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.		
8.3–10	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		
10–16.4	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, soft, medium, silty CLAY with trace sand and slight trace gravel.		
16.4–16.8	Brown (10YR5/3) with 15% gray (10YR6/1) mottles, very moist, medium dense, silty, very fine- to medium-grained SAND.		
16.8–18	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.		

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18
Elevation scale: 626, 624, 622, 620, 618, 616, 614, 612, 610

End of Boring = 18.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/15/2010
Finish: 2/15/2010
WEATHER: Overcast, cold, windy (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G104
Well ID: G104
Surface Elev: 627.96 ft. MSL
Completion: 20.00 ft. BGS
Station: 875,849.26N
2,514,504.98E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 15.40 - 3/1/2010

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	16/24 *67%*	ss	*9-11 12-14* N=23	16		
2A	20/24 *83%*	ss	*3-5 9-12* N=14	21		
3A	19/24 *79%*	ss	*3-6 8-9* N=14	21		
4A	17/24 *71%*	ss	*2-3 4-7* N=7	25		
5A	22/24 *92%*	ss	*1-2 5-8* N=7	24		
6A	18/24 *75%*	ss	*1-2 3-5* N=5	21		
7A	23/24 *96%*	ss	*woh-2 3-4* N=5	23		
8A	22/24 *92%*	ss	*1-3 3-3* N=6	24		
9A				16		
9B	17/24 *71%*	ss	*woh-6 27-40* N=33	13		
10A	22/24 *92%*	ss	*10-24 44-66* N=68	7		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~4.5	FILL - Brown (10YR5/3) with 5% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with slight trace sand and gravel.	626, 624
~4.5 – ~6.4	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.	622
~6.4 – 12	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.	620, 618
12 – ~14.6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.	616, 614
~14.6 – 16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel. (▽ at 15.4)	612
16 – ~16.6	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.	
~16.6 – ~18.2	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.	610
~18.2 – 20	Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.	608

End of Boring = 20.0 ft. BGS

Remarks

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/16/2010
Finish: 2/16/2010
WEATHER: Sunny, cold, windy (mid-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G105
Well ID: G105
Surface Elev: 626.86 ft. MSL
Completion: 19.83 ft. BGS
Station: 875,499.70N
2,514,509.15E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

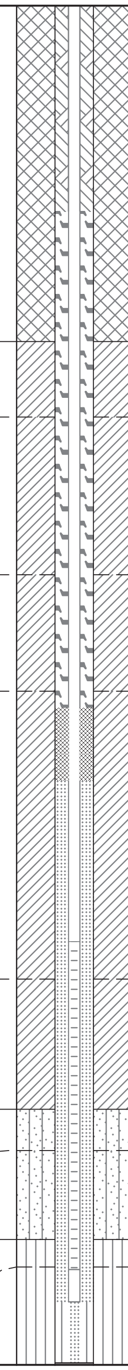
WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 16.08 - 3/1/2010

SAMPLE			TESTING			
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	18/24 *75%*	SS	*4-4 4-7* N=8	20		
2A	19/24 *79%*	SS	*2-4 6-10* N=10	19		
3A	19/24 *79%*	SS	*2-4 5-6* N=9	29		
4A	20/24 *83%*	SS	*1-4 4-5* N=8	29		
5A	22/24 *92%*	SS	*1-3 3-3* N=6	20		
6A	24/24 *100%*	SS	*1-2 3-4* N=5	25		
7A	24/24 *100%*	SS	*1-2 3-5* N=5	22		
8A	19/24 *79%*	SS	*1-2 2-2* N=4	18		
9A	18/24 *75%*	SS	*1-2 8-10* N=10	18		
9B				14		
10A	19/22 *86%*	SS	*11-40 53-60/4"* N=93	7		

Depth ft. BGS	Lithologic Description
0–4.9	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel.
4.9–6	Grayish brown (10YR5/2) with 40% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY, slight trace roots.
6–8.3	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.
8.3–10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.
10–14.2	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
14.2–16.1	Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and gravel.
16.1–16.7	Gray (10YR5/1), very moist to wet, loose, silty, fine- to coarse-grained SAND with slight trace gravel.
16.7–18	Brown (10YR5/3), very moist to wet, loose, silty, very fine- to coarse-grained SAND with slight trace gravel.
18–18.6	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.
18.6–19.8	Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.

Depth ticks: 2, 4, 6, 8, 10, 12, 14, ▽ 16, 18

Borehole Detail



Elevation ft. MSL: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Remarks

End of Boring = 19.8 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/16/2010
Finish: 2/16/2010
WEATHER: Overcast, cold, windy (mid-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G106
Well ID: G106
Surface Elev: 625.96 ft. MSL
Completion: 18.00 ft. BGS
Station: 875,149.76N
2,514,512.79E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 12.62 - 3/1/2010

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	17/24 *71%*	SS	*7-8 13-16* N=21	18		
2A	16/24 *67%*	SS	*2-4 5-7* N=9	16		
3A	17/24 *71%*	SS	*2-4 6-7* N=10	21		
4A	20/24 *83%*	SS	*2-3 5-6* N=8	24		
5A	22/24 *92%*	SS	*1-3 3-5* N=6	21		
6A	22/24 *92%*	SS	*1-2 4-4* N=6	24		
7A	23/24 *96%*	SS	*1-3 4-4* N=7	22		
8A	19/24 *79%*	SS	*1-4 7-7* N=11	20		
8B				14		
9A	23/24 *96%*	SS	*7-15 22-22* N=37	8		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–4.7	FILL - Brown (10YR5/3) with 15% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.	
4.7–6	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.	
6–8.4	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with slight trace sand.	
8.4–12.3	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.	
12.3–14.5	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.	
14.5–15.1	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand.	
15.1–15.8	Brown (10YR5/3), moist, medium dense, clayey, very fine- to medium-grained SAND with slight trace gravel.	
15.8–16.6	Yellowish brown (10YR5/6) with 5% gray (10YR6/1) mottles, moist, medium, clayey SILT with trace sand and gravel.	
16.6–17.3	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.	
17.3–18	Gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18 ft. BGS; Elevation scale: 624, 622, 620, 618, 616, 614, 612, 610, 608 ft. MSL

End of Boring = 18.0 ft. BGS

Borehole Detail | Remarks

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/17/2010
Finish: 2/17/2010
WEATHER: Overcast, cold, windy (mid-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G107
Well ID: G107
Surface Elev: 627.11 ft. MSL
Completion: 20.00 ft. BGS
Station: 874,994.33N
2,514,358.25E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.80 - While drilling
▼ = 11.56 - Upon Completion
▽ = 10.40 - 3/1/2010

Number (SAMPLE)	Recov / Total (in) / *% Recovery*	Type	*Blows / 6 in* / N - Value / **RQD** (TESTING)	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) / *Failure Type*	Depth ft. BGS	Lithologic Description
	0/18 *0%*	BD					0–1.8	GRAVEL FILL
1A	5/6 *83%*	SS	*3*	12				
2A	14/24 *58%*	SS	*3-3 6-8* N=9	17			1.8–4.3	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with trace sand and slight and gravel.
3A	16/24 *67%*	SS	*3-5 5-7* N=10	20			4.3–8.4	Grayish brown (10YR5/2) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.
4A	18/24 *75%*	SS	*2-3 6-7* N=9	27				
5A	22/24 *92%*	SS	*2-3 4-5* N=7	18			8.4–13.6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
6A	22/24 *92%*	SS	*1-3 3-4* N=6	23				
7A	24/24 *100%*	SS	*1-2 3-4* N=5	27				
							13.6–15.0	Gray (10YR6/1) with 35% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
8A	2/24 *8%*	SS	*1-3 2-3* N=5	23			15.0–16.4	Brown (10YR5/3), very moist to wet, very loose, clayey, very fine- to coarse-grained SAND.
9A	20/24 *83%*	SS	*woh-3 8-12* N=11	22			16.4–18.0	Brown (10YR5/3), slightly moist, stiff, clayey SILT with trace sand and gravel.
9B				10			18.0–18.7	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.
10A	20/24 *83%*	SS	*8-25 26-58* N=51	11			18.7–20.0	Gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.

Elevation ft. MSL: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Remarks:

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/12/2010
Finish: 2/12/2010
WEATHER: Overcast, cold ~25F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G108
Well ID: G108
Surface Elev: 625.58 ft. MSL
Completion: 20.00 ft. BGS
Station: 874,948.81N
2,514,248.25E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.50 - While drilling
▼ = 19.00 - Upon completion
▽ = 8.93 - 3/1/2010

SAMPLE			TESTING			
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	23/24 *96%*	SS	*24-25 13-13* N=38	16		
2A	13/24 *54%*	SS	*4-5 8-11* N=13	26		
3A	20/24 *83%*	SS	*2-2 5-7* N=7	28		
4A	24/24 *100%*	SS	*2-3 5-6* N=8	18		
5A	23/24 *96%*	SS	*1-2 3-4* N=5	20		
6A	24/24 *100%*	SS	*1-3 3-5* N=6	19		
7A	19/24 *79%*	SS	*1-1 1-2* N=2	19		
8A	23/24 *96%*	SS	*2-4 7-10* N=11	19		
8B				13		
9A	22/24 *92%*	SS	*10-24 25-10* N=49	11		
9B				8		
10A	24/24 *100%*	SS	*10-25 40-40* N=65	10		

Depth ft. BGS	Lithologic Description
0–3	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with slight trace gravel.
3–4.5	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.
4.5–6.8	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/8) and 5% very dark brown (10YR2/2) mottles, moist, medium, clayey SILT with trace sand and slight trace gravel.
6.8–11.7	Gray (10YR5/1) with 10% brownish yellow (10YR6/8) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
11.7–12.6	Grayish brown (10YR5/2) with brownish yellow (10YR6/8) mottles, moist, soft, sandy CLAY with trace gravel.
12.6–13.9	Brownish yellow (10YR6/8), very moist, soft, sandy CLAY with trace gravel.
13.9–14.5	Brownish yellow (10YR6/8), very moist, soft, sandy SILT with trace gravel.
14.5–15	Brownish yellow (10YR6/6), wet, medium, SILT.
15–18	Light yellowish brown (10YR6/4) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, clayey SILT with trace sand and gravel.
18–18.5	Gray (10YR5/1), slightly moist, hard, SILT with gravel.
18.5–19	Gray (10YR5/1), wet, hard, SILT with sand and gravel.
19–20	Gray (10YR5/1), very moist, hard, SILT with gravel.

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale (ft. MSL): 624, 622, 620, 618, 616, 614, 612, 610, 608, 606

Borehole Detail | Remarks

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/11/2010
Finish: 2/11/2010
WEATHER: Sunny, cold ~32F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G109
Well ID: G109
Surface Elev: 624.79 ft. MSL
Completion: 18.00 ft. BGS
Station: 874,970.10N
2,514,137.84E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.20 - While drilling
▼ = 11.50 - Upon completion
▽ = 8.85 - 3/1/2010

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	24/24 *100%*	SS	*6-7 7-8* N=14	22		
2A	19/24 *79%*	SS	*3-5 5-6* N=10	27		
3A	20/24 *83%*	SS	*2-5 6-8* N=11	24		
4A	24/24 *100%*	SS	*2-4 5-6* N=9	19		
5A	22/24 *92%*	SS	*2-3 4-5* N=7	20		
6A	24/24 *100%*	SS	*1-3 3-4* N=6	19		
7A	23/24 *96%*	SS	*1-1 2-2* N=3	19		
8A	22/24 *92%*	SS	*8-15 15-21* N=30	14		
9A	24/24 *100%*	SS	*12-29 44-45* N=73	7		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–3.5	FILL - Grayish brown (10YR5/2) with 40% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace gravel.		624, 622	
3.5–5.1	Light yellowish brown (10YR6/4) with 50% brownish yellow (10YR6/8) mottles, moist, medium, silty CLAY, slight trace roots.			
5.1–9.0	Light brownish gray (10YR6/2) with 10% brownish yellow (10YR6/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel.		620, 618	
9.0–11.0	Light brownish gray (10YR6/2) with 10% brownish yellow (10YR6/6) and 2% very dark gray (10YR3/1) mottles, moist, medium, silty CLAY with slight trace sand and gravel.		616	
11.0–14.2	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, medium, sandy CLAY with slight trace gravel.		614, 612	
14.2–15.8	Brownish yellow (10YR6/6), wet, dense, silty SAND with trace gravel.		610	
15.8–17.3	Brownish yellow (10YR6/8), wet, dense, SAND with trace gravel.		608	
17.3–18	Grayish brown (10YR5/2), slightly moist, hard, gravelly SILT with sand.			

End of Boring = 18.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/11/2010
Finish: 2/11/2010
WEATHER: Sunny, cold 10-20F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: .

BOREHOLE ID: G110
Well ID: G110
Surface Elev: 624.81 ft. MSL
Completion: 18.00 ft. BGS
Station: 875,015.42N
2,514,057.73E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.00 - While drilling
▼ =
▽ = 9.50 - 3/1/2010

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	24/24 *100%*	SS	*8-6 6-8* N=12	17		
2A	14/24 *58%*	SS	*2-4 5-7* N=9	25		
3A	22/24 *92%*	SS	*1-4 5-9* N=9	22		
4A	24/24 *100%*	SS	*3-6 8-9* N=14	18		
5A	24/24 *100%*	SS	*1-3 4-6* N=7	21		
6A	24/24 *100%*	SS	*2-4 4-6* N=8	21		
7A	24/24 *100%*	SS	*1-2 3-3* N=5	22		
8A	19/24 *79%*	SS	*1-2 2-1* N=4	24		
9A	24/24 *100%*	SS	*7-26 49-60* N=75	6		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – 5.5	FILL - Yellowish brown (10YR5/6) with 20% light brownish gray (10YR6/2) mottles, moist, stiff, silty CLAY with slight trace sand.	624, 622, 620
5.5 – 8	Grayish brown (10YR5/2) with 20% yellowish brown (10YR5/6) and 5% very dark brown (10YR2/2) mottles, moist, medium, silty CLAY.	618
8 – 11	Grayish brown (10YR5/2) with 20% yellowish brown (10YR5/6) and 5% very dark brown (10YR2/2) mottles, moist, medium, silty CLAY with slight trace sand and gravel.	616, 614
11 – 12.8	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, medium, clayey SILT with trace sand and gravel.	
12.8 – 13.3	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, very moist, medium, sandy CLAY with trace gravel.	612
13.3 – 15	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, moist, soft, clayey SILT with trace sand and slight trace gravel.	610
15 – 16.5	Gray (10YR6/1) with 30% brownish yellow (10YR6/8) mottles, wet, soft, sandy CLAY.	
16.5 – 18	Grayish brown (10YR5/2), slightly moist, hard, clayey SILT with trace sand and gravel.	608

End of Boring = 18.0 ft. BGS

Borehole Detail | Remarks

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/10/2010
Finish: 2/11/2010
WEATHER: Sunny, breezy ~25F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G111
Well ID: G111
Surface Elev: 625.28 ft. MSL
Completion: 18.00 ft. BGS
Station: 875,058.70N
2,513,981.72E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.50 - While drilling
▼ =
▽ = 10.50 - 3/1/2010

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	20/24 *83%*	SS	*7-7 6-9* N=13	18		
2A	13/24 *54%*	SS	*3-5 7-8* N=12	20		
3A	18/24 *75%*	SS	*2-4 6-8* N=10	20		
4A	16/24 *67%*	SS	*4-12 20-17* N=32	18		
5A	22/24 *92%*	SS	*2-3 4-5* N=7	21		
6A	24/24 *100%*	SS	*2-3 6-6* N=9	23		
7A	24/24 *100%*	SS	*1-4 5-6* N=9	20		
8A	24/24 *100%*	SS	*1-2 2-2* N=4	17		
9A	18/18 *100%*	SS	*12-50 66* N=116	7		
	0/6 *0%*	BD				

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–5.8	FILL - Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.		624, 622, 620	
5.8–7.5	Grayish brown (10YR5/2) with 20% yellowish brown (10YR5/6) and 5% dark brown (10YR3/3) mottles, moist, medium, clayey SILT with slight trace sand, slight trace roots.		618	
7.5–10	Grayish brown (10YR5/2) with 5% yellowish brown (10YR5/6) mottles, moist, medium, clayey SILT with trace sand.		616	
10–13.5	Grayish brown (10YR5/2) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand.		614, 612	
13.5–14.5	Grayish brown (10YR5/2) with 30% yellowish brown (10YR5/8) mottles, moist, stiff, clayey SILT with trace sand and gravel.			
14.5–16	Yellowish brown (10YR5/8), wet, soft, clayey SAND with trace gravel.		610	
16–18	Grayish brown (10YR5/2) with 20% brownish yellow (10YR6/6) mottles, slightly moist, hard, clayey SILT with gravel.		608	

End of Boring = 18.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/9/2010
Finish: 2/9/2010
WEATHER: Cold, snow, windy (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G119
Well ID: G119
Surface Elev: 626.57 ft. MSL
Completion: 20.10 ft. BGS
Station: 875,675.04N
2,513,907.73E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 11.26 - 3/1/2010

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	16/24 *67%*	SS	*3-2 3-3* N=5	21		
2A	16/24 *67%*	SS	*2-4 5-5* N=9	20		
3A	10/24 *42%*	SS	*2-5 5-6* N=10	25		
4A	17/24 *71%*	SS	*2-5 4-5* N=9	18		
5A	20/24 *83%*	SS	*2-3 4-5* N=7	19		
6A	19/24 *79%*	SS	*1-3 4-6* N=7	21		
7A	20/24 *83%*	SS	*1-3 3-5* N=6	20		
8A	18/24 *75%*	SS	*1-2 2-2* N=4	18		
9A	22/24 *92%*	SS	*3-9 13-16* N=22	13		
9B				12		
10A	17/24 *71%*	SS	*6-25 33-39* N=58	8		

Depth ft. BGS	Lithologic Description
0–6	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
6–10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand.
10–12.5	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
12.5–14.2	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and gravel.
14.2–16	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, soft, sandy CLAY with slight trace gravel.
16–16.6	Brown (10YR5/3), moist, medium, silty CLAY with trace sand and slight trace gravel.
16.6–17.3	Brown (10YR5/3), moist, medium dense, silty, very fine-grained SAND.
17.3–18.2	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.
18.2–20.1	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Borehole Detail | Remarks

End of Boring = 20.1 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/8/2010
Finish: 2/8/2010
WEATHER: Cold, snow, windy (mid-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G120
Well ID: G120
Surface Elev: 627.21 ft. MSL
Completion: 20.00 ft. BGS
Station: 875,854.43N
2,513,905.84E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 13.85 - 3/1/2010

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
1A	20/24 *83%*	SS	*3-3 4-5* N=7	16		
2A	19/24 *79%*	SS	*3-4 7-9* N=11	20		
3A	16/24 *67%*	SS	*2-3 4-5* N=7	26		
4A	17/24 *71%*	SS	*3-5 6-6* N=11	24		
5A	14/24 *58%*	SS	*2-4 4-6* N=8	22		
6A	22/24 *92%*	SS	*1-3 3-4* N=6	23		
7A	22/24 *92%*	SS	*1-2 3-5* N=5	21		
8A	19/24 *79%*	SS	*woh-2 3-3* N=5	25		
9A / 9B	24/24 *100%*	SS	*woh-3 12-21* N=15	21 / 10		
10A	24/24 *100%*	SS	*13-36 46-70* N=82	7		

Depth ft. BGS	Lithologic Description
0–~4.9	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
~4.9–~6.5	Gray (10YR5/1) with15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.
~6.5–8	Gray (10YR5/1) with15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel, slight trace roots.
8–10	Gray (10YR5/1) with15% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand.
10–~12.7	Gray (10YR5/1) with brownish yellow (10YR6/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
~12.7–~16.2 (▽ 14)	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
~16.2–~16.9	Brown (10YR5/3), very moist, soft, clayey SAND with slight trace gravel.
~16.9–~18.2	Brown (10YR5/3), slightly moist, stiff, clayey SILT with trace sand and slight trace gravel.
~18.2–20	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Borehole Detail | Remarks

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/4/2010
Finish: 2/4/2010
WEATHER: Overcast, cold (lo-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G121
Well ID: G121
Surface Elev: 627.94 ft. MSL
Completion: 22.00 ft. BGS
Station: 875,964.59N
2,513,904.35E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 14.44 - 3/1/2010

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	22/24 *92%*	SS	*4-4 7-8* N=11	15		
2A	20/24 *83%*	SS	*3-5 8-12* N=13	16		
3A	18/24 *75%*	SS	*1-4 5-6* N=9	27		
4A	18/24 *75%*	SS	*2-3 5-6* N=8	25		
5A	18/24 *75%*	SS	*2-2 3-4* N=5	24		
6A	13/24 *54%*	SS	*2-2 4-4* N=6	23		
7A	19/24 *79%*	SS	*woh-2 3-4* N=5	23		
8A	18/24 *75%*	SS	*1-2 2-2* N=4	23		
9A	23/24 *96%*	SS	*woh-woh 1-2*	21		
10A	22/24 *92%*	SS	*4-12 26-30* N=38	8		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~5.7	FILL - Brown (10YR4/3) with 10% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.	
~5.7 – ~7.3	Dark yellowish brown (10YR4/4), moist, medium, silty CLAY with slight trace sand.	
~7.3 – ~8.0	Gray (10YR5/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with trace sand.	
~8.0 – 12	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.	
12 – ~16.2	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.	
~16.2 – ~18.2	Brown, (10YR5/3), very moist, very soft, clayey SAND with slight trace gravel.	
~18.2 – 20	Brown (10YR5/3), slightly moist, hard, very silty CLAY with trace sand and gravel.	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Borehole Detail | Remarks

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station	**CONTRACTOR:** Layne-Western Co		
Site: CCB Management Facility	**Rig mfg/model:** CME-750 ATV Drill	**BOREHOLE ID:** G121	
Location: Coffeen, Illinois	**Drilling Method:** 4¼" HSA w/SS samplers	**Well ID:** G121	
Project:		**Surface Elev:** 627.94 ft. MSL	
DATES: Start: 2/4/2010	**FIELD STAFF: Driller:** T. List	**Completion:** 22.00 ft. BGS	
Finish: 2/4/2010	**Helper:** M. Herbst/S. Hamby	**Station:** 875,964.59N	
WEATHER: Overcast, cold (lo-30's)	**Eng/Geo:** S. Simpson	2,513,904.35E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 14.44 - 3/1/2010

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 *100%*	SS	*13-23 31-48* N=54	7			22	Dark gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.		606	

End of Boring = 22.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/4/2010
Finish: 2/4/2010
WEATHER: Overcast, cold (lo-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G122
Well ID: G122
Surface Elev: 628.05 ft. MSL
Completion: 20.00 ft. BGS
Station: 876,080.14N
2,513,902.82E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 17.00 - While drilling
▼ =
▽ = 12.84 - 3/1/2010

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Failure Type
1A	23/24 96%	SS	5-5 6-11 N=11	16		
2A	20/24 83%	SS	3-3 5-5 N=8	22		
3A	20/24 83%	SS	3-4 5-6 N=9	25		
4A	19/24 79%	SS	1-5 5-6 N=10	29		
5A	20/24 83%	SS	1-3 3-3 N=6	21		
6A	19/24 79%	SS	1-2 3-3 N=5	22		
7A	16/24 67%	SS	1-2 3-4 N=5	21		
8A	19/24 79%	SS	1-1 2-2 N=3	21		
9A	20/24 83%	SS	1-1 4-16 N=5	14		
10A	24/24 100%	SS	10-38 51-58 N=89	6		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–4.8	FILL - Grayish brown (10YR5/2) with 15% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.	626, 624
4.8–7.5	Dark yellowish brown (10YR4/4), moist, medium, silty CLAY.	622
7.5–9.5	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY.	620
9.5–11.7	Grayish brown (10YR5/2), moist, medium, clayey SILT with sand.	618
11.7–12.5	Yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace gravel.	616
12.5–13.7	Gray (10YR5/1), moist, medium, clayey SILT with fine sand.	
13.7–14.7	Brown (10YR4/3), moist, medium, silty CLAY with trace gravel.	614
14.7–15.5	Grayish brown (10YR5/2), moist, soft, sandy SILT.	
15.5–17.0	Yellowish brown (10YR5/4) with 40% dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with slight trace sand.	612
17.0–18.8	Dark yellowish brown (10YR4/6), wet, medium dense, silty SAND.	610
18.8–19.3	Brownish yellow (10YR6/6), slightly moist, hard, clayey SILT with trace sand and gravel.	
19.3–20.0	Gray (10YR5/1), slightly moist, hard, clayey SILT with gravel.	

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/3/2010
Finish: 2/4/2010
WEATHER: Overcast, cold (lo-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G123
Well ID: G123
Surface Elev: 628.12 ft. MSL
Completion: 24.00 ft. BGS
Station: 876,189.60N
2,513,901.46E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.50 - While drilling
▼ =
▽ = 15.98 - 3/1/2010

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	22/24 *92%*	SS	*6-8 9-11* N=17	16		
2A	19/24 *79%*	SS	*4-5 6-7* N=11	18		
3A	17/24 *71%*	SS	*2-3 5-6* N=8	24		
4A	18/24 *75%*	SS	*1-3 5-8* N=8	24		
5A	20/24 *83%*	SS	*2-3 4-5* N=7	18		
6A	19/24 *79%*	SS	*1-2 3-5* N=5	21		
7A	23/24 *96%*	SS	*1-3 4-4* N=7	19		
8A	22/24 *92%*	SS	*1-2 3-3* N=5	17		
9A	22/24 *92%*	SS	*1-1 2-2* N=3	19		
10A	12/24 *50%*	SS	*3-3 3-4* N=6	16		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–5.2	FILL - Grayish brown (10YR5/2) with 10% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.	628, 626, 624
5.2–6.4	Dark grayish brown (10YR4/2) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand, slight trace roots.	622
6.4–8	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.	620
8–12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.	618, 616
12–13.5	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with sand and slight trace gravel.	
13.5–15	Dark yellowish brown (10YR3/6) with dark yellowish brown (10YR4/6) mottles, moist, medium, silty CLAY with trace gravel.	614
15–16.5	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, sandy SILT.	612
16.5–18	Dark yellowish brown (10YR4/6), wet, soft, clayey SAND.	610
18–20	Yellowish brown (10YR5/6), wet, medium, sandy SILT with trace gravel.	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Borehole Detail | Remarks

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT:	AEG Coffeen Power Station	**CONTRACTOR:**	Layne-Western Co		
Site:	CCB Management Facility	**Rig mfg/model:**	CME-750 ATV Drill	**BOREHOLE ID:**	G123
Location:	Coffeen, Illinois	**Drilling Method:**	4¼" HSA w/SS samplers	**Well ID:**	G123
Project:				**Surface Elev:**	628.12 ft. MSL
DATES: Start:	2/3/2010	**FIELD STAFF: Driller:**	T. List	**Completion:**	24.00 ft. BGS
Finish:	2/4/2010	**Helper:**	M. Herbst/S. Hamby	**Station:**	876,189.60N
WEATHER:	Overcast, cold (lo-30's)	**Eng/Geo:**	D. Lamb		2,513,901.46E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.50 - While drilling
▼ =
▽ = 15.98 - 3/1/2010

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										608	
11A	20/24 *83%*	SS	*6-12* *12-12* N=24	11				Yellowish brown (10YR5/6), wet, medium, sandy SILT with trace gravel. *[Continued from previous page]*			
							22	Gray (10YR5/1), moist, very stiff, clayey SILT with trace gravel.		606	
12A	19/24 *79%*	SS	*3-8* *13-9* N=21	9				Dark gray (10YR4/1), moist, very stiff, sandy SILT with trace clay and gravel.			
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/3/2010
Finish: 2/3/2010
WEATHER: Sunny, cold (mid-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: G124
Well ID: G124
Surface Elev: 628.70 ft. MSL
Completion: 20.00 ft. BGS
Station: 876,304.85N
2,513,900.34E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 10.99 - 3/1/2010

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	24/24 *100%*	SS	*6-4 5-6* N=9	17			0–5.2	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.	628	
2A	22/24 *92%*	SS	*4-5 7-8* N=12	21			2		626	
3A	19/24 *79%*	SS	*2-4 6-7* N=10	25			4		624	
							5.2–6	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY.		
4A	13/24 *54%*	SS	*3-3 6-6* N=9	28			6–8	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, slight trace roots.	622	
5A	20/24 *83%*	SS	*1-3 5-6* N=8	21			8–10	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel.	620	
6A	17/24 *71%*	SS	*1-3 3-4* N=6	22			10–15 (▽ 10.99)	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.	618	
7A	18/24 *75%*	SS	*1-3 3-4* N=6	23			12		616	
8A	20/24 *83%*	SS	*woh-woh 2-3*	28			14		614	
8B				22			15–16.3	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, very soft, silty CLAY with trace sand and slight trace gravel.		
9A	19/24 *79%*	SS	*1-2 3-3* N=5	22			16.3–17.3	Gray (10YR6/1) with 5% yellowish brown (10YR5/6) mottles, moist, medium, sandy CLAY with slight trace gravel.	612	
9B				17			17.3–18.3	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, sandy CLAY with slight trace gravel.		
							18.3–18.9	Yellowish brown (10YR5/4), moist, medium, clayey SILT with trace sand and slight trace gravel.	610	
10A	20/24 *83%*	SS	*4-10 17-23* N=27	12			18.9–19.6	Yellowish brown (10YR5/4), slightly moist, stiff, clayey SILT with trace sand and slight trace gravel.		
							19.6–20	Gray (10YR5/1), slightly moist, stiff, clayey SILT with trace sand and slight trace gravel.		

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/2/2010
Finish: 2/3/2010
WEATHER: Sunny, cold (mid-30's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

BOREHOLE ID: G125
Well ID: G125
Surface Elev: 628.85 ft. MSL
Completion: 20.13 ft. BGS
Station: 876,409.47N
2,513,899.12E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 17.00 - While drilling
▼ = Dry - Upon completion
▽ = 8.58 - 3/1/2010

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
1A	18/24 *75%*	SS	*5-6 7-9* N=13	17		
2A	16/24 *67%*	SS	*3-4 6-9* N=10	17		
3A	20/24 *83%*	SS	*2-5 5-7* N=10	25		
4A	19/24 *79%*	SS	*2-4 5-5* N=9	23		
5A	14/24 *58%*	SS	*3-4 4-6* N=8	25		
6A	18/24 *75%*	SS	*2-3 3-5* N=6	22		
7A	20/24 *83%*	SS	*3-4 3-4* N=7	23		
8A	24/24 *100%*	SS	*3-3 3-3* N=6	23		
9A	24/24 *100%*	SS	*woh-1 2-1* N=3	25		
9B				18		
10A	19/24 *79%*	SS	*woh-1 7-19* N=8	22		
10B				11		

Depth ft. BGS	Lithologic Description
0 – 4.7	FILL - Brown (10YR5/3) with 5% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.
4.7 – 8.2	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel, slight trace roots.
8.2 – 10.7	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand and gravel, slight trace roots.
10.7 – 12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.
12 – 14.8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
14.8 – 17.3	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
17.3 – 18.9	Brown (10YR5/3), very moist, very soft, clayey SAND with slight trace gravel.
18.9 – 20.1	Brown (10YR5/3), slightly moist, medium, clayey SILT with trace sand and slight trace gravel.

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 628, 626, 624, 622, 620, 618, 616, 614, 612, 610

Borehole Detail | Remarks

End of Boring = 20.1 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/10/2010
Finish: 2/10/2010
WEATHER: Partly cloudy, wind 10 mph, ~25F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: D. Lamb

BOREHOLE ID: G126
Well ID: G126
Surface Elev: 622.96 ft. MSL
Completion: 18.00 ft. BGS
Station: 875,062.44N
2,513,895.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.20 - While drilling
▼ = 13.00 - Upon completion
▽ = 8.82 - 3/1/2010

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	20/24 *83%*	SS	*9-7 12-10* N=19	15				FILL - Dark yellowish brown (10YR4/6), moist, very stiff, sandy CLAY with silt and trace gravel.		622	
							2	Light grayish brown (10YR6/2), slightly moist, stiff, silty CLAY.			
2A	19/24 *79%*	SS	*2-4 6-9* N=10	26				Light grayish brown (10YR6/2) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, slight trace roots.		620	
3A	22/24 *92%*	SS	*2-4 5-7* N=9	20			4			618	
4A	24/24 *100%*	SS	*2-3 4-5* N=7	22			6	Dark brown (10YR3/3) with 10% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY.		616	
5A	24/24 *100%*	SS	*1-3 4-5* N=7	22			8 ▽			614	
6A	22/24 *92%*	SS	*1-3 4-5* N=7	18			10	Light grayish brown (10YR6/2) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.		612	
							12	Grayish brown (10YR5/2) with dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with sand and slight trace gravel.			
7A	20/24 *83%*	SS	*1-2 3-4* N=5	19			▼	Gray (10YR6/1). very moist, medium, sandy CLAY with trace gravel.		610	
8A	24/24 *100%*	SS	*4-15 12-29* N=27	20			14	Yellowish brown (10YR5/8) with 40% dark yellowish brown (10YR4/6) mottles, slightly moist, very stiff, clayey SILT with trace gravel.		608	
							16	Brownish yellow (10YR6/8), moist, very stiff, sandy SILT with gravel.			
9A	23/24 *96%*	SS	*29-39 39-29* N=78	8			18	Grayish brown (10YR5/2), moist, hard, sandy SILT with gravel.		606	

End of Boring = 18.0 ft. BGS

NOTE(S): G126 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 12/19/2011
Finish: 12/19/2011
WEATHER: Cloudy, rain (mid-60's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. McCuan
Eng/Geo: R. Fiorito

BOREHOLE ID: G151
Well ID: G151
Surface Elev: 622.82 ft. MSL
Completion: 20.46 ft. BGS
Station: 875,023.67N
2,513,805.93E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.00 - While drilling
▼ = 11.50 - Upon completion
▽ = 7.79 - 12/21/2011

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	21/24 *88%*	SS	*2-3 4-5* N=7			
2A	19/24 *79%*	SS	*2-3 6-9* N=9			
3A	19/24 *79%*	SS	*2-4 6-8* N=10			
4A	19/24 *79%*	SS	*15-15 18-11* N=33			
5A	18/24 *75%*	SS	*1-3 4-4* N=7			
6A	16/24 *67%*	SS	*3-3 4-6* N=7			
7A	22/24 *92%*	SS	*9-9 10-9* N=19			
8A	19/24 *79%*	SS	*15-15 35-70* N=50			
9A	4/4 *100%*	SS	*50/4"*			
10A	10/23 *43%*	SS	*12-18 70-99/5"* N=88			

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–2	FILL - Light yellowish brown (10YR6/4), silty CLAY with some sand and gravel.	622
2–4	FILL - Brown (10YR5/3), silty CLAY with some sand and slight trace gravel.	620
4–	FILL - Brown (10YR5/3), silty CLAY with some sand and slight trace gravel.	618
–8	Brown (10YR5/3) with 30% gray (10YR6/1) mottles, clayey SILT with trace sand and slight trace gravel.	616
8–10	Brown (10YR5/3) with 30% gray (10YR6/1) mottles, silty CLAY with sand and gravel.	614
10–14	Light gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, sandy CLAY with some silt and slight trace gravel.	612, 610
14–	Light brown (10YR5/3) silty SAND with slight trace gravel.	
	Light gray (10YR6/1), silty SAND with slight trace gravel.	608
16	Light brown (10YR6/4), silty SAND with some gravel.	
–20.5	Dark gray (10YR5/1), very silty CLAY with sand and trace gravel.	606, 604

End of Boring = 20.5 ft. BGS

NOTE(S): G151 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 12/20/2011
Finish: 12/20/2011
WEATHER: Cloudy, (mid-40's), rainy later.

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. McCuan
Eng/Geo: R. Fiorito

BOREHOLE ID: G152
Well ID: G152
Surface Elev: 623.06 ft. MSL
Completion: 18.57 ft. BGS
Station: 874,687.53N
2,513,894.46E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.50 - While drilling
▼ = 3.05 - Upon completion
▽ = 17.00 - 12/21/2011

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	12/24 *50%*	SS	*2-2 2-3* N=4			
2A, 2B	22/24 *92%*	SS	*2-4 9-7* N=13			
3A, 3B	15/24 *63%*	SS	*3-4 5-6* N=9			
5A	19/24 *79%*	SS	*10-10 12-10* N=22			
5B	20/24 *83%*	SS	*2-4 6-7* N=10			
6A	21/24 *88%*	SS	*2-3 5-7* N=8			
7A	20/24 *83%*	SS	*5-7 9-10* N=16			
8A, 8B	21/24 *88%*	SS	*3-4 7-11* N=11			
9A	23/24 *96%*	SS	*14-35 60-70* N=95			

Depth ft. BGS	Lithologic Description
0	Dark brown (10YR4/2), silty CLAY with trace sand and slight trace gravel.
	Light yellowish brown (10YR6/4), silty CLAY with trace sand and slight trace gravel.
▼ ~3	Gray (10YR6/1), silty CLAY with trace sand and slight trace gravel.
4	Gray (10YR6/1) and 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.
	Gray (10YR5/1), clayey SILT silty CLAY with sand and slight trace gravel.
	Gray (10YR5/1) with 25% brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.
10	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, silty CLAY with trace sand and slight trace gravel.
	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND with some silt and slight trace gravel.
14	Yellowish brown (10YR5/6) with 20% gray (10YR6/1), mottles, clayey SAND with some silt and slight trace gravel.
▼	Yellowish brown (10YR5/6), silty SAND.
	Yellowish brown (10YR5/6), silty SAND with slight trace gravel.
16	Dark grayish brown (10YR4/2), very silty CLAY with sand and trace gravel.
▽	Grayish brown (10YR5/2) silty CLAY with sand and trace gravel.

Depth ticks: 2, 4, 6, 8, 10, 12, 14, 16, 18

Elevation ft. MSL: 622, 620, 618, 616, 614, 612, 610, 608, 606

Borehole Detail | Remarks

End of Boring = 18.6 ft. BGS

NOTE(S): G152 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 12/15/2011
Finish: 12/15/2011
WEATHER: Cloudy, windy, (mid-high 30's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. McCuan
Eng/Geo: R. Fiorito

BOREHOLE ID: G153
Well ID: G153
Surface Elev: 623.30 ft. MSL
Completion: 20.76 ft. BGS
Station: 874,532.71N
2,513,532.68E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.00 - While drilling
▼ = 15.70 - Upon completion
▽ = 17.55 - 12/21/2011

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
1A	16/24 *67%*	SS				
1B						
	17/24 *71%*	SS	*woh-3 4-6* N=7			
2A						
3A	18/24 *75%*	SS	*3-4 5-5* N=9			
4A	21/24 *88%*	SS	*4-5 6-8* N=11			
	20/24 *83%*	SS	*1-4 4-5* N=8			
5A						
	20/24 *83%*	SS	*1-4 4-6* N=8			
6A						
	23/24 *96%*	SS	*7-6 6-15* N=12			
7A						
8A	19/24 *79%*	SS	*15-23 37-50* N=60			
9A	9/12 *75%*	SS	*50-99*			
	20/24 *83%*	SS	*23-50 58-109* N=108			
10A						
	6/7 *86%*	SS	*75-99/1"*			
11A						

Depth ft. BGS	Lithologic Description
	FILL - Light yellowish brown (10YR6/4), silty CLAY with sand and slight trace gravel.
2	FILL - Gray (10YR6/1), silty CLAY with sand and slight trace gravel.
4	Gray (10YR6/1) with 50% brownish yellow (10YR6/8) mottles, silty CLAY with trace sand.
6	Gray (10YR5/1), silty CLAY with trace sand.
	Gray (10YR6/1), silty CLAY with sand and slight trace gravel.
10	Gray (10YR6/1), silty CLAY with sand and slight trace gravel.
	Gray (10YR6/1) with 50% brownish yellow (10YR6/8) mottles, silty CLAY with sand and slight trace gravel.
12	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) mottles, clayey SAND with trace silt.
14	Yellowish brown (10YR5/8), silty SAND with slight trace gravel.
	Brownish yellow (10YR6/8), silty CLAY with sand and trace gravel.
18	Dark gray (10YR4/1), silty CLAY with sand and trace gravel.

Borehole Detail | Elevation ft. MSL: 622, 620, 618, 616, 614, 612, 610, 608, 606, 604 | Remarks

End of Boring = 20.8 ft. BGS

NOTE(S): G153 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 12/16/2011
Finish: 12/16/2011
WEATHER: Ptly. cloudy (mid-30's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. McCuan
Eng/Geo: R. Fiorito

BOREHOLE ID: G154
Well ID: G154
Surface Elev: 623.52 ft. MSL
Completion: 20.00 ft. BGS
Station: 874,978.38N
2,513,243.10E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.45 - While drilling
▼ =
▽ = 11.10 - 12/21/2011

SAMPLE:

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	14/24 *58%*	SS	*3-4 4-5* N=8			
2A	10/24 *42%*	SS	*woh-1 4-5* N=5			
3A	14/24 *58%*	SS	*2-4 6-7* N=10			
4A	21/24 *88%*	SS	*6-8 10-10* N=18			
5A	16/24 *67%*	SS	*1-4 6-8* N=10			
6A	13/24 *54%*	SS	*1-4 6-8* N=10			
7A, 7B	20/24 *83%*	SS	*4-6 8-12* N=14			
8A, 8B, 8C	23/24 *96%*	SS	*4-18 30-37* N=48			
9A	21/24 *88%*	SS	*40-75 86-84* N=161			
10A	20/24 *83%*	SS	*28-28 30-34* N=58			

LITHOLOGY:

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0–2	FILL - Light yellowish brown (10YR6/4), silty CLAY with trace sand and slight trace gravel.	622	
2–4	Brownish yellow (10YR6/6) with 25% gray (10YR6/1) mottles, silty CLAY with trace sand.	620	
4–6	Gray (10YR5/1) with 25% yellowish brown (10YR5/4) mottles, silty CLAY with trace sand.	618	
6–12	Gray (10YR6/1) with 25% brownish yellow (10YR6/6) mottles, silty CLAY with trace sand and slight trace gravel.	616, 614, 612	
12–12.8	Gray (10YR6/1) with 10% brownish yellow (10YR6/8) mottles, silty CLAY with trace sand and slight trace gravel.		
12.8–14	Gray (10YR6/1), silty CLAY with trace sand and slight trace gravel.	610	
14–14.7	Gray (10YR6/1), clayey SAND with trace silt.		
14.7–15.2	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, silty SAND with slight trace gravel.		
15.2–16	Dark yellowish brown (10YR4/4), silty CLAY with sand and trace gravel.	608	
16–17.8	Brown (10YR4/3), silty CLAY with sand and trace gravel.	606	
17.8–20	Dark gray (10YR4/1), silty CLAY with sand and trace gravel.	604	

End of Boring = 20.0 ft. BGS

NOTE(S): G154 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 12/19/2011
Finish: 12/19/2011
WEATHER: Cloudy, rainy, (mid-40's)

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. McCuan
Eng/Geo: R. Fiorito

BOREHOLE ID: G155
Well ID: G155
Surface Elev: 622.89 ft. MSL
Completion: 20.23 ft. BGS
Station: 875,127.65N
2,513,501.75E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.30 - While drilling
▼ = 12.90 - Upon completion
▽ = 7.90 - 12/21/2011

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	20/24 *83%*	SS	*4-6 8-6* N=14			
2A	20/24 *83%*	SS	*2-4 6-7* N=10			
3A	17/24 *71%*	SS	*2-4 5-8* N=9			
4A	24/24 *100%*	SS	*6-7 11-11* N=18			
5A	22/24 *92%*	SS	*woh-3 6-6* N=9			
6A	17/24 *71%*	SS	*2-4 6-6* N=10			
7A	24/24 *100%*	SS	*6-8 10-12* N=18			
8A	23/24 *96%*	SS	*woh-woh 4-15*			
8B / 9A	16/16 *100%*	SS	*15-50 99/4"*			
10A	15/17 *88%*	SS	*24-68 99/5"*			

Depth ft. BGS (approx.)	Lithologic Description	Elevation ft. MSL
0	FILL - Yellow (10YR7/6), silty CLAY with trace sand and slight trace gravel.	
	FILL - Brown (10YR5/3), silty CLAY with sand and trace gravel.	622
	FILL - Brown (10YR5/3), silty CLAY with trace sand and slight trace gravel.	
2	FILL - Brownish yellow (10YR6/6), silty CLAY with trace sand and slight trace gravel.	620
	FILL - Dark grayish brown (10YR4/2), silty CLAY with trace sand and slight trace gravel.	
4	Gray (10YR5/1), silty CLAY with trace sand and slight trace gravel.	618
6	Brownish yellow (10YR6/6) with 10% gray (10YR6/1) mottles, silty CLAY with trace sand and slight trace gravel.	616
8	Dark gray (10YR4/1) with10% brown (10YR4/3) mottles, silty CLAY with trace sand and slight trace gravel.	614
10	Dark yellowish brown (10YR4/6) with 30% grayish brown (10YR5/2) mottles,silty CLAY with trace sand and slight trace gravel.	612
12	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, clayey SAND with trace silt.	610
14	Yellowish brown (10YR6/4), clayey SAND with trace silt.	
	Yellowish brown (10YR5/6), silty SAND with slight trace gravel.	608
16	Yellowish brown (10YR5/6), silty SAND with slight trace gravel.	606
	Light brownish gray (10YR6/2), silty CLAY with sand and trace gravel.	
18	Light gray (10YR6/2), silty CLAY with sand and trace gravel.	604
20		

Borehole Detail | Remarks

End of Boring = 20.2 ft. BGS

NOTE(S): G155 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/25/2008
Finish: 2/25/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G200
Well ID: G200
Surface Elev: 624.20 ft. MSL
Completion: 18.00 ft. BGS
Station: 877,930.59N
2,515,649.96E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.50 - While drilling
▼ = 2.75 - 3/12/08
▽ =

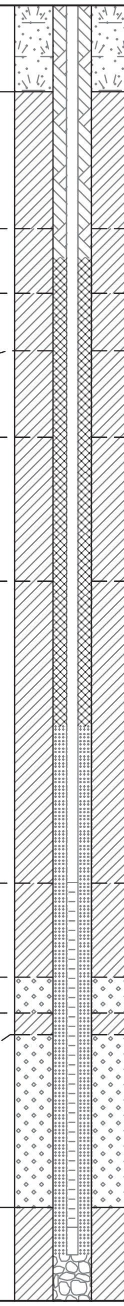
SAMPLE / TESTING

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
	24/24 *100%*	SS	*3-2 3-3* N=5			
1A				31		1.36 B
2A				26		1.94 BSh
	19/24 *79%*	SS	*3-3 6-6* N=9			
2B				26		2.33 Sh
3A	19/24 *79%*	SS	*3-3 4-5* N=7	26		1.59 B
3B				23		1.55 B
4A	22/24 *92%*	SS	*5-5 5-5* N=10	29		0.31 B
5A	20/24 *83%*	SS	*2-2 3-5* N=5	25		1.09 B
	22/24 *92%*	SS	*1-3 2-3* N=5			
6A				22		1.01
	24/24 *100%*	SS	*3-3 5-6* N=8			
7A				15		0.50 B
7B				18		
8A				24		0.27 B
	19/24 *79%*	SS	*0-3 5-8* N=8			
8B				17		
9A				13		
	24/24 *100%*	SS	*8-15 30-50* N=45			
9B				8		

Lithologic Description

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
	Very dark grayish brown (10YR3/2), moist, firm, friable, clayey SILT	624
2	Dark gray (10YR4/1) with 5% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY	622
	Dark gray (10YR4/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY	
4	Dark gray (10YR4/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand	620
	Very dark gray (10YR3/1), moist, firm, silty CLAY, slight trace sand	
6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace coarse sand	618
8		616
10	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, sand and slight trace gravel	614
12	Yellowish brown (10YR5/8), moist, soft, sandy CLAY	612
	Gray (10YR5/1), wet, soft, fine- to coarse-grained SAND	
14	Gray (10YR5/1), wet, soft, silty CLAY, trace sand and gravel	610
	Yellowish brown (10YR5/4), wet, soft, fine- to coarse-grained SAND, trace gravel	
16		608
	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel	
18		

Borehole Detail



Remarks

End of Boring = 18.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/25/2008
Finish: 2/25/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G201
Well ID: G201
Surface Elev: 623.90 ft. MSL
Completion: 18.15 ft. BGS
Station: 877,924.94N
2,514,849.47E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.20 - While drilling
▼ = 2.17 - 3/12/08
▽ =

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	Elevation ft. MSL	Remarks
1A	22/24 *92%*	SS	*3-3 2-3* N=5	23				Very dark grayish brown (10YR3/2), moist, soft, friable, clayey SILT, slight trace sand and gravel		
1B				33		1.16	2	Dark brown (10YR3/3), moist, soft, silty CLAY	622	
2A	22/24 *92%*	SS	*2-3 5-6* N=8	26		2.33 BSh	4	Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel	620	
3A	20/24 *83%*	SS	*2-4 5-5* N=9	15		1.94 B	6	Gray (10YR5/1) with 5% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY, sand and trace gravel	618	
4A	24/24 *100%*	SS	*7-7 7-6* N=14	19		1.24 B	8	Gray (10YR5/1), moist, firm, sandy CLAY, trace silt and slight trace gravel	616	
5A	24/24 *100%*	SS	*1-2 3-3* N=5	23		1.16 B	10	Yellowish brown (10YR5/8) with 10% gray (10YR5/1) mottles, moist, firm, sandy CLAY, trace gravel	614	
6A	23/24 *96%*	SS	*0-1 1-2* N=2	20			12	Yellowish brown (10YR5/8), wet, soft, silty SAND, trace gravel	612	
								Yellowish brown (10YR5/8), moist, firm, clayey SILT		
7A	20/24 *83%*	SS	*3-6 6-12* N=12	22		2.72 BSh	14	Greenish gray (5GY6/1), moist, firm, interbedded clayey SILT and SILT	610	
8A	24/24 *100%*	SS	*4-7 7-10* N=14	23		1.59 Sh				
8B				19			16	Yellowish brown (10YR5/8), wet, soft, fine- to coarse-grained SAND, slight trace gravel	608	
9A	24/24 *100%*	SS	*7-12 25-30* N=37	15				Yellowish brown (10YR5/8), wet, firm, very fine- to fine-grained silty SAND		
9B				20				Gray (10YR5/1), wet, soft, SILT		
9C				11				Gray (10YR5/1), wet, soft, fine- to coarse-grained SAND, slight trace gravel		
							18	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel	606	

End of Boring = 18.15 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/21/2008
Finish: 2/21/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G205
Well ID: G205
Surface Elev: 622.15 ft. MSL
Completion: 16.00 ft. BGS
Station: 875,550.19N
2,515,914.87E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.10 - While drilling
▼ = 5.06 - 3/12/08
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type
1A	24/24 *100%*	SS	*4-3* *4-4* N=7	22		
1B				30		1.67 Sh
2A	19/24 *79%*	SS	*3-5* *6-5* N=11	24		1.86 B
3A	20/24 *83%*	SS	*2-2* *5-5* N=7	19		1.55 B
4A	19/24 *79%*	SS	*5-6* *7-8* N=13	20		1.12 B
5A	16/24 *67%*	SS	*2-2* *3-5* N=5	20		0.62 BSh
6A	22/24 *92%*	SS	*1-2* *3-3* N=5	17		0.62 BSh
6B				17		
7A				25		
7B	23/24 *96%*	SS	*3-3* *5-6* N=8	17		1.36 BSh
8A				15		
8B	17/24 *71%*	SS	*5-19* *26-35* N=45	10		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0 – ~1.3	Very dark grayish brown (10YR3/2), moist, firm, clayey SILT	622	
~1.3 – ~2.3	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand	620	
~2.3 – ~5.7	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY, slight trace sand	618	
~5.7 – ~8.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel	616	
~8.4 – ~11.1	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel	614, 612	
~11.1 – ~12.3	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel	610	
~12.3 – ~14.5	Yellowish brown (10YR 5/4), moist, soft, silty SAND, trace gravel	608	
~14.5 – 16	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/14/2010
Finish: 10/14/2010
WEATHER: Sunny, warm, breezy (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G206
Well ID: G206
Surface Elev: 630.54 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,103.91N
2,514,669.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 22.00 - While drilling
▼ = 21.54 - Upon completion
▽ =

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
1A	12/24 *50%*	SS	*2-2 3-2* N=5	18			0–3.2	FILL - Grayish brown (10YR5/2), moist, firm, silty CLAY with trace sand and gravel.		
2A	20/24 *83%*	SS	*2-2 3-5* N=5	16			3.2–8	FILL - Dark gray (10YR4/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		
3A	20/24 *83%*	SS	*4-9 6-8* N=15	19						
4A	19/24 *79%*	SS	*2-4 5-6* N=9	20						
5A	17/24 *71%*	SS	*2-3 4-5* N=7	30			8	Very dark gray (10YR3/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.		
								Dark grayish brown (10YR4/2) with 35% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		
6A	22/24 *92%*	SS	*2-3 4-6* N=7	19			10	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand and gravel.		
7A	23/24 *96%*	SS	*1-2 3-4* N=5	23			12.2	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		
8A	22/24 *92%*	SS	*1-1 3-3* N=4	22			14	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		
9A	24/24 *100%*	SS	*1-1 2-2* N=3	21			16	Dark yellowish brown (10YR4/6) with 30% gray (10YR5/1) mottles, moist, soft, silty CLAY with trace sand and gravel.		
								Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		
							18	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, silty CLAY with trace sand and gravel.		
10A	24/24 *100%*	SS	*woh-woh 1-5*	25				Gray (10YR5/1), moist, very soft, very fine- to fine-grained sandy CLAY with trace gravel.		
							19.8–20	Gray (10YR5/1), moist, firm, very fine- to fine-grained		

Elevation scale: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

NOTE(S): G206 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/14/2010
Finish: 10/14/2010
WEATHER: Sunny, warm, breezy (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G206
Well ID: G206
Surface Elev: 630.54 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,103.91N
2,514,669.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 22.00 - While drilling
▼ = 21.54 - Upon completion
▽ =

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
								sandy CLAY with trace gravel.			
11A	22/24 *92%*	SS	*19-6 13-19* N=19	13				Dark yellowish brown (10YR4/6), wet dense, silty, fine- to coarse-grained SAND with trace gravel.		610	
11B				16				Dark yellowish brown (10YR4/6), moist, hard, clayey SILT with sand and gravel.			
							22	Grayish brown (10YR5/2), moist, dense, silty, very fine- to fine-grained SAND.			
12A	20/24 *83%*	SS	*11-20 19-13* N=39	10				Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
12B				10				Dark gray (10YR4/1), wet, dense, silty, fine- to coarse-grained SAND with gravel.			
							24	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			

End of Boring = 24.0 ft. BGS

NOTE(S): G206 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/8/2010
Finish: 10/8/2010
WEATHER: Sunny, mild

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: R. Hasenyager

BOREHOLE ID: G207
Well ID: G207
Surface Elev: 630.61 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,166.36N
2,514,837.94E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ =

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	23/24 *96%*	SS	*6-5 5-8* N=10	15		
2A	24/24 *100%*	SS	*4-4 7-8* N=11	15		
3A	23/24 *96%*	SS	*3-6 7-9* N=13	17		
4A	24/24 *100%*	SS	*3-4 6-7* N=10	16		
5A	24/24 *100%*	SS	*2-2 3-4* N=5	22		
5B				24		
6A	22/24 *92%*	SS	*2-2 2-5* N=4	27		
7A	24/24 *100%*	SS	*2-2 2-3* N=4	27		
8A	24/24 *100%*	SS	*woh-1 2-3* N=3	25		
9A	23/24 *96%*	SS	*woh-2 2-3* N=4	22		
10A	24/24 *100%*	SS	*woh-woh 2-3*	19		

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

Lithologic Description	Remarks
FILL - Yellowish brown (10YR5/6) with 10% gray (10YR6/1) and 5% black (10YR2/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.	
FILL - Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with sand and trace gravel.	
FILL - Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, moist, hard, silty CLAY with sand and trace gravel.	
FILL - Dark yellowish brown (10YR4/4), moist, hard, silty CLAY with slight trace sand and gravel.	
FILL - Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with slight trace sand and gravel.	
Yellowish brown (10YR5/6) with 25% gray (10YR5/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.	
Gray (10YR5/1) with 15% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.	
Gray (10YR5/1) with 40% yellowish brown (10YR5/8) mottles, very moist, firm, silty CLAY with slight trace sand and gravel.	
Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, very moist, soft, silty CLAY with trace sand and gravel.	
Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.	
Yellowish brown (10YR5/6) with 25% gray (10YR6/1) mottles, very moist, very soft, sandy, silty CLAY with trace gravel.	
Yellowish brown (10YR5/6) with 30% gray (10YR6/1) mottles, very moist, very soft, sandy CLAY with silt and trace gravel.	

NOTE(S): G207 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/8/2010
Finish: 10/8/2010
WEATHER: Sunny, mild

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: R. Hasenyager

BOREHOLE ID: G207
Well ID: G207
Surface Elev: 630.61 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,166.36N
2,514,837.94E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ =

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
								Yellowish brown (10YR5/6) with 30% gray (10YR6/1) mottles, very moist, very soft, sandy CLAY with silt and trace gravel. *[Continued from previous page]*		610	
11A	22/24 *92%*	SS	*woh-1* *2-2* N=3	18				Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, very moist to wet, loose, silty, very fine- to fine-grained SAND with slight trace gravel.			
							22				
12A	24/24 *100%*	SS	*10-24* *26-30* N=50					Gray (10YR5/1), slightly moist, hard, very silty CLAY with trace sand and slight trace gravel.		608	
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G207 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/7/2010
Finish: 10/7/2010
WEATHER: Sunny, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G208
Well ID: G208
Surface Elev: 630.57 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,231.46N
2,514,993.57E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 23.92 - Upon completion
▽ =

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
1A	19/24 *79%*	SS	*4-3 3-5* N=6	23		
2A	24/24 *100%*	SS	*2-3 4-6* N=7	14		
3A	24/24 *100%*	SS	*2-4 4-7* N=8	21		
4A	24/24 *100%*	SS	*2-4 6-8* N=10	17		
5A	20/24 *83%*	SS	*2-2 4-5* N=6	24		
6A	23/24 *96%*	SS	*1-2 4-4* N=6	26		
7A	19/24 *79%*	SS	*1-2 2-3* N=4	23		
8A	22/24 *92%*	SS	*1-1 2-3* N=3	24		
9A	24/24 *100%*	SS	*1-1 2-3* N=3	24		
9B				20		
10A	22/24 *92%*	SS	*woh-woh 1-2*	20		
10B				17		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–2	FILL - Brown (10YR4/3) with 5% dark gray (10YR4/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		630	
2–8.6	FILL - Brown (10YR4/3) with 15% dark gray (10YR4/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		628, 626, 624, 622	
8.6–9.1	Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand and gravel, trace roots.			
9.1–10	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.			
10–12	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.		620	
12–16	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand, trace roots.		618, 616	
16–17.3	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel, trace roots.		614	
17.3–18.9	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, very moist, soft, silty, very fine- to fine-grained sandy CLAY with trace gravel.		612	
18.9–20	Dark yellowish brown (10YR4/6) with 15% gray (10YR5/1) mottles, very moist to wet, soft, clayey, very fine- to medium-grained SAND with trace gravel.			

NOTE(S): G208 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/7/2010
Finish: 10/7/2010
WEATHER: Sunny, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G208
Well ID: G208
Surface Elev: 630.57 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,231.46N
2,514,993.57E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 23.92 - Upon completion
▽ =

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
11A	20/24 *83%*	SS	*woh-2* *5-12* N=7	13				Yellowish brown (10YR5/4), moist, firm, very silty CLAY with sand and gravel.		610	
12A	24/24 *100%*	SS	*6-11* *18-24* N=29	9			22	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
							▼ 24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G208 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/7/2010
Finish: 10/7/2010
WEATHER: Sunny, cool (lo-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G209
Well ID: G209
Surface Elev: 630.57 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,298.23N
2,515,149.56E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 22.40 - Upon completion
▽ =

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
1A	24/24 *100%*	SS	*4-4 4-6* N=8	21		
2A	24/24 *100%*	SS	*3-4 6-6* N=10	13		
3A	24/24 *100%*	SS	*2-3 6-8* N=9	19		
4A	22/24 *92%*	SS	*2-3 6-8* N=9	17		
5A	18/24 *75%*	SS	*2-3 3-5* N=6	20		
6A	24/24 *100%*	SS	*1-2 2-5* N=4	26		
7A	22/24 *92%*	SS	*1-3 4-4* N=7	22		
8A	24/24 *100%*	SS	*woh-1 2-3* N=3	25		
9A	19/24 *79%*	SS	*woh-1 2-3* N=3	24		
10A	14/24 *58%*	SS	*woh-2 3-3* N=5	20		

Depth ft. BGS	Lithologic Description
0–7.6	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.
7.6–8.1	Grayish brown (10YR5/2), moist, firm, clayey SILT with trace sand and gravel.
8.1–12.3	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.
12.3–14	Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.
14–20	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

Borehole Detail | Remarks

NOTE(S): G209 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/7/2010
Finish: 10/7/2010
WEATHER: Sunny, cool (lo-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G209
Well ID: G209
Surface Elev: 630.57 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,298.23N
2,515,149.56E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 22.40 - Upon completion
▽ =

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
11A	1/24 *4%*	SS	*woh-1 1-1* N=2	21				Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel. *[Continued from previous page]*		610	
12A	20/24 *83%*	SS	*9-16 17-26* N=33	7			22 ▼	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G209 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/6/2010
Finish: 10/6/2010
WEATHER: Sunny, warm (mid-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G210
Well ID: G210
Surface Elev: 630.48 ft. MSL
Completion: 25.00 ft. BGS
Station: 875,359.71N
2,515,298.97E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 19.90 - Upon completion
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	20/24 *83%*	SS	*4-3 5-6* N=8	16		
2A	24/24 *100%*	SS	*3-4 7-7* N=11	15		
3A	24/24 *100%*	SS	*3-5 10-9* N=15	19		
4A	24/24 *100%*	SS	*3-6 9-11* N=15	17		
5A	24/24 *100%*	SS	*3-4 5-7* N=9	15		
6A	22/24 *92%*	SS	*2-2 4-6* N=6	26		
7A	19/24 *79%*	SS	*1-3 3-5* N=6	23		
8A	24/24 *100%*	SS	*2-2 2-4* N=4	26		
9A	24/24 *100%*	SS	*1-1 2-3* N=3	24		
10A	20/24 *83%*	SS	*1-1 2-2* N=3	24		
10B				31		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–6.3	FILL - Brown (10YR4/3) with 20% dark gray (N5/1) mottles, moist, firm, silty CLAY with trace sand and gravel.	630–624
6.3–7.6	FILL - Dark grayish brown (10YR4/2), slightly moist, firm, clayey SILT with trace sand and gravel.	
7.6–8.1	Gray (10YR5/1) with 10% dark grayish brown (10YR4/2) mottles, moist, firm, silty CLAY with trace sand.	
8.1–9.4	Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand, trace roots.	622
9.4–10	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand.	
10–12.6	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	620, 618
12.6–14	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist to very moist, firm, silty CLAY with sand.	
14–16	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.	616
16–19	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.	614, 612
19–20	Gray (N6/1), very moist, very soft, silty, very fine- to fine-grained sandy CLAY with trace gravel.	

Remarks

NOTE(S): G210 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/6/2010
Finish: 10/6/2010
WEATHER: Sunny, warm (mid-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

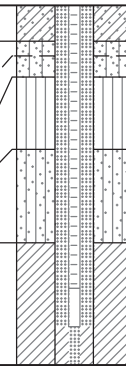
BOREHOLE ID: G210
Well ID: G210
Surface Elev: 630.48 ft. MSL
Completion: 25.00 ft. BGS
Station: 875,359.71N
2,515,298.97E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 19.90 - Upon completion
▽ =

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
11A	14/24 *58%*	SS	*woh-5 6-18* N=11	12				Yellowish brown (10YR5/4), moist, medium dense, silty, fine- to coarse-grained SAND with trace gravel.	610	
								Gray (N6/1), moist, medium dense, silty, very fine - to fine-grained SAND.		
							22	Yellowish brown (10YR5/4), slightly moist, hard, clayey SILT with sand and gravel.		
12A	19/24 *79%*	SS	*7-18 26-36* N=44	14				Brown (10YR5/3), very moist, dense, very fine- to fine-grained sandy SILT with trace gravel.	608	
13A	10/12 *83%*	SS	*27-50/6"*	9			24	Gray (N5/1), slightly moist, hard, very silty CLAY with sand and gravel.	606	

Borehole Detail



End of Boring = 25.0 ft. BGS

NOTE(S): G210 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/11/2010
Finish: 10/11/2010
WEATHER: Sunny, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G211
Well ID: G211
Surface Elev: 630.31 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,424.49N
2,515,449.06E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 20.60 - Upon completion
▽ =

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
1A	20/24 *83%*	SS	*5-3 4-5* N=7	23			0–3.5	FILL - Brown (10YR4/3) with 20% dark gray (10YR4/1) mottles, moist, firm, silty CLAY with trace sand and gravel.		630	
2A	20/24 *83%*	SS	*3-5 5-8* N=10	17			2			628	
3A	24/24 *100%*	SS	*2-3 5-7* N=8	24			3.5–7.8	FILL - Dark gray (10YR4/1) with 20% brown (10YR4/3) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		626	
4A	24/24 *100%*	SS	*3-5 7-9* N=12	29			6			624	
5A	24/24 *100%*	SS	*2-2 3-5* N=5	31			7.8–10	Dark gray (10YR4/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY, slight trace roots.		622	
6A	17/24 *71%*	SS	*1-2 4-4* N=6	19			10–12	Dark gray (10YR4/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.		620	
7A	24/24 *100%*	SS	*1-2 2-4* N=4	22			12–16.6	Dark gray (10YR4/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		618	
8A	24/24 *100%*	SS	*1-1 3-2* N=4	28			14			616	
9A	22/24 *92%*	SS	*1-1 1-2* N=2	19			16.6–18.4	Dark yellowish brown (10YR4/6) with 30% gray (10YR5/1) mottles, very moist, soft, very fine- to fine-grained sandy CLAY with trace gravel.		614	
10A	19/24 *79%*	SS	*1-4 5-11* N=9	13			18.4–20	Dark yellowish brown (10YR4/4) with 15% grayish brown (10YR5/2) mottles, moist, firm, clayey SILT with sand and gravel.		612	

▼ 20

NOTE(S): G211 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/11/2010
Finish: 10/11/2010
WEATHER: Sunny, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G211
Well ID: G211
Surface Elev: 630.31 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,424.49N
2,515,449.06E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 20.60 - Upon completion
▽ =

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
11A	18/24 *75%*	SS	*7-17 23-21* N=40	10			▼	Grayish brown (10YR5/2), slightly moist, hard, very silty CLAY with sand and gravel.		610	
							22			608	
12A	24/24 *100%*	SS	*4-14 15-17* N=29	13				Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G211 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station	**CONTRACTOR:** Layne-Western Co		
Site: CCB Management Facility	**Rig mfg/model:** CME-750 ATV Drill	**BOREHOLE ID:** G212	
Location: Coffeen, Illinois	**Drilling Method:** 4¼" HSA w/SS samplers	**Well ID:** G212	
Project: 05S3004A		**Surface Elev:** 630.59 ft. MSL	
DATES: Start: 10/11/2010	**FIELD STAFF: Driller:** D. Mahurin	**Completion:** 24.00 ft. BGS	
Finish: 10/11/2010	**Helper:** J. Litsch/D. Smail	**Station:** 875,486.50N	
WEATHER: Sunny, warm (lo-80's)	**Eng/Geo:** .	2,515,583.03E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 19.00 - While drilling
▼ = 20.72 - Upon completion
▽ =

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
1A	24/24 *100%*	SS	*4-3 3-6* N=6	17			0–1.7	FILL - Brown (10YR4/3), slightly moist, firm, silty CLAY with trace sand and gravel.	630	
2A	24/24 *100%*	SS	*2-3 4-5* N=7	21			1.7–3.5	FILL - Dark gray (10YR4/1) with 20% brown (10YR4/3) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.	628	
3A	24/24 *100%*	SS	*2-5 6-7* N=11	13			3.5–8.2	FILL - Brown (10YR4/3) with 15% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	626	
4A	24/24 *100%*	SS	*2-5 7-10* N=12	15					624	
5A	24/24 *100%*	SS	*2-2 4-7* N=6	29			8.2–10	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY, slight trace roots.	622	
6A	18/24 *75%*	SS	*2-3 4-6* N=7	23			10–12	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.	620	
7A	17/24 *71%*	SS	*1-2 2-2* N=4	25			12–18	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	618	
8A	24/24 *100%*	SS	*woh-1 2-3* N=3	27					616	
9A	22/24 *92%*	SS	*1-1 2-2* N=3	25					614	
10A	24/24 *100%*	SS	*woh-woh 1-2*	19			18–19.5 ▼	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, very moist, very soft, silty, very fine- to fine-grained sandy CLAY with trace gravel.	612	
10B				22			19.5–20	Gray (10YR5/1), loose, wet, silty, very fine- to		

NOTE(S): G212 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/11/2010
Finish: 10/11/2010
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G212
Well ID: G212
Surface Elev: 630.59 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,486.50N
2,515,583.03E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 19.00 - While drilling
▼ = 20.72 - Upon completion
▽ =

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
								medium-grained SAND.			
11A	7/24 *29%*	SS	*1-6 10-22* N=16	19			▼	Brown (10YR5/3), moist, medium dense, SILT with trace sand and gravel.		610	
12A	20/24 *83%*	SS	*5-21 18-27* N=39	12			22	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		608	
							24				

End of Boring = 24.0 ft. BGS

NOTE(S): G212 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Partly cloudy, mild (mid-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G213
Well ID: G213
Surface Elev: 630.34 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,544.37N
2,515,723.51E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 19.92 - Upon completion
▽ =

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
1A	23/24 *96%*	SS	*4-3 4-5* N=7	15			0–10.3	FILL - Brown (10YR4/3) with 10% dark gray (10YR4/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, silty CLAY with trace sand and gravel.	630	
2A	22/24 *92%*	SS	*2-4 6-8* N=10	21					628	
3A	22/24 *92%*	SS	*2-4 7-8* N=11	17					626	
4A	22/24 *92%*	SS	*2-4 4-8* N=8	16					624	
5A	20/24 *83%*	SS	*1-3 6-6* N=9	12					622	
6A	20/24 *83%*	SS	*2-2 5-7* N=7	24			10.3–11.3	Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.	620	
							11.3–12.2	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT, trace roots.		
7A	20/24 *83%*	SS	*2-3 3-5* N=6	19			12.2–14	Dark gray (10YR4/1) with 3% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	618	
8A	22/24 *92%*	SS	*1-2 2-3* N=4	24			14–16.8	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	616, 614	
9A	24/24 *100%*	SS	*woh-1 2-2* N=3	24			16.8–17.8	Gray (10YR5/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		
							17.8–18.8	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, very fine- to fine-grained sandy CLAY with trace gravel.	612	
10A	18/24 *75%*	SS	*woh-woh 1-2*	24			18.8–20	Dark yellowish brown (10YR4/6), very moist, soft, sandy CLAY with trace gravel.		

NOTE(S): G213 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Partly cloudy, mild (mid-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G213
Well ID: G213
Surface Elev: 630.34 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,544.37N
2,515,723.51E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 20.00 - While drilling
▼ = 19.92 - Upon completion
▽ =

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
										610	
11A	18/24 *75%*	ss	*1-1* *1-2* N=2	18				Dark yellowish brown (10YR4/6), moist, soft, clayey, very fine- to coarse-grained SAND with trace gravel.			
								Dark yellowish brown (10YR4/6), moist, firm, very silty CLAY with sand and gravel.			
							22			608	
12A	22/24 *92%*	ss	*10-13* *18-22* N=31	11				Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G213 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/14/2010
Finish: 10/14/2010
WEATHER: Sunny, cool (lo-40's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G214
Well ID: G214
Surface Elev: 630.39 ft. MSL
Completion: 24.00 ft. BGS
Station: 875,668.02N
2,515,960.84E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ =

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	24/24 *100%*	SS	*6-7 7-9* N=14	15		
2A	24/24 *100%*	SS	*3-3 6-5* N=9	22		
3A	24/24 *100%*	SS	*3-4 6-8* N=10	18		
4A	24/24 *100%*	SS	*3-4 7-10* N=11	17		
5A	24/24 *100%*	SS	*3-2 4-5* N=6	19		
6A	24/24 *100%*	SS	*2-3 4-7* N=7	24		
7A	24/24 *100%*	SS	*2-3 4-6* N=7	22		
7B				16		
8A	24/24 *100%*	SS	*woh-2 3-4* N=5	22		
9A	22/24 *92%*	SS	*1-2 2-3* N=4	21		
10A	22/24 *92%*	SS	*woh-2 2-2* N=4	15		
10B				21		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~3.1	FILL - Brown (10YR4/3) with 10% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	
~3.1 – ~4	FILL - Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	
~4 – ~8.4	FILL - Brown (10YR4/3) with 10% dark yellowish brown (10YR4/6) and 5% dark gray (10YR4/1) mottles, moist, firm, silty CLAY with trace sand and gravel.	
~8.4 – ~10.5	Grayish brown (10YR5/2) with 15% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand and gravel.	
~10.5 – ~12.2	Brown (10YR4/3) with 15% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	
~12.2 – ~13	Gray (10YR6/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY.	
~13 – 16	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	
16 – ~16.9	Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	
~16.9 – ~19.4	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	
~19.4 – 20	Gray (10YR5/1), wet, loose, silty, very fine- to medium-grained SAND with trace gravel and clayey seams.	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

Borehole Detail | Remarks

NOTE(S): G214 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station	**CONTRACTOR:** Layne-Western Co		
Site: CCB Management Facility	**Rig mfg/model:** CME-750 ATV Drill	**BOREHOLE ID:** G214	
Location: Coffeen, Illinois	**Drilling Method:** 4¼" HSA w/SS samplers	**Well ID:** G214	
Project: 05S3004A		**Surface Elev:** 630.39 ft. MSL	
DATES: Start: 10/14/2010	**FIELD STAFF: Driller:** D. Mahurin	**Completion:** 24.00 ft. BGS	
Finish: 10/14/2010	**Helper:** J. Litsch/D. Smail	**Station:** 875,668.02N	
WEATHER: Sunny, cool (lo-40's)	**Eng/Geo:** .	2,515,960.84E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ =

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
								Gray (10YR5/1), wet, loose, silty, very fine- to medium-grained SAND with trace gravel and clayey seams. *[Continued from previous page]*		610	
11A	20/24 *83%*	SS	*woh-woh 3-12*	24							
11B				14				Dark yellowish brown (10YR4/6), moist, firm, very silty CLAY with trace sand and gravel.			
							22			608	
12A	24/24 *100%*	SS	*12-28 32-28* N=60	7				Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with trace sand and gravel.			
							24	**End of Boring = 24.0 ft. BGS**			

NOTE(S): G214 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/13/2010
Finish: 10/13/2010
WEATHER: Sunny, warm, windy (hi-60's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G215
Well ID: G215
Surface Elev: 630.48 ft. MSL
Completion: 24.31 ft. BGS
Station: 875,810.19N
2,515,971.55E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ = 22.52 - 10/14/10

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
1A	23/24 *96%*	SS	*5-3 3-5* N=6	18		
2A	19/24 *79%*	SS	*3-3 5-6* N=8	17		
3A	20/24 *83%*	SS	*2-3 7-7* N=10	13		
4A	23/24 *96%*	SS	*3-6 6-7* N=12	16		
4B				27		
5A	20/24 *83%*	SS	*3-3 3-5* N=6	20		
6A	13/24 *54%*	SS	*2-2 3-5* N=5	24		
7A	19/24 *79%*	SS	*2-3 4-6* N=7	17		
8A	20/24 *83%*	SS	*2-3 4-5* N=7	19		
9A	22/24 *92%*	SS	*1-3 3-4* N=6	19		
10A	24/24 *100%*	SS	*woh-1 2-2* N=3	17		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–6	FILL - Brown (10YR4/3) with 30% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		630, 628, 626	
6–7.5	FILL - Dark grayish brown (10YR4/2), moist, firm, silty CLAY with trace sand and gravel.		624	
7.5–8.4	FILL - Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand.			
8.4–9	Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand, trace roots.		622	
9–12	Dark gray (10YR4/1) with 30% dark yellowish brown (10YR4/6) moist, firm, silty CLAY with trace sand.		620	
12–13.3	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		618	
13.3–15	Dark gray (10YR4/1), moist, firm, clayey SILT with trace sand.		616	
15–18.6	Dark gray (10YR4/1) with 30% Dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		614	
18.6–20	Dark gray (10YR4/1) with 30% Dark yellowish brown (10YR4/6) mottles, moist, soft, sandy CLAY with trace gravel.		612	

NOTE(S): G215 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/13/2010
Finish: 10/13/2010
WEATHER: Sunny, warm, windy (hi-60's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G215
Well ID: G215
Surface Elev: 630.48 ft. MSL
Completion: 24.31 ft. BGS
Station: 875,810.19N
2,515,971.55E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = Dry - Upon completion
▽ = 22.52 - 10/14/10

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
								Dark yellowish brown (10YR4/6), moist, medium dense, clayey SILT with sand and trace gravel.	610	
11A	20/24 *83%*	SS	*2-4 4-4* N=8	17				Yellowish brown (10YR5/6), moist, medium dense, silty, very fine- to fine-grained SAND.		
							22	Dark yellowish brown (10YR4/6) with 30% dark gray (10YR4/1) mottles, moist, firm, sandy CLAY with trace gravel.		
12A	24/24 *100%*	SS	*7-11 17-19* N=28	11			▽	Grayish brown (10YR5/2), slightly moist, very firm, very silty CLAY with sand and gravel.	608	
12B	0/4 *0%*	BD		9			24	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		

End of Boring = 24.3 ft. BGS

NOTE(S): G215 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/13/2010
Finish: 10/13/2010
WEATHER: Partly cloudy, mild, windy (lo-60's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G216
Well ID: G216
Surface Elev: 630.28 ft. MSL
Completion: 26.00 ft. BGS
Station: 875,976.05N
2,515,968.53E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 21.00 - While drilling
▼ = Dry - Upon completion
▽ =

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
1A	24/24 *100%*	SS	*3-2 2-4* N=4	22		
2A	19/24 *79%*	SS	*2-2 5-4* N=7	28		
3A	24/24 *100%*	SS	*2-2 4-5* N=6	19		
4A	22/24 *92%*	SS	*3-4 6-6* N=10	19		
5A	20/24 *83%*	SS	*2-3 3-6* N=6	18		
6A	18/24 *75%*	SS	*2-3 3-4* N=6	17		
7A	16/24 *67%*	SS	*1-2 3-4* N=5	20		
8A	22/24 *92%*	SS	*2-2 5-5* N=7	20		
9A	23/24 *96%*	SS	*woh-2 3-3* N=5	18		
10A	24/24 *100%*	SS	*woh-woh 1-2*	17		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0 – ~5.1	FILL - Brown (10YR4/3) with 20% dark gray (10YR4/6) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		
~5.1 – ~6.4	FILL - Dark gray (10YR4/1) with 15% brown (10YR4/3) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand and gravel.		
~6.4 – ~8.4	FILL - Dark grayish brown (10YR4/2) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		
~8.4 – 12	Dark gray (10YR4/1) with 40% gray (10YR6/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.		
12 – ~14.2	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.		
~14.2 – ~15.4	Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand.		
~15.4 – ~18.3	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.		
~18.3 – ~19.3	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, sandy CLAY with trace gravel.		
~19.3 – 20	Dark yellowish brown (10YR4/6) and 40% gray		

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. Elevation scale: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612.

NOTE(S): G216 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/13/2010
Finish: 10/13/2010
WEATHER: Partly cloudy, mild, windy (lo-60's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G216
Well ID: G216
Surface Elev: 630.28 ft. MSL
Completion: 26.00 ft. BGS
Station: 875,976.05N
2,515,968.53E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 21.00 - While drilling
▼ = Dry - Upon completion
▽ =

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
								(10YR5/1) mottles, moist, soft, sandy CLAY with trace gravel. *[Continued from previous page]*		610	
11A	20/24 *83%*	SS	*2-9 9-7* N=18	14			▼	Light brownish gray (10YR6/2), wet, medium dense, very fine- to fine-grained sandy SILT with trace gravel.			
							22	Yellowish brown (10YR5/6), wet, medium dense, silty, very fine-to medium-grained SAND.			
								Gray (10YR5/1), very moist, medium dense, very fine- to fine-grained sandy SILT.		608	
12A	22/24 *92%*	SS	*5-10 21-25* N=31	19				Gray (10YR5/1), wet, medium dense, very fine- to fine-grained sandy SILT.			
12B				16				Dark gray (10YR4/1), wet, dense, silty, fine- to coarse-grained SAND with gravel.			
							24			606	
13A	20/24 *83%*	SS	*14-25 27-27* N=52	9				Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			
							26	**End of Boring = 26.0 ft. BGS**			

NOTE(S): G216 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G217
Well ID: G217
Surface Elev: 630.67 ft. MSL
Completion: 26.00 ft. BGS
Station: 876,185.57N
2,515,963.02E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 23.00 - While drilling
▼ = 24.82 - Upon completion
▽ = 23.98 - 10/13/10

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp* (tsf) Failure Type
1A	20/24 *83%*	SS	*5-2 3-4* N=5	21		
2A	19/24 *79%*	SS	*2-3 5-6* N=8	28		
3A	19/24 *79%*	SS	*2-3 6-7* N=9	14		
4A	23/24 *96%*	SS	*5-6 7-8* N=13	15		
5A	20/24 *83%*	SS	*3-5 7-6* N=12	13		
6A	19/24 *79%*	SS	*3-3 4-5* N=7	27		
7A	18/24 *75%*	SS	*3-4 6-8* N=10	28		
8A	20/24 *83%*	SS	*2-4 6-8* N=10	16		
9A	19/24 *79%*	SS	*2-3 4-5* N=7	26		
10A	19/24 *79%*	SS	*1-2 2-3* N=4	18		

Depth ft. BGS	Lithologic Description
0–4.4	FILL - Brown (10YR4/3) with 10% dark gray (10YR4/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.
4.4–6	FILL - Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.
6–7.2	FILL - Brown (10YR4/3) with 10% dark gray (10YR4/1) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.
7.2–9.4	FILL - Dark grayish brown (10YR4/2) with 5% dark yellowish brown (10YR4/6) slightly moist, firm, clayey SILT with trace sand and gravel.
9.4–10.2	FILL - Very dark gray (10YR3/1), moist, firm, silty CLAY with trace sand and gravel.
10.2–10.8	Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand and gravel.
10.8–12	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, trace roots.
12–14	Dark grayish brown (10YR4/2) with 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY trace sand, trace roots.
14–16	Dark gray (10YR4/1), moist, firm, silty CLAY with trace sand and gravel.
16–17.4	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand and gravel.
17.4–20	Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

Borehole Detail | Remarks

NOTE(S): G217 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Sunny, warm (lo-80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G217
Well ID: G217
Surface Elev: 630.67 ft. MSL
Completion: 26.00 ft. BGS
Station: 876,185.57N
2,515,963.02E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 23.00 - While drilling
▼ = 24.82 - Upon completion
▽ = 23.98 - 10/13/10

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
	22/24 *92%*	SS	*woh-woh 1-2*					Gray (10YR5/1) with 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel. *[Continued from previous page]*		610	
11A				18			22	Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with sand and trace gravel.			
12A	10/24 *42%*	SS	*4-6 7-10* N=13	13			24	Yellowish brown (10 YR5/4), wet, medium dense, silty, very fine- to coarse-grained SAND with trace gravel.		608	
13A	22/24 *92%*	SS	*8-18 17-17* N=35	12			26	Dark gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.		606	

End of Boring = 26.0 ft. BGS

NOTE(S): G217 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Partly cloudy, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G218
Well ID: G218
Surface Elev: 630.64 ft. MSL
Completion: 26.00 ft. BGS
Station: 876,380.92N
2,515,962.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 24.00 - While drilling
▼ = 24.76 - Upon completion
▽ =

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	18/24 *75%*	ss	*4-1 2-1* N=3	20		
2A	22/24 *92%*	ss	*2-2 3-5* N=5	20		
3A	19/24 *79%*	ss	*2-3 4-8* N=7	17		
4A	22/24 *92%*	ss	*2-5 6-8* N=11	14		
5A	20/24 *83%*	ss	*3-4 8-7* N=12	17		
6A	19/24 *79%*	ss	*2-2 3-5* N=5	19		
6B				25		
7A	22/24 *92%*	ss	*2-3 5-7* N=8	22		
8A	18/24 *75%*	ss	*2-3 4-5* N=7	19		
9A	24/24 *100%*	ss	*2-2 2-4* N=4	19		
10A	24/24 *100%*	ss	*1-2 2-3* N=4	18		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~2.4	FILL - Brown (10YR4/3) with 15% dark gray (10YR4/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	
~2.4 – ~6.2	FILL - Dark gray (10YR4/1) with 30% brown (10YR4/3) and 10% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand and gravel.	
~6.2 – ~9.4	FILL - Brown (10YR5/3) with 10% dark gray (10YR4/1) mottles, slightly moist, firm, clayey SILT with trace sand and gravel.	
~9.4 – ~10.6	Dark grayish brown (10YR4/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.	
~10.6 – ~13.2	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with trace sand, slight trace roots.	
~13.2 – ~15.3	Dark gray (10YR4/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with trace sand.	
~15.3 – 20	Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 630, 628, 626, 624, 622, 620, 618, 616, 614, 612

Borehole Detail | Remarks

NOTE(S): G218 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/12/2010
Finish: 10/12/2010
WEATHER: Partly cloudy, warm (lo-70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: .

BOREHOLE ID: G218
Well ID: G218
Surface Elev: 630.64 ft. MSL
Completion: 26.00 ft. BGS
Station: 876,380.92N
2,515,962.16E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 24.00 - While drilling
▼ = 24.76 - Upon completion
▽ =

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
										610	
11A	22/24 *92%*	SS	*woh-woh* *woh-woh*	16				Gray (10YR5/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.			
							22	Yellowish brown, wet, loose, silty, very fine- to coarse-grained SAND with trace gravel.		608	
12A	24/24 *100%*	SS	*1-1* *1-3* N=2	10				Dark gray (10YR4/1) with 10% dark yellowish brown (10YR4/6) mottles, moist, soft, silty CLAY with trace sand and gravel.			
12B				16			24 ▼	Gray (10YR5/1), wet, loose, silty, very fine- to coarse-grained SAND with trace gravel.		606	
13A	24/24 *100%*	SS	*1-5* *9-13* N=14	20			▼				
13B				17			26	Dark gray (10YR4/1), slightly moist, very firm, very silty CLAY with sand and gravel.			

End of Boring = 26.0 ft. BGS

NOTE(S): G218 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/26/2008
Finish: 2/26/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G270
Well ID: G270
Surface Elev: 622.92 ft. MSL
Completion: 18.27 ft. BGS
Station: 874,801.92N
2,514,996.84E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.00 - While drilling
▼ = 5.62 - 3/12/08
▽ =

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
	20/24 *83%*	SS	*2-2 2-4* N=4					Dark grayish brown (10YR4/2), moist, firm, clayey SILT	622	
1A				24				Dark grayish brown (10YR4/2), moist, firm, silty CLAY		
							2	Dark grayish brown (10YR4/2) with 5% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand		
2A	19/24 *79%*	SS	*3-4 5-9* N=9	22		2.33 B			620	
2B				20		5.04 Sh	4	Gray (10YR5/1) with 70% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand and gravel		
3A	20/24 *83%*	SS	*14-5 7-8* N=12	17		2.52 Sh	▼	Dark gray (10YR4/1) with 5% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel	618	
							6			
4A	24/24 *100%*	SS	*8-6 7-5* N=13	21		1.24 BSh			616	
4B				21		1.20 B	8	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		
5A	22/24 *92%*	SS	*2-3 4-4* N=7	21		1.36 B			614	
							10	Gray (10YR5/1) with 60% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		
6A	24/24 *100%*	SS	*1-2 2-3* N=4	21		0.74 BSh		Gray (10YR5/1), moist, soft, sandy CLAY	612	
6B				24		0.78 B	12	Gray (10YR5/1), moist, soft, sandy CLAY, trace gravel		
7A	17/24 *71%*	SS	*2-2 2-3* N=4	21					610	
8A				20			14	Gray (10YR5/1), moist, soft, fine- to coarse-grained SAND, trace gravel		
								Dark yellowish brown (10YR4/4), moist, soft, sandy CLAY		
8B	19/24 *79%*	SS	*1-3 5-6* N=8	17		4.46 Sh		Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand and gravel	608	
							▼ 16	Yellowish brown (10YR5/4), wet, soft, fine to coarse SAND		
9A	24/24 *100%*	SS	*6-8 30-35* N=38	20					606	
9B				8			18	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		

End of Boring = 18.27 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/9/2009
Finish: 9/10/2009
WEATHER: Sunny, warm (70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G271
Well ID: G271
Surface Elev: 622.89 ft. MSL
Completion: 16.00 ft. BGS
Station: 874,239.38N
2,515,517.12E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.70 - While drilling
▼ = 12.50 - 9/21/09
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	20/24 *83%*	SS	*2-5 5-6* N=10	27		
2A	24/24 *100%*	SS	*2-6 5-5* N=11	23		
3A	23/24 *96%*	SS	*4-5 4-5* N=9	18		
4A	24/24 *100%*	SS	*2-4 4-5* N=8	17		
5A	24/24 *100%*	SS	*2-4 4-6* N=8	20		
6A	24/24 *100%*	SS	*2-4 4-5* N=8	22		
6B				20		
7A				20		
7B	20/24 *83%*	SS	*2-2 3-7* N=5	19		
8A	24/24 *100%*	SS	*10-19 30-33* N=49	7		

Depth ft. BGS	Lithologic Description
0	FILL - Yellowish brown (10YR5/4), moist, firm, silty CLAY with trace sand.
	Grayish brown (10YR5/2), dry, friable, clayey SILT.
	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.
	Gray (10YR6/1), moist, firm, very silty CLAY with slight trace sand.
	Gray (10YR5/1) with 30% brownish yellow (10YR6/6) mottles, moist, firm, silty CLAY with sand and trace gravel.
	Very dark gray (10YR3/1), organic-rich (PEAT), silty CLAY and trace sand.
	Brownish yellow (10YR6/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with sand and trace gravel.
	Gray (10YR6/1) with 20% brownish yellow (10YR6/8) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.
	Brownish yellow (10YR6/6), very moist to wet, soft, sandy CLAY with silt and slight trace gravel.
	Gray (10YR6/1), wet, loose, very fine to medium SAND with silt.
	Gray (10YR5/1), slightly moist, hard, very silty CLAY with sand and gravel.
16	**End of Boring = 16.0 ft. BGS**

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16
Elevation ft. MSL: 622, 620, 618, 616, 614, 612, 610, 608

Borehole Detail | Remarks

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/10/2009
Finish: 9/10/2009
WEATHER: Sunny, warm (70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G272
Well ID: G272
Surface Elev: 620.72 ft. MSL
Completion: 14.32 ft. BGS
Station: 874,234.83N
2,515,744.99E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.00 - While drilling
▼ = 9.49 - 9/21/09
▽ =

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
1A	20/24 *83%*	SS	*3-2 3-4* N=5	18			0–1.8	FILL - Brownish yellow (10YR6/6) with 30% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		620	
2A	24/24 *100%*	SS	*4-5 6-7* N=11	25			1.8–5.4	Brownish yellow (10YR6/6) with 20% brownish yellow (10YR6/8) and 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.		618	
3A	23/24 *96%*	SS	*2-4 4-6* N=8	18						616	
3B				17			5.4–8.4	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with sand and trace gravel.		614	
4A	24/24 *100%*	SS	*3-4 4-4* N=8	20							
5A	23/24 *96%*	SS	*2-3 3-5* N=6	21			8.4–10.3 (▼ 9.49)	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, moist, soft, silty CLAY with sand and slight trace gravel.		612	
6A	22/24 *92%*	SS	*2-3 3-3* N=6	23			10.3–11.7	Gray (10YR6/1) with 30% brownish yellow (10YR6/6) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.		610	
							11.7–13.0	Gray (10YR6/1), very moist, loose, SILT and very fine sand.		608	
7A	18/24 *75%*	SS	*2-9 15-21* N=24	14			13.0–13.5 (▼ 13.00)	Gray (10YR6/1), wet, loose, SILT and very fine sand.			
7B				10			13.5–14.3	Yellowish brown (10YR5/6), moist, hard, very silty CLAY with sand and trace gravel.			

End of Boring = 14.3 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/10/2009
Finish: 9/10/2009
WEATHER: Sunny, warm (70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G273
Well ID: G273
Surface Elev: 620.17 ft. MSL
Completion: 16.00 ft. BGS
Station: 874,235.24N
2,515,975.49E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.50 - While drilling
▼ = 9.89 - 9/21/09
▽ =

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
1A	16/24 *67%*	SS	*3-3 3-3* N=6	24		
2A	24/24 *100%*	SS	*3-4 5-7* N=9	28		
3A				18		
3B	24/24 *100%*	SS	*3-5 6-8* N=11	25		
4A				19		
4B	24/24 *100%*	SS	*3-5 5-6* N=10	16		
5A	23/24 *96%*	SS	*2-4 5-4* N=9	19		
5B				21		
6A	24/24 *100%*	SS	*1-2 3-4* N=5	19		
7A	24/24 *100%*	SS	*4-8 17-24* N=25	11		
7B				11		
8A	22/24 *92%*	SS	*9-22 22-23* N=44	8		

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16 — Elevation ft. MSL: 620, 618, 616, 614, 612, 610, 608, 606

Lithologic Description (Borehole Detail; Remarks)

- FILL -Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with slight trace sand.
- FILL - Gray (10YR5/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, firm, silty CLAY with slight trace sand and gravel.
- Brownish yellow (10YR6/8) with 40% gray (10YR5/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.
- Gray (10YR6/1) with 10% brownish yellow(10YR6/6) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.
- Gray (10YR5/1), moist, firm, silty CLAY with sand and trace gravel.
- Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, moist, soft, sandy CLAY with silty and slight trace gravel.
- Brownish yellow (10YR6/8) with 10% gray (10YR6/1) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.
- Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.
- Light yellowish brown (10YR6/4), wet, loose, very fine- to very coarse-grained SAND with trace silt.
- Light yellowish brown (10YR6/4), wet, dense, sandy, silty CLAY.
- Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/16/2009
Finish: 9/16/2009
WEATHER: Sunny, warm (80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G274
Well ID: G274
Surface Elev: 621.67 ft. MSL
Completion: 18.06 ft. BGS
Station: 874,239.25N
2,516,195.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.00 - While drilling
▼ = 13.12 - 9/21/09
▽ =

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	20/24 *83%*	SS	*2-3 3-4* N=6	17		
2A	24/24 *100%*	SS	*4-6 7-9* N=13	25		
3A	24/24 *100%*	SS	*3-4 6-9* N=10	26		
3B				21		
4A	16/24 *67%*	SS	*3-6 6-8* N=12	24		
5A	24/24 *100%*	SS	*2-4 4-6* N=8	20		
6A	22/24 *92%*	SS	*1-3 4-6* N=7	19		
7A	23/24 *96%*	SS	*1-2 4-4* N=6	21		
8A	22/24 *92%*	SS	*1-3 3-6* N=6	17		
9A	14/24 *58%*	SS	*wor-4 9-11* N=13	13		
9B				13		

Depth ft. BGS	Lithologic Description
0–5.6	FILL - Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.
5.6–8.5	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with slight trace sand and gravel.
8.5–10.4	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.
10.4–15.4	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and trace gravel.
15.4–16.0	Yellowish brown (10YR5/8), very moist, soft, silty CLAY with sand and trace gravel.
16.0–17.0	Brownish yellow (10YR6/6), wet, loose, very fine- to very coarse-grained SAND.
17.0–17.7	Brownish yellow (10YR6/6), moist, firm, very silty CLAY with sand and gravel.
17.7–18.1	Gray (10YR6/1), moist, hard, very silty CLAY with sand and gravel.

End of Boring = 18.1 ft. BGS

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18

Borehole Detail

Elevation ft. MSL: 620, 618, 616, 614, 612, 610, 608, 606, 604

Remarks

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/16/2009
Finish: 9/16/2009
WEATHER: Sunny, warm (80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G275
Well ID: G275
Surface Elev: 616.14 ft. MSL
Completion: 13.19 ft. BGS
Station: 874,298.94N
2,516,375.86E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.90 - While drilling
▼ = 10.25 - 9/21/09
▽ =

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
1A	22/24 *92%*	SS	*2-4 4-6* N=8	22			0–2.2	FILL - Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel.	616	
2A	18/24 *75%*	SS	*3-6 7-7* N=13	19			2.2–4.3	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.	614	
3A	24/24 *100%*	SS	*2-4 4-5* N=8	22			4.3–6.5	Gray (10YR6/1), moist, soft, silty CLAY with sand and slight trace gravel.	612	
4A	24/24 *100%*	SS	*2-3 4-6* N=7	17			6.5–9.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and slight trace gravel.	610, 608	
5A	24/24 *100%*	SS	*1-2 3-3* N=5	18						
5B				21			9.4–10.7	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, very moist, soft, silty CLAY with sand and trace gravel.	606	
6A				16						
6B	20/24 *83%*	SS	*woh-4 5-2* N=9	13			10.7–11.6	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, very moist, very soft, silty CLAY with sand and trace gravel.		
6C				15			11.6–12.2	Gray (10YR6/1), wet, loose, very fine- to very coarse-grained SAND with trace gravel.	604	
7A	12/12 *100%*	SS	*10-35*	8			12.2–13.2	Yellowish brown (10YR5/6), moist, hard, very silty CLAY with sand and gravel.		

End of Boring = 13.2 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/16/2009
Finish: 9/16/2009
WEATHER: Sunny, mild (70'S)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G276
Well ID: G276
Surface Elev: 629.14 ft. MSL
Completion: 28.00 ft. BGS
Station: 874,438.60N
2,516,358.83E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 25.55 - 9/21/09
▽ =

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
1A	17/24 *71%*	SS	*5-8 9-10* N=17	10			0–6	FILL - Yellowish brown (10YR5/4) with 20% gray (10YR5/1) mottles, moist, hard, silty CLAY with trace sand and slight trace gravel.	628	
2A	19/24 *79%*	SS	*7-7 10-14* N=17	15					626	
3A	11/24 *46%*	SS	*5-10 14-27* N=24	14					624	Rock fragment in split spoon shoe
4A	24/24 *100%*	SS	*5-9 10-14* N=19	8			6–7	FILL - Yellowish brown (10YR5/4) with 20% gray (10YR5/1) mottles, slightly moist, hard, silty CLAY with trace sand and slight trace gravel.	622	
4B				5			7–8.3	FILL - Yellowish brown (10YR5/4) with 10% gray (10YR5/1) mottles, slightly moist, hard, friable, clayey SILT with sand and trace gravel.		
5A	17/24 *71%*	SS	*4-4 8-19* N=12	22			8.3–13	FILL - Yellowish brown (10YR5/4) with 25% gray (10YR5/1) mottles, slightly moist, firm, silty CLAY with slight trace sand and gravel.	620	
6A	17/24 *71%*	SS	*4-5 8-14* N=13	14					618	
7A	16/24 *67%*	SS	*6-7 2-4* N=9	20			13–16.8	Gray (10YR6/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.	616	
8A	20/24 *83%*	SS	*2-4 6-6* N=10	21					614	
9A	22/24 *92%*	SS	*1-4 5-7* N=9	17			16.8–18.4	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, sandy CLAY with silt and slight trace gravel.	612	
9B				13						
10A	23/24 *96%*	SS	*2-3 8-12* N=11	20			18.4–20	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and slight trace gravel.	610	

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/16/2009
Finish: 9/16/2009
WEATHER: Sunny, mild (70'S)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G276
Well ID: G276
Surface Elev: 629.14 ft. MSL
Completion: 28.00 ft. BGS
Station: 874,438.60N
2,516,358.83E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 25.55 - 9/21/09
▽ =

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
11A	24/24 *100%*	SS	*1-3 5-7* N=8	21			22	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and slight trace gravel. *[Continued from previous page]*	608	
12A	24/24 *100%*	SS	*1-4 6-7* N=10	16			24	Yellowish brown (10YR5/8), moist, firm, silty CLAY with sand and slight trace gravel.	606	
13A	24/24 *100%*	SS	*2-3 4-6* N=7	16				Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, very moist, soft, silty CLAY with sand and trace gravel.	604	
							▼ 26	Gray (10YR6/1), very moist, loose, very fine- to fine-grained, SAND		
14A	24/24 *100%*	SS	*1-5 15-29* N=20	16				Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, very moist, soft, silty CLAY with sand and trace gravel.		
								Gray (10YR6/1), very moist, firm, clayey SILT with trace very fine-grained sand.	602	
								Gray (10YR6/1) with 40% yellowish brown (10YR5/4) mottles, moist, hard, very silty CLAY with sand and trace gravel.		
							28	Yellowish brown (10YR5/4), moist, hard, very silty CLAY with sand and trace gravel.		

End of Boring = 28.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/14/2009
Finish: 9/14/2009
WEATHER: Sunny, mild (70'S)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G277
Well ID: G277
Surface Elev: 620.79 ft. MSL
Completion: 20.00 ft. BGS
Station: 874,581.80N
2,516,370.51E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.40 - While drilling
▼ = 18.23 - 9/21/09
▽ =

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
1A	23/24 96%	SS	2-2 4-6 N=6	21		
2A	24/24 100%	SS	2-4 6-7 N=10	22		
2B				16		
3A				11		
3B	17/24 71%	SS	4-7 9-11 N=16	22		
4A	18/24 75%	SS	4-8 8-6 N=16	13		
5A	19/24 79%	SS	3-7 8-9 N=15	12		
6A	22/24 92%	SS	3-9 9-10 N=18	14		
6B				16		
7A	18/24 75%	SS	3-5 7-9 N=12	17		
8A	22/24 92%	SS	2-5 5-8 N=10	12		
9A	22/24 92%	SS	1-2 3-3 N=5	14		
10A				11		
10B	23/24 96%	SS	1-3 19-47 N=22	9		
10						

Depth ft. BGS	Lithologic Description
0–1.6	FILL - Yellowish brown (10YR5/4) with 10% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with slight trace sand and gravel.
1.6–3.1	FILL - Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand and gravel.
3.1–4.0	Yellowish brown (10YR5/4) with 20% gray (10YR5/1) and 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand.
~4.0	Light brownish gray (10YR6/2), dry, friable, clayey SILT.
~4.1–7.3	Light brownish gray (10YR6/2) with 25% yellowish brown (10YR5/8) mottles, moist, firm, clayey SILT with slight trace sand.
7.3–8.1	Gray (10YR6/1) with 50% very dark grayish brown (10YR3/2) mottles, moist, hard, clayey SILT with slight trace sand and gravel.
8.1–10.8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, hard, very silty CLAY with sand and slight trace gravel.
10.8–15.4	Yellowish brown (10YR5/8) with 30% gray (10YR6/1) mottles, moist, hard, silty CLAY with sand and trace gravel.
15.4–16.1	Gray (10YR6/1), moist, slightly dense, silty, very fine- to very coarse-grained SAND.
16.1–16.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.
16.4–17.6	Gray (10YR6/1) with 20% brownish yellow (10YR6/6) mottles, wet, very soft, silty, very fine- to fine-grained SAND with trace gravel.
17.6–18.6	Gray (10YR6/1) with 30% grayish brown (10YR5/2) mottles, moist, soft, sandy CLAY with slight trace gravel.
18.6–20.0	Brownish yellow (10YR6/6) with 25% gray (10YR6/1) mottles, moist, hard, very silty CLAY with sand and trace gravel.

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. Elevation ft. MSL: 620, 618, 616, 614, 612, 610, 608, 606, 604, 602.

Borehole Detail | Remarks

End of Boring = 20.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/11/2009
Finish: 9/11/2009
WEATHER: Sunny, warm (70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G278
Well ID: G278
Surface Elev: 628.85 ft. MSL
Completion: 24.06 ft. BGS
Station: 874,875.37N
2,516,200.66E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 23.98 - 9/21/09
▽ =

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	Remarks
1A	16/24 *67%*	SS	*3-4 6-7* N=10	19			
2A	24/24 *100%*	SS	*4-7 8-11* N=15	21			
3A	22/24 *92%*	SS	*9-10 9-35* N=19	10			Rock fragment in split spoon shoe
4A	4/24 *17%*	SS	*20-7 10-8* N=17				Rock fragment in split spoon shoe
5A	14/24 *58%*	SS	*11-6 8-8* N=14	15			Rock fragment in split spoon shoe
6A	20/24 *83%*	SS	*6-4 8-9* N=12	26			
7A	24/24 *100%*	SS	*2-4 8-11* N=12	18			
8A	20/24 *83%*	SS	*4-7 10-11* N=17	12			
8B				22			
9A	22/24 *92%*	SS	*4-6 6-9* N=12	17			
10A	20/24 *83%*	SS	*2-4 5-8* N=9	21			

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 628, 626, 624, 622, 620, 618, 616, 614, 612, 610

Lithologic Description

FILL - Yellowish brown (10YR5/4) with 15% yellowish brown(10YR5/8) mottles, moist, hard, silty CLAY with trace sand and slight trace gravel.

Gray (10YR6/1) with 30% brownish yellow (10YR6/6) mottles, moist, firm, clayey SILT with slight trace sand.

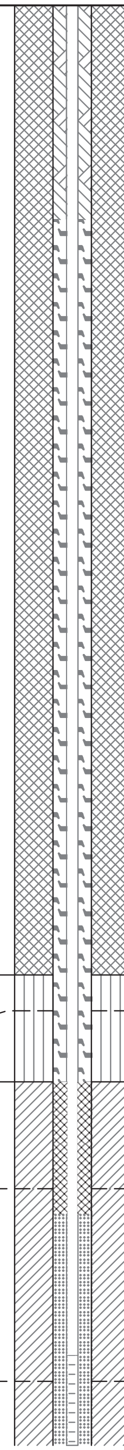
Very dark gray (10YR3/1), moist, firm, clayey SILT with slight trace sand and trace roots.

Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.

Gray (10YR6/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.

Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with sand and trace gravel.

Borehole Detail



NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/11/2009
Finish: 9/11/2009
WEATHER: Sunny, warm (70's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G278
Well ID: G278
Surface Elev: 628.85 ft. MSL
Completion: 24.06 ft. BGS
Station: 874,875.37N
2,516,200.66E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 23.98 - 9/21/09
▽ =

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
11A	18/24 *75%*	SS	*2-4* *7-7* N=11	19				Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY with sand and trace gravel. *[Continued from previous page]*		608	
11B							22	Yellowish brown (10YR5/6), very moist, soft, silty, very fine- to medium-grained SAND.			
12A	20/24 *83%*	SS	*1-5* *10-18* N=15	16				Yellowish brown (10YR5/4), moist, hard, very silty CLAY with sand and trace gravel.		606	
12B				10			▼ 24				

End of Boring = 24.1 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/10/2009
Finish: 9/10/2009
WEATHER: Sunny, warm (80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G279
Well ID: G279
Surface Elev: 629.19 ft. MSL
Completion: 28.00 ft. BGS
Station: 875,028.06N
2,516,245.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 23.60 - While drilling
▼ = 24.68 - 9/21/09
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	24/24 *100%*	SS	*3-3 5-6* N=8	18		
2A	24/24 *100%*	SS	*5-9 10-11* N=19	14		
3A	24/24 *100%*	SS	*5-9 9-10* N=18	17		
4A	24/24 *100%*	SS	*4-5 7-6* N=12	21		
5A	24/24 *100%*	SS	*3-3 5-7* N=8	19		
6A	24/24 *100%*	SS	*3-4 6-9* N=10	17		
7A	23/24 *96%*	SS	*2-5 5-6* N=10	23		
8A	24/24 *100%*	SS	*2-3 7-6* N=10	23		
9A	18/24 *75%*	SS	*4-7 8-9* N=15	25		
10A	24/24 *100%*	SS	*3-6 7-10* N=13	17		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0 – 3.5	FILL - Brown (10YR4/3) with 30% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with sand and trace gravel.		628, 626	
3.5 – 14	FILL - dark gray (10YR4/1) with 10% brownish yellow (10YR6/6) mottles, moist, hard, silty CLAY with sand and trace gravel.		624, 622, 620, 618, 616	
14 – 15.3	Brownish yellow (10YR6/8) with 30% gray (10YR5/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		614	
15.3 – 18.4	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, moist, firm, silty CLAY with slight trace sand and gravel.		612	
18.4 – 20	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel.		610	

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 9/10/2009
Finish: 9/10/2009
WEATHER: Sunny, warm (80's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: G. Mills
Helper: J. Twellman
Eng/Geo: R. Hasenyager

BOREHOLE ID: G279
Well ID: G279
Surface Elev: 629.19 ft. MSL
Completion: 28.00 ft. BGS
Station: 875,028.06N
2,516,245.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 23.60 - While drilling
▼ = 24.68 - 9/21/09
▽ =

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
11A	23/24 *96%*	SS	*2-4* *5-7* N=9	18				Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel. *[Continued from previous page]*		608	
12A	19/24 *79%*	SS	*4-9* *8-9* N=17	13			22	Yellowish brown (10YR5/8), moist, firm, clayey SILT and very fine-grained SAND with slight trace gravel.		606	
12B				12			24				
13A	17/24 *71%*	SS	*1-5* *5-7* N=10	18				Light brownish gray (10YR6/2), wet, loose, very fine- to coarse-grained SAND.		604	
14A				16			26	Brownish yellow (10YR6/6), moist, hard, very silty CLAY with sand and trace gravel.			
14B	24/24 *100%*	SS	*10-10* *18-18* N=28	14			28	Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.		602	

End of Boring = 28.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/26/2008
Finish: 2/26/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G280
Well ID: G280
Surface Elev: 622.95 ft. MSL
Completion: 17.98 ft. BGS
Station: 875,045.11N
2,515,679.48E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.60 - While drilling
▼ = 4.34 - 3/12/08
▽ =

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	24/24 *100%*	SS	*5-3 4-4* N=7	23		
1B				26		2.33 B
2A	24/24 *100%*	SS	*3-4 4-6* N=8	30		1.28 BSh
2B				25		
	19/24 *79%*	SS	*3-4 6-6* N=10			
3A				14		3.10 Sh
	22/24 *92%*	SS	*9-11 10-8* N=21			
4A				18		1.67 BSh
5A	19/24 *79%*	SS	*2-2 4-4* N=6	20		1.47 B
5B				21		1.28 B
	22/24 *92%*	SS	*2-3 3-3* N=6			
6A				20		
	23/24 *96%*	SS	*3-14 23-21* N=37			
7A				13		
	23/24 *96%*	SS	*12-17 24-26* N=41			
8A				9		
8B				15		
9A	24/24 *100%*	SS	*11-27 54-43* N=81	26		
9B				7		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~1.1	Dark grayish brown (10YR4/2), moist, firm, clayey SILT	622
~1.1 – 2	Brown (10YR4/3) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY	
2 – ~2.6	Dark yellowish brown (10YR4/4), moist, firm, silty CLAY	620
~2.6 – ~4.8	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY	618
~4.8 – ~7	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand	616
~7 – 8	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel	
8 – ~10.8	Dark gray (10YR4/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, sand, trace gravel	614
~10.8 – ~12.4	Yellowish brown (10YR5/8) with 20% light gray (10YR6/1) mottles, moist, soft, sandy CLAY	612
~12.4 – ~13	Yellowish brown (10YR5/8), moist, soft, fine to coarse SAND, trace gravel	
~13 – ~13.6	Yellowish brown (10YR5/8), moist, firm, sandy CLAY, trace gravel	610
~13.6 – 15.6	Yellowish brown (10YR5/4), moist, firm, clayey SILT, trace sand and gravel	608
15.6 – ~16.8	Yellowish brown (10YR5/4), wet, soft, fine- to coarse-grained SAND, trace gravel	
~16.8 – 17.98	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel	606

End of Boring = 17.98 ft. BGS

Borehole Detail | Remarks

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 9/8/2015
Finish: 9/8/2015
WEATHER: Sunny, hi 70's

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: Hollow Stem Auger (3¼"overdrill / 4¼")

FIELD STAFF: Driller: D. Crump
Helper: D. Groves
Eng/Geo: K. Theesfeld

BOREHOLE ID: G281
Well ID: G281
Surface Elev: 623.82 ft. MSL
Completion: 20.29 ft. BGS
Station: 2,514,455.48N
874,375.37E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - 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
1A	17/24 *71%*	SS	*15-10 7-6* N=17	14		
2A	19/24 *79%*	SS	*2-4 5-5* N=9	25		*1.50*
3A	22/24 *92%*	SS	*2-2 3-4* N=5	23		*0.40*
4A	24/24 *100%*	SS	*5-5 6-6* N=11	19		*1.20*
5A	20/24 *83%*	SS	*2-2 3-4* N=5	21		*1.40*
6A	22/24 *92%*	SS	*2-2 3-3* N=5	18		*0.50*
7A	17/24 *71%*	SS	*3-4 5-5* N=9	19		*0.30*
	19/24 *79%*	SS	*3-11 21-28* N=32			
	24/24 *100%*	SS	*21-36 39-50* N=75			
8A	11/24 *46%*	SS	*16-9 30-50* N=39	7		*4.50*
	0/3 *0%*	BD				

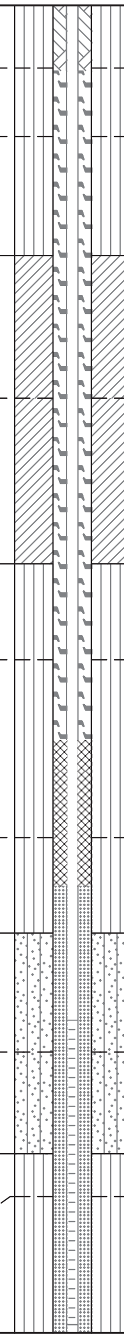
Depth ft. BGS: 2, 4, 6, 8, 10, 12, ▼ 14, 16, 18, 20

Lithologic Description

- Light gray (10YR7/2), dry, very stiff, SILT with little clay and trace gravel.
- Yellowish brown (10YR5/4) with 5% dark brown (10YR3/3) mottles, dry, very stiff, SILT with few clay and trace gravel.
- Yellowish brown (10YR5/4) with 15% dark yellowish brown (10YR4/6) and 5% dark brown (10YR3/3) mottles, moist, stiff, SILT with few clay.
- Yellowish brown (10YR5/4) with 15% dark yellowish brown (10YR4/6) mottles, moist, medium, CLAY with some silt and trace fine-grained sand and small gravel.
- Yellowish brown (10YR5/4) with 15% dark yellowish brown (10YR4/6) and 5% dark brown (10YR3/3) mottles, moist, stiff, CLAY with some silt and trace fine-grained sand and small gravel.
- Yellowish brown (10YR5/4) with 30% dark yellowish brown (10YR4/6) and 5% dark brown (10YR3/3) mottles, moist, stiff, SILT with some clay and trace very fine- to fine-grained sand and small gravel.
- Dark yellowish brown (01YR4/6) with 30% yellowish brown (10YR5/4) mottles, moist, soft, SILT with few clay and little fine- to coarse-grained sand and small gravel, trace wood fragments.
- Dark yellowish brown (01YR4/6) with 15% yellowish brown (10YR5/4) mottles, moist, soft, SILT with few clay and very fine- to fine-grained sand and trace small gravel.
- Dark yellowish brown (10YR4/4), wet, dense, very fine- to fine-grained SAND with some silt, few clay and trace small gravel.
- Dark yellowish brown (10YR4/4), wet, dense, very fine- to fine-grained SAND with few silt, little clay and trace small gravel.
- Yellowish brown (10YR5/6) with 5% strong brown (7.5YR5/6) mottles, moist, hard, SILT with few clay and little fine-grained sand and small gravel.
- Dark grayish brown (10YR4/2) with 5% strong brown (7.5YR5/6) mottles, moist, hard, SILT with few clay and little fine-grained sand and small gravel.

End of boring = 20.29 feet

Borehole Detail



Elevation ft. MSL: 622, 620, 618, 616, 614, 612, 610, 608, 606, 604

Remarks

NOTE(S): G281 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 9/4/2015
Finish: 9/4/2015
WEATHER: Sunny, hi 70's

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: Hollow Stem Auger (3¼"overdrill / 4¼")

FIELD STAFF: Driller: D. Crump
Helper: D. Groves
Eng/Geo: K. Theesfeld

BOREHOLE ID: G301
Well ID: G301
Surface Elev: 620.27 ft. MSL
Completion: 16.21 ft. BGS
Station: 2,515,582.97N
872,234.82E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - 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
1A	19/24 *79%*	SS	*4-4 3-5* N=7	18		*1.80*	0–1.6	Brown (10YR4/3), moist, stiff, SILT with few clay, trace organics.	620	
							1.6–2	Brown (10YR5/3) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, SILT with few clay, trace organics.		
2A	22/24 *92%*	SS	*2-4 4-6* N=8	26		*2.40*	2–4.2	Brown (10YR5/3) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, SILT with few clay, trace very fine- to medium-grained sand.	618	
3A	21/24 *88%*	SS	*2-2 3-4* N=5	22		*1.30*	4.2–6	Brown (10YR5/3) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, CLAY with some silt and trace very fine- to medium-grained sand.	616	
4A	24/24 *100%*	SS	*6-4 6-6* N=10	19		*1.10*	6–7.8	Brown (10YR5/3) with 10% yellowish brown (10YR5/6) mottles, moist, medium to stiff, CLAY with some silt and little very fine- to coarse-grained sand and small gravel.	614	
5A	21/24 *88%*	SS	*1-2 3-4* N=5	21			7.8–9.2	Brown (10YR5/3) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, SILT with some clay and little very fine- to coarse-grained sand and small gravel.	612	
6A	24/24 *100%*	SS	*3-2 3-3* N=5	19		*0.80*	9.2–12	Brown (10YR5/3) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, SILT with some clay and little very fine- to coarse-grained sand and small gravel.	610	
7A	24/24 *100%*	SS	*2-4 6-21* N=10	13		*1.60*	12–14.5	Yellowish brown (10YR5/6) with 10% grayish brown (10YR5/2) and 5% yellowish brown (10YR5/4) mottles, wet, stiff, SILT with few clay and little fine- to coarse-grained sand and small gravel.	608	
8A	21/24 *88%*	SS	*20-27 50* N=77	7		*4.50*	14.5–16.21	Grayish brown (10YR5/2) with 5% brown (10YR5/3) mottles, dry, hard, SILT with few clay, very fine- to coarse-grained sand and small gravel.	606	
	0/3 *0%*	BD								

End of boring = 16.21 feet

NOTE(S): G301 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 9/3/2015
Finish: 9/4/2015
WEATHER: Sunny, hi 70's

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: Hollow Stem Auger (3¼"overdrill / 4¼")
FIELD STAFF: Driller: D. Crump
Helper: D. Groves
Eng/Geo: K. Theesfeld

BOREHOLE ID: G302
Well ID: G302
Surface Elev: 617.95 ft. MSL
Completion: 18.39 ft. BGS
Station: 2,516,214.19N
872,252.95E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - 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	Elevation ft. MSL	Remarks
1A	23/24 *96%*	SS	*5-5 5-6* N=10	17		*1.50*		Yellowish brown (10YR5/6) to dark yellowish brown (10YR4/6), moist, hard, SILT with some clay and trace fine-grained sand and small gravel.		
2A	20/24 *83%*	SS	*2-3 4-4* N=7	27		*2.60*	2	Very dark brown (10YR3/1), moist, hard, SILT with some clay and trace fine-grained sand and small gravel.	616	
							4	Dark grayish brown (10YR4/2) with very dark gray (10YR3/1) mottles, moist, stiff, CLAY with some silt and trace sand.	614	
3A	21/24 *88%*	SS	*1-2 3-4* N=5	26		*1.80*		Brown (10YR5/3) with dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with some silt and trace sand.		
4A	24/24 *100%*	SS	*4-7 8-8* N=15	18		*1.60*	6		612	
5A	24/24 *100%*	SS	*2-3 5-5* N=8	17		*1.80*	8	Brown (10YR5/3) with dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with some silt and few very fine- to fine-grained sand.	610	
6A	18/24 *75%*	SS	*2-2 4-5* N=6	19			10	Brown (10YR4/3) with dark yellowish brown (10YR4/6) mottles, moist, stiff, SILT with some clay and few sand.	608	
							12	Dark gray (10YR4/1), moist, stiff, SILT with some clay and few sand.	606	
								Yellowish brown (10YR5/8) with reddish brown (5YR4/4) inclusions, moist, stiff, SILT with some clay and few sand.		
7A	24/24 *100%*	SS	*7-7 8-8* N=15	16		*1.70*		Dark gray (10YR4/1), moist, stiff, SILT with some clay, few sand and trace small gravel.		
8A				18		*0.80*	▼ 14		604	
8B	22/24 *92%*	SS	*2-5 25-32* N=30	12		*4.50*		Grayish brown (10YR5/2), wet, hard, SILT with little clay and very fine-grained sand and trace small gravel.		
							16	Brown (10YR5/3), wet, hard, SILT with little clay and very fine-grained sand and trace small gravel.	602	
9A	24/24 *100%*	SS	*7-24 48-38* N=72	8		*4.50*		Brown (10YR5/3) grading to yellowish brown (10YR5/4), moist, hard, SILT with some clay, few small gravel.		
	0/5 *0%*	BD					18		600	

End of boring = 18.39 feet

NOTE(S): G302 installed in borehole.

Surface Elevation: 619.10

Datum: msl

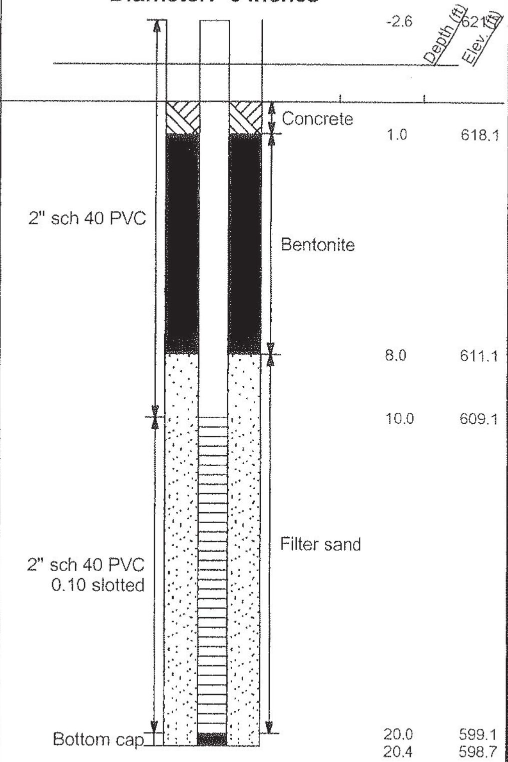
Completion Date: 8/26/10

Northing: 871382.45

Easting: 2516641.06

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	FILL: brown, silty clay		1-2-3	SS1
3	Medium stiff, grayish-brown, silty CLAY with lignite - CL		1-3-3	SS2
5			1-3-4	SS3
9	Soft, brown, silty CLAY - CL ▽		2-3-3	SS4
10	Stiff to hard, brown to grayish-brown, silty CLAY - CL (TILL)			
15			27-44 -50/1"	SS5
20			44-50/2"	SS6
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 9 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DTK	App'vd. by: RBP
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G303

LOG OF BORING: APW-3

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01- COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 623.46

Datum msl

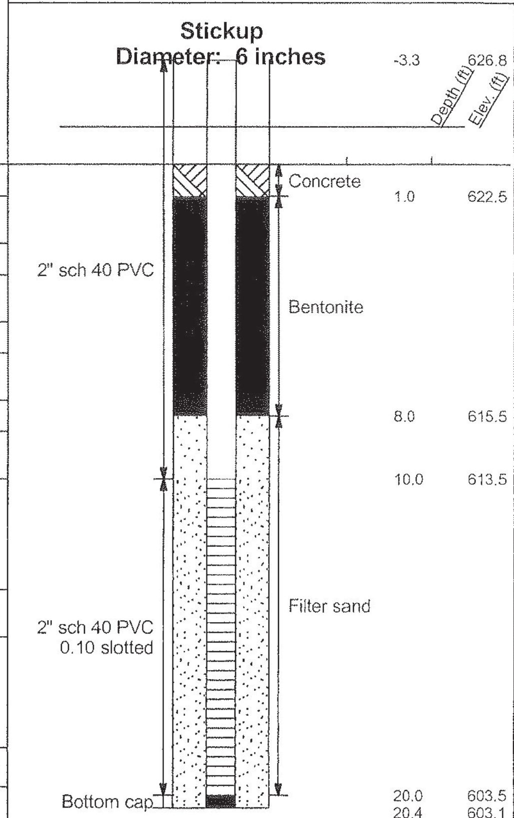
Completion Date: 8/26/10

Northing: 871397.48

Easting: 2515520.23

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Medium stiff, grayish-brown, silty CLAY - CL			
			0-1-1	SS1
			1-2-5	SS2
5				
			1-3-4	SS3
			1-2-3	SS4
10				
	Medium to fine SAND - SP		1-2-1	SS5
15	Hard, gray, silty CLAY - CL (TILL)			
			14-47	SS6
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 14 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DTK	App'vd. by: RBS
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G304

LOG OF BORING: APW-4

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01-COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Power Station
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 5/3/2016
Finish: 5/3/2016
WEATHER: Cloudy, breezy, warm, lo 60s

CONTRACTOR: Ramsey Geotechnical Engineering LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: 4 ¼" HSA, split spoon sampler

FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: G305
Well ID: G305
Surface Elev: 622.54 ft. MSL
Completion: 18.45 ft. BGS
Station: 2,515,199.36N
871,156.33E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 14, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 3.00 - 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	Borehole Detail	Elevation ft. MSL	Remarks
1A	14/24 *58%*	SS	*2-2 5-7* N=7	12			0–1.2	FILL - Grayish brown (10YR5/2), moist, soft, silty CLAY with few small to coarse sand and few small to large gravel.		622	
							1.2–2.4	FILL - Black (10YR2/1), moist, loose, silty, fine- to coarse-grained SAND with little coal fragments.			
2A	17/24 *71%*	SS	*6-7 7-6* N=14	19			2.4–4	Gray (10YR6/1) and light yellowish brown (10YR6/4), moist, very stiff, SILT with little clay.		620	
3A	18/24 *75%*	SS	*3-3 6-4* N=9	28			4–6	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with trace very fine-grained sand.		618	
4A	16/24 *67%*	SS	*6-6 7-8* N=13	24			6–8	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with trace very fine- to coarse-grained sand.		616	
5A	23/24 *96%*	SS	*1-3 5-6* N=8	21			8–10.6	Dark gray (10YR4/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with few fine- to coarse-grained sand and trace small gravel.		614	
6A	21/24 *88%*	SS	*3-4 6-6* N=10	21			10.6–12	Gray (10YR5/1) with 35% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with few fine- to coarse-grained sand and trace small gravel.		612	
7A	24/24 *100%*	SS	*8-8 9-9* N=17	18			12–14	Yellowish brown (10YR5/8) with 15% gray (10YR5/1) mottles, moist, very stiff, silty CLAY with few fine- to coarse-grained sand and trace small gravel.		610	
	19/24 *79%*	SS	*3-3 4-4* N=7				14–15.3	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with little fine- to coarse-grained sand and trace small gravel.		608	
8A				18			15.3–16.1	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with some fine- to coarse-grained sand and trace small gravel.			
9A	22/24 *92%*	SS	*1-3 7-14* N=10	19			16.1–17.5	Brown (10YR5/3), wet, loose, very silty, very fine- to coarse-grained SAND with trace small gravel.		606	
9B	0/5 *0%*	BD		15			17.5–18.45	Brown (10YR5/3) with 40% yellowish brown (10YR5/8) mottles, moist, very stiff, SILT with little clay and trace fine- to coarse-grained sand.			

End of boring = 18.45 feet

NOTE(S): G305 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Power Station
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 5/3/2016
Finish: 5/3/2016
WEATHER: Sunny, calm, warm, lo 60s

CONTRACTOR: Ramsey Geotechnical Engineering LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: 4 ¼" HSA, split spoon sampler

FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: G306
Well ID: G306
Surface Elev: 622.84 ft. MSL
Completion: 18.00 ft. BGS
Station: 2,516,120.41N
871,140.98E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 14, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 5.50 - 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
1A	12/24 *50%*	SS	*1-3 3-4* N=6	14		
2A	24/24 *100%*	SS	*5-4 5-4* N=9	21		
2B				19		
3A	22/24 *92%*	SS	*2-2 3-3* N=5	30		
4A	20/24 *83%*	SS	*3-4 6-6* N=10	26		
5A	24/24 *100%*	SS	*2-2 3-3* N=5	23		
6A	22/24 *92%*	SS	*1-2 3-4* N=5	20		
7A	20/24 *83%*	SS	*5-6 6-6* N=12	21		
8A	20/24 *83%*	SS	*2-2 8-14* N=10	15		
8B				12		
9A	23/24 *96%*	SS	*14-17 28-50/5"* N=45	10		
9B				13		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0–2	Very dark brown (10YR2/2), moist, medium, SILT with little clay and few very fine- to medium-grained sand, roots, trace coal fragments.	622	
2–3	Dark gray (10YR4/1) with 5% dark yellowish brown (10YR3/6) mottles, moist, stiff, SILT with little clay and trace very fine- to medium-grained sand.	620	
3–4.2	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT with little clay and trace very fine-grained sand.		
4.2–8	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT with some clay and trace very fine-grained sand.	618, 616	
8–12	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with trace very fine- to coarse-grained sand.	614, 612	
12–14	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY with few very fine- to coarse-grained sand.	610	
14–15	Yellowish brown (10YR5/6), wet, soft, very fine- to coarse-grained sandy CLAY with little silt.	608	
15–16	Yellowish brown (10YR5/6), wet, medium dense, silty, very fine- to medium-grained SAND with trace coarse-grained sand.		
16–17	Yellowish brown (10YR5/6), moist, dense, fine- to coarse-grained SAND with little silt, little very fine-grained sand, and trace small gravel.	606	
17–18	Brown (10YR5/3) with 20% dark yellowish brown (10YR4/6) mottles, moist, hard, SILT with little clay, few very fine- to coarse-grained sand, and trace small gravel.		

End of boring = 18.0 feet

NOTE(S): G306 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Power Station Ash Pond 1
Location: Coffeen, Illinois
Project: 16E0108
DATES: Start: 07/26/2016
Finish: 07/27/2016
WEATHER: Overcast, warm & humid (mid-80s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME 55LC Track Drill
Drilling Method: 4¼" Hollow Stem Auger w/Continuous Split Spoon
FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: G307
Well ID: G307
Surface Elev: 622.08 ft. MSL
Completion: 18.22 ft. BGS
Station: 871,398.55N
2,515,553.26E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - during drilling
▼ = -1.76 - 7/27/2016 @ 07:30
▽ =

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
							0	Brown (10YR5/3), moist, stiff, SILT with few clay, trace sand, gravel and roots.	
1A	18/24 *75%*	SS	*1-3 3-2* N=6	22				Gray (10YR5/1), moist, soft, CLAY, with some silt, trace sand, gravel and roots.	
							2		620
2A	22/24 *92%*	SS	*2-1 3-3* N=4	28				Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with some silt, trace sand, gravel and roots.	
							4		618
3A	24/24 *100%*	SS	*1-2 3-4* N=5	26					
							6	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, medium CLAY,with some silt, few very fine- to medium-grained sand, and trace gravel.	616
4A	24/24 *100%*	SS	*1-3 3-3* N=6	18					
							8		614
5A	24/24 *100%*	SS	*3-3 4-5* N=7	19					
							10		612
6A	24/24 *100%*	SS	*3-3 4-5* N=7	20				Gray (10YR5/1), moist, medium, CLAY with little silt and very fine to very coarse sand, trace gravel.	
							12	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with some silt, trace sand and gravel.	610
7A	24/24 *100%*	SS	*woh-2 5-13* N=7	20					
7B				11			▼ 14	Gray (10YR6/1), wet, medium dense, very fine- to very coarse-grained SAND with few silt and trace clay.	608
8A	24/24 *100%*	SS	*12-9 6-9* N=15	20				Yellow brown (10YR5/6), wet. medium dense, very fine- to very coarse-grained SAND, with little silt and trace gravel.	
							16	Yellowish brown (10YR5/8), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand and trace gravel.	606
9A	18/18 *100%*	SS	*8-30 50* N=80	8				Gray (10YR5/1), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand and trace gravel.	
	0/9 *0%*	BD					18		604

End of boring = 18.2 feet

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 9/14/2015
Finish: 9/14/2015
WEATHER: Sunny, hi 60's

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: Hollow Stem Auger (3¼"overdrill / 4¼")

FIELD STAFF: Driller: D. Crump
Helper: D. Groves
Eng/Geo: R. Hasenyager

BOREHOLE ID: G401
Well ID: G401
Surface Elev: 623.03 ft. MSL
Completion: 19.30 ft. BGS
Station: 2,515,614.84N
872,510.57E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - 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
1A	16/24 *67%*	SS	*2-2 3-7* N=5	17		
2A	21/24 *88%*	SS	*8-11 8-9* N=19	17		*1.80*
2B				25		
3A	23/24 *96%*	SS	*3-4 7-8* N=11	23		*2.50*
4A	24/24 *100%*	SS	*8-9 12-14* N=21	21		*3.30*
4B				19		*2.80*
5A	24/24 *100%*	SS	*2-3 4-5* N=7	21		*1.30*
6A	24/24 *100%*	SS	*2-4 5-6* N=9	17		*2.50*
7A	24/24 *100%*	SS	*9-7 8-9* N=15	21		*1.40*
8A	24/24 *100%*	SS	*2-3 2-4* N=5	17		*1.30*
8B				19		
9A	20/24 *83%*	SS	*5-4 5-10* N=9	21		
9B				16		
10A	12/16 *75%*	SS	*23-41 50/4"*	6		*4.50*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–1	Dark grayish brown (10YR4/2), moist, soft, CLAY with little silt and trace very fine- to fine-grained sand - FILL.	622
1–2.5	Yellowish brown (10YR5/6) moist, medium, CLAY with some silt and trace very fine- to coarse-grained sand - FILL.	
2.5–3.2	Dark gray (10YR4/1), moist, stiff, SILT with little clay and trace very fine-grained sand.	620
3.2–4	Yellowish brown (10YR5/6), moist, stiff, CLAY with some silt and trace very fine- to fine-grained sand.	
4–7.4	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with some silt and trace very fine- to fine-grained sand.	618, 616
7.4–8.3	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, stiff, SILT and very fine-grained SAND with trace clay.	
8.3–14.8	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with some silt and trace very fine- to fine-grained sand.	614, 612, 610
14.8–15.8	Gray (10YR6/1), moist soft, CLAY with very fine- to fine-grained sand and little silt.	608
15.8–16.6	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND with trace silt.	
16.6–17.2	Yellowish brown (10YR5/6), wet medium, SILT with some very fine-grained sand and little clay.	606
17.2–18	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND with trace silt.	
18–19.3	Gray (10YR5/1), moist, very hard, SILT with few clay and little very fine- to very coarse sand.	604

End of boring = 19.3 feet

NOTE(S): G401 installed in borehole.

Surface Elevation: 610.56

Datum: msl

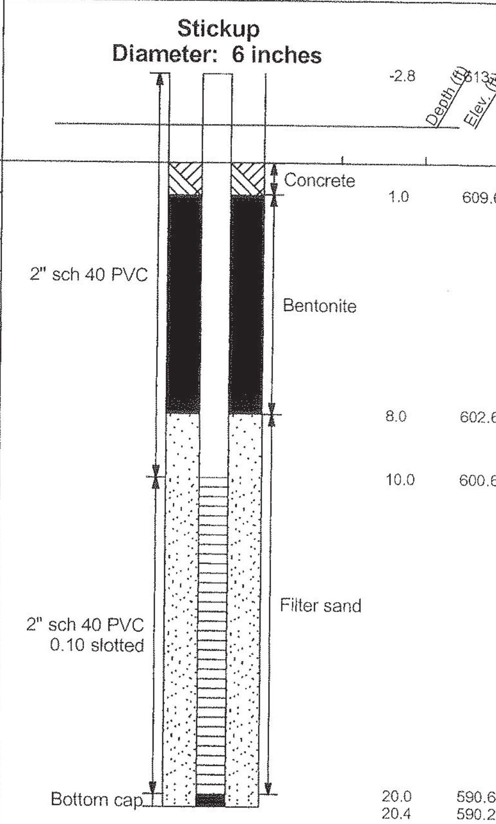
Completion Date: 8/27/10

Northing: 872502.26

Easting: 2516632.59

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Medium stiff, brown, silty CLAY - CL			
			6-3-3	SS1
			1-2-4	SS2
5	Medium stiff, gray, silty CLAY, trace sand - CL			
7 ▽			1-2-5	SS3
	Hard to stiff, brown to gray, silty CLAY, trace sand seams - CL (TILL)		9-22-28	SS4
10				
15			1-6-12	SS5
			3-4-9	SS6
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 7 FEET ▽

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DTK	App'vd. by: KRB
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G402

LOG OF BORING: APW-2

Project No. J017150.01

FIELD BORING LOG

HANSON

CLIENT: Natural Resource Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 9/11/2015
Finish: 9/11/2015
WEATHER: Raining, hi 60's

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: Hollow Stem Auger (3¼"overdrill / 4¼")

FIELD STAFF: Driller: D. Crump
Helper: D. Groves
Eng/Geo: K. Theesfeld

BOREHOLE ID: G403
Well ID: G403
Surface Elev: 623.81 ft. MSL
Completion: 18.15 ft. BGS
Station: 2,514,616.63N
873,561.34E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.00 - 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
1A	19/24 *79%*	SS	*2-2 2-2* N=4	25		*0.80*	0–2	Very dark brown (10YR2/2) grading to dark grayish brown (10YR4/2), moist, medium, SILT with some clay, trace roots and grass.	622	
2A	22/24 *92%*	SS	*2-2 3-4* N=5	29			2	Very dark brown (10YR2/2) grading to dark grayish brown (10YR4/2), moist , stiff, SILT with some clay, trace wood.		
2B				26		*1.50*		Yellowish brown (10YR5/4) with 10% very dark brown (10YR2/2) mottles, moist, stiff, CLAY with little silt, trace very fine-grained sand seams (<1/16" thick).	620	
3A	8/24 *33%*	SS	*2-3 4-4* N=7	25		*1.50*	4	Yellowish brown (10YR5/4), moist, stiff, CLAY with little silt and trace very fine-grained sand.	618	
4A	21/24 *88%*	SS	*8-7 8-7* N=15	20		*1.30*	6	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) and 5% very dark grayish brown (10YR3/2) mottles, moist, stiff, CLAY with little silt and trace very fine-grained sand.	616	
5A	20/24 *83%*	SS	*2-2 3-3* N=5	22		*0.70*	8	Grayish brown (10YR5/2) with 5% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with little silt and trace very fine-grained sand.	614	
6A	24/24 *100%*	SS	*2-2 3-4* N=5	23		*1.40*	10	Grayish brown (10YR5/2) with 30% yellowish brown (10YR5/6) mottles, moist, very stiff, CLAY with little silt, few very fine- to medium-grained sand, and trace gravel.	612	
7A	21/24 *88%*	SS	*5-5 6-5* N=11	20		*0.90*	12	Grayish brown (10YR5/3) with 45% yellowish brown (10YR5/6) and 5% dark brown (10YR3/3) mottles, moist, stiff, SILT with some clay, few very fine- to coarse-grained sand, and trace gravel.	610	
8A	24/24 *100%*	SS	*3-2 3-6* N=5	17			14	Grayish brown (10YR5/3) with 40% yellowish brown (10YR5/6) mottles, moist, medium, SILT with little clay, few very fine- to coarse-grained sand, and trace gravel.		
								Yellowish brown (10YR5/6) with 30% grayish brown (10YR5/2) mottles, moist, medium, SILT with little clay, few very fine- to coarse-grained sand, and trace gravel.	608	
							16	Yellowish brown (10YR5/6), wet, loose, SAND with some clay and few silt.		
9A	19/24 *79%*	SS	*8-12 21-25* N=33	8		*4.50*		Yellowish brown (10YR5/6) with 30% grayish brown (10YR5/2) mottles, moist, stiff, SILT with few clay, very fine- to coarse-grained sand, and gravel.		
								Yellowish brown (10YR5/6), moist, very stiff, SILT with some clay and few sand and gravel.	606	
	0/2 *0%*	BD					18	Very dark grayish brown (10YR3/2), dry, hard, SILT with little clay and few very fine- to coarse-grained sand and gravel.		

End of boring = 18.15 feet

NOTE(S): G403 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 5/1/2007
Finish: 5/1/2007
WEATHER: Partly sunny, warm

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" Hollow stem auger with split spoon sampler
FIELD STAFF: Driller: A. Rachford
Helper: M. Brown
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB22 Formerly MW22S
Well ID: G404
Surface Elev: 613.10 ft. MSL
Completion: 12.00 ft. BGS
Station: 873,999.77N
2,516,397.85E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 2.07 - 05/10/2007
▼ =
▽ =

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
1A	19/24 79%	SS		26		0.85 B
1B				26		
2A	19/24 79%	SS		16		2.47 B
3A	18/24 75%	SS		19		2.18 B
3B				18		2.33 B
4A	24/24 100%	SS		23		0.58 B
4B				18		
5A	23/24 96%	SS		10		
5B				19		
6A	19/24 79%	SS		19		
6B				11		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–1.8	Black (10YR2/1), moist, firm, clayey SILT (TOPSOIL)		612	
1.8–5	Gray (10YR5/1) with 35% dark yellowish brown (10YR4/6) mottles, moist, firm, clayey SILT with sand and trace gravel		610	
5–6.1	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel		608	
6.1–6.8	Yellowish brown (10YR5/8), moist, soft, sandy CLAY with slight trace gravel			
6.8–8.1	Yellowish brown (10YR5/8), very moist to wet, very soft, clayey, very fine- to medium-grained SAND with trace gravel		606	
8.1–9.6	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, clayey SILT with sand and trace gravel		604	
9.6–11.1	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND with coarse-grained sand and slight trace gravel		602	
11.1–12	Dark yellowish brown (10YR4/6) with 40% yellowish brown (10YR5/8) mottles, moist, very hard, very silty CLAY with sand and gravel			

End of Boring = 12.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Energy Center
Location: Coffeen, Illinois
Project: 15E0030
DATES: Start: 5/1/2007
Finish: 5/1/2007
WEATHER: Partly sunny, warm

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" Hollow stem auger with split spoon sampler
FIELD STAFF: Driller: A. Rachford
Helper: M. Brown
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB21 Formerly MW21S
Well ID: G405
Surface Elev: 620.90 ft. MSL
Completion: 14.21 ft. BGS
Station: 873,996.79N
2,515,335.70E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

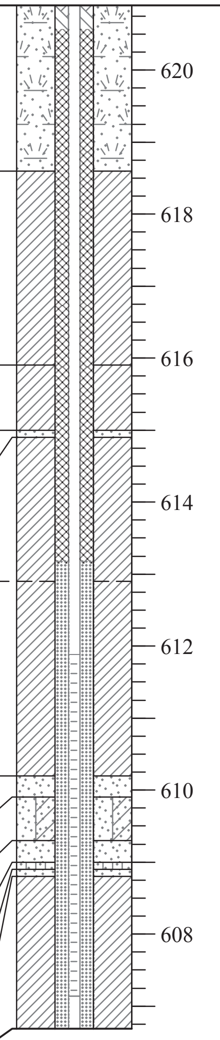
WATER LEVEL INFORMATION:
▼ = 1.28 - 05/10/2007
▼ =
▽ =

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	19/24 79%	SS		43		0.78 B
1B				26		1.94 B
2A	12/12 100%	SS		27		2.52 BSh
3A	24/24 100%	SS		24		3.92 BSh
3B				24		2.33 BSh
4A	24/24 100%	SS		20		2.33 BSh
5A	24/24 100%	SS		24		1.55 BSh
	24/24 100%	SS				
6A				19		
6B				18		
7A	24/24 100%	SS		9		7.42 BSh

Depth ft. BGS	Lithologic Description
0–2.3	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)
2.3–5.0	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY
5.0–5.9	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand
5.9–6.5	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND
6.5–8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel
8–10.7	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel
10.7–11.3	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
11.3–11.9	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel
11.9–12.5	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
12.5–13.2	Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel
13.2–13.8	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND
13.8–14.2	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel

End of Boring = 14.2 ft. BGS

Borehole Detail / Elevation ft. MSL / Remarks



NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

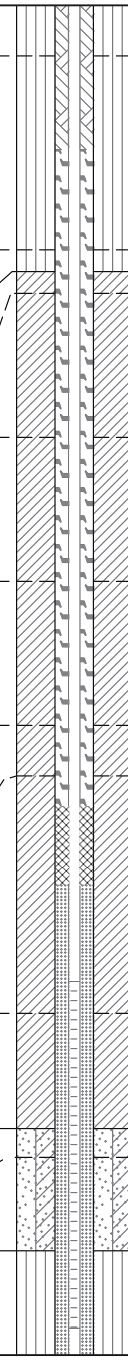
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406
Well ID: G406
Surface Elev: 621.86 ft. MSL
Completion: 18.75 ft. BGS
Station: 872,521.34N
2,514,702.38E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
								Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.			
							2	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.		620	
								Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay.		618	
							4	Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.			
								Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.		616	
							6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt and trace fine- to medium-grained sand.			
							8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt, little fine- to medium-grained sand and trace small gravel.		614	
							10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.		612	
							12	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.		610	
							14	Gray (10YR6/1) with 10% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with some fine- to medium-grained sand, little silt, and trace small gravel.		608	
								Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, wet, loose, fine-grained SAND with some clay.		606	
							16	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.			
							18	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel.		604	



End of Boring = 18.75 ft. BGS

NOTE(S): G406 installed in boring.
Boring was blind drilled adjacent to G406D.

FIELD BORING LOG

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

HANSON

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	18/24 *75%*	SS	*4-3 4-6* N=7	11		*1.50*		Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.		
1B				15		*3.00*	2	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.	620	
2A	12/24 *50%*	SS	*4-6 3-3* N=9	12		*2.50*				
2B				18		*2.00*	4	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay.	618	
3A	3/24 *13%*	SS	*3-3 4-7* N=7	24				Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.		
							6	Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.	616	
4A	20/24 *83%*	SS	*2-3 4-5* N=7	21		*1.25*	8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt and trace fine- to medium-grained sand.	614	
5A	19/24 *79%*	SS	*1-3 4-6* N=7	18		*1.75*	10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt, little fine- to medium-grained sand and trace small gravel.	612	
6A	23/24 *96%*	SS	*2-2 4-5* N=6	18		*2.50*	12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.	610	
7A	21/24 *88%*	SS	*1-3 4-5* N=7	16		*1.00*	14	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.	608	
8A	23/24 *96%*	SS	*1-2 2-2* N=4	18		*0.75*		Gray (10YR6/1) with 10% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with some fine- to medium-grained sand, little silt, and trace small gravel.		
8B				17		*0.75*	16	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, wet, loose, fine-grained SAND with some clay.	606	
9A	22/24 *92%*	SS	*4-13 27-23* N=40	8				Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.		
9B				8			18		604	
10A	17/24 *71%*	SS	*13-31 33-42* N=64	7		*4.50*	20	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel.	602	

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
11-1	3/3 *100%*	SH				
	8/24 *33%*	DS				
12-1						
13-1						
13-2	24/24 *100%*	DS				
13-3						
13-4						
14A				19		
14B	21/21 *100%*	SS	*7-30 32-20* N=62	7		
14C				8		*4.50*
15A	12/24 *50%*	SS	*15-16 10-11* N=26	10		*4.50*
16A	17/24 *71%*	SS	*2-5 7-11* N=12	16		*3.00*
17A	17/24 *71%*	SS	*2-5 7-12* N=12	15		*2.50*
18A	12/24 *50%*	SS	*3-7 12-20* N=19	17		*2.50*
19A	23/24 *96%*	SS	*4-4 6-9* N=10	25		*1.00*
20A	22/24 *92%*	SS	*2-2 5-7* N=7	17		*1.00*
21A	24/24 *100%*	SS	*2-3 4-6* N=7	17		*1.00*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
20–24.4	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel. *[Continued from previous page]*	
24.4	Pale brown (10YR6/3), wet, loose, fine-grained SAND.	
	Pale brown (10YR6/3), wet, loose, fine-grained SAND and small GRAVEL.	
–26	Gray (10YR5/1), dry, hard, SILT with some clay, trace fine- to coarse-grained sand and trace small gravel.	
26–28	Dark gray (10YR4/1), dry, hard, CLAY with some silt, trace fine- to coarse-grained sand and trace small gravel.	
28–31.6	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	
31.6	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small to large gravel.	
–34	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	
34–35.7	Dark gray (10YR4/1) with 5% very dark gray (10YR3/1) and brown (10YR5/3) mottles, moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	
35.7	Gray (10YR5/1) with 5% very dark gray (10YR3/1) and brown (10YR5/3) mottles, moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	
–40	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel.	

Depth scale (ft. BGS): 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale (ft. MSL): 600, 598, 596, 594, 592, 590, 588, 586, 584, 582

Borehole Detail | Remarks

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Sunny, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger
FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G406D
Well ID: G46D
Surface Elev: 621.91 ft. MSL
Completion: 52.00 ft. BGS
Station: 872,519.70N
2,514,697.78E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

WATER LEVEL INFORMATION:
▼ = Dry - 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
22A	24/24 *100%*	SS	*1-3 5-6* N=8	17		*1.50*
23-1, 23-2, 23-3, 23-4	24/24 *100%*	SH		16		
24A	24/24 *100%*	SS	*3-4 6-7* N=10	17		*1.50*
25A	24/24 *100%*	SS	*2-2 5-7* N=7	18		*1.25*
26A	24/24 *100%*	SS	*2-5 6-8* N=11	17		*1.75*
27A	23/24 *96%*	SS	*2-3 9-12* N=12	15		*3.50*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
42–52	Dark gray (10YR4/1), moist, very stiff, CLAY with few silt, trace fine- to coarse-grained sand and trace small gravel. *[Continued from previous page]*		580, 578, 576, 574, 572, 570	

Depth ticks: 42, 44, 46, 48, 50, 52

End of Boring = 52.0 ft. BGS

NOTE(S): G46D installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/16/2016
Finish: 8/16/2016
WEATHER: Rain, (mid-70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: G407
Well ID: G407
Surface Elev: 618.35 ft. MSL
Completion: 20.00 ft. BGS
Station: 2,513,705.87N
2,513,705.87E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 10, **Tier** 7 N.; **Range** 3 W.

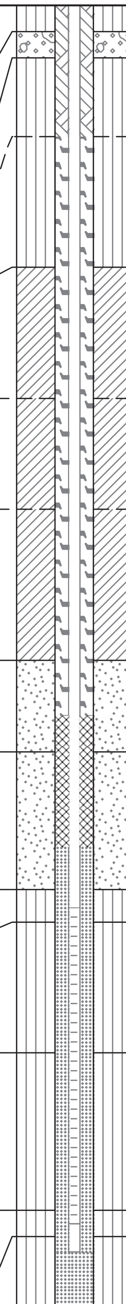
WATER LEVEL INFORMATION:
▼ = 16.00 - During Drilling
▼ =
▽ =

SAMPLE Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
1A	12/24 50%	SS	4-3 3-3 N=6	14		3.50
2A	20/24 83%	SS	2-2 4-4 N=6	18		1.50
3A	23/24 96%	SS	1-2 3-4 N=5	19		1.75
4A	24/24 100%	SS	1-3 3-5 N=6	19		1.50
5A	21/24 88%	SS	1-2 4-4 N=6	19		0.50
6A	22/24 92%	SS	1-2 2-1 N=4	17		
7A	24/24 100%	SS	7-29 33-17 N=62	8		
8A	24/24 100%	SS	3-7 12-17 N=19	12		4.50
9A	24/24 100%	SS	4-9 14-20 N=23	13		4.00
10A	24/24 100%	SS	2-8 14-19 N=22	14		4.50

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
	Very dark gray (10YR3/1), wet, medium, SILT with some organics. [Fill]	618
	Gray (10YR6/1), wet, loose, SAND with some gravel and little clay. [Fill]	
2	Yellowish brown (10YR5/6) with 5% dark yellowish brown (10YR3/6) mottles, moist, very stiff, SILT with some clay and trace very fine- to fine-grained sand.	616
	Brown (10YR5/3) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, SILT with some clay, little fine- to coarse-grained sand, and trace small gravel.	
4	Brown (10YR5/3) with 25% yellowish brown (10YR5/6) mottles, moist, stiff, CLAY with some silt, trace fine-grained sand and trace small gravel.	614
6	Brown (10YR5/3) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, CLAY with some silt, little fine- to coarse-grained sand and trace small gravel.	612
8	Yellowish brown (10YR5/6) with 25% brown (10YR5/3) mottles, moist, medium, CLAY with few silt, few fine-grained sand, and trace small gravel.	610
10	Yellowish brown (10YR5/8) with 5% gray (10YR5/1) mottles, moist, very loose, fine-grained SAND with some clay and trace small gravel.	608
12	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very dense, fine-grained SAND	606
	Brown (10YR5/3), moist, hard, SILT with some clay and little fine- to coarse-grained sand.	
14	Yellowish brown (10YR5/4) with 5% yellowish brown (10YR5/6) and 5% black (10YR2/1) mottles, SILT with some clay and little fine- to coarse-grained sand.	604
▼ 16	Yellowish brown (10YR5/4) with 5% yellowish brown (10YR5/6), 5% dark gray (10YR4/1) and 5% black (10YR2/1) mottles, moist, hard, SILT with little fine- to coarse-grained sand and trace small gravel.	602
18	Yellowish brown (10YR5/4) with 5% yellowish brown (10YR5/6), 5% dark gray (10YR4/1) and 5% black (10YR2/1) mottles, wet, stiff, SILT with little fine- to coarse-grained sand and little small gravel.	600
20	Dark grayish brown (10YR4/2) with 10% dark yellowish brown (10YR3/6) mottles, moist, hard, CLAY with some silt, little fine- to coarse-grained sand and trace small gravel.	

End of Boring = 20.0 ft. BGS

Borehole Detail



Remarks

NOTE(S): G407 installed in boring.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Power Station - Ash Pond 2
Location: Coffeen, Illinois
Project: 16E0031A
DATES: Start: 2/23/2018
Finish: 2/23/2018
WEATHER: Overcast, mild (mid-40s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA with continuous split spoon

FIELD STAFF: Driller: C. Dutton
Helper: M. Baetje
Eng/Geo: R. Hasenyager

BOREHOLE ID: G410
Well ID: G410
Surface Elev: 617.21 ft. MSL
Completion: 14.09 ft. BGS
Station: 872,968.54N
2,513,206.33E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.00 - During drilling
▼ = 13.30 - Upon completion
▽ = 4.82 - 1 March 2018

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	14/24 *58%*	SS	*2-3* *1-5* N=4	26.7			0–2	FILL - Light gray (10YR7/1), moist, loose, very fine- to very coarse-grained SAND with few small to medium gravel. / Very dark grayish brown (10YR3/2), moist, soft, CLAY with some silt and trace very fine- to fine-grained sand. / Yellowish brown (10YR5/4), moist, soft, CLAY with some silt and trace very fine- to fine-grained sand.	616	
2A	15/24 *63%*	SS	*4-4* *4-5* N=8	25.2			2–6	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium,CLAY with some silt and trace very fine- to fine-grained sand.	614	
3A	17/24 *71%*	SS	*2-3* *4-6* N=7	17.9			▽ 4.82		612	
4A	20/24 *83%*	SS	*3-4* *5-6* N=9	17.2			6–10.7	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, medium, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small to medium gravel.	610	
5A	11/24 *46%*	SS	*3-3* *5-6* N=8	17.5					608	
6A	22/24 *92%*	SS	*2-3* *4-6* N=7	16.9			▼ 11.00	Gray (10YR6/1), moist, loose, very fine- to medium-grained SAND with few silt and few clay.	606	
6B				16.8				Yellowish brown (10YR5/8) with 10% gray (10YR5/1) mottles, moist, medium, CLAY with some silt, little very fine- to very coarse-grained sand, and trace small to medium gravel.		
7A	24/24 *100%*	SS	*6-28* *36-42* N=64	10.3			12–14 ▼ 13.30	Yellowish brown (10YR5/6), moist, hard, SILT with some clay, few very fine- to very coarse-grained sand, and trace small to medium gravel.	604	
	0/1 *0%*	BD					14			

End of Boring = 14.09 ft bgs

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Power Station - Ash Pond 2
Location: Coffeen, Illinois
Project: 16E0031A
DATES: **Start:** 2/22/2018
Finish: 2/22/2018
WEATHER: Overcast, cool (lo-40s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA with continuous split spoon

FIELD STAFF: **Driller:** C. Dutton
Helper: M. Baetje
Eng/Geo: R. Hasenyager

BOREHOLE ID: G411
Well ID: G411
Surface Elev: 620.49 ft. MSL
Completion: 16.47 ft. BGS
Station: 873,844.81N
2,513,122.38E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.00 - During drilling
▼ = 8.00 - Upon completion
▽ = 2.65 - 1 March 2018

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0 – 0.3	Very dark grayish brown (10YR3/2), moist, soft, CLAY with some silt and trace sand.		620	
1A	17/24 71%	SS	5-2 4-4 N=6	15.6			0.3 – 2	Dark yellowish brown (10YR4/4), moist, soft, CLAY with some silt.			
2A	17/24 71%	SS	4-4 4-6 N=8	28.9			2 – 7.5	Gray (10YR6/1) with 25% yellowish brown (10YR5/6) mottles, moist, medium,CLAY with some silt.		618	
3A	20/24 83%	SS	2-3 4-5 N=7	18.8						616	
4A	24/24 100%	SS	2-3 4-4 N=7	19.0						614	
5A	20/24 83%	SS	2-3 4-4 N=7	21.0			7.5 – 11.5	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, medium, CLAY with some silt, few very fine- to very coarse-grained sand, and trace gravel.		612	
	24/24 100%	SS	2-4 5-6 N=9							610	
6A				14.4			11.5 – 13	Dark grayish brown (10YR4/2), moist, medium, CLAY with some silt, few very fine- to very coarse-grained sand, and trace small gravel.		608	
7A	24/24 100%	SS	1-3 2-4 N=5	18.9			13 – 14.1	Brown (10YR4/3), wet, loose, very fine- to very coarse-grained SAND with little silt and few clay.			
	23/24 96%	SS	3-17 20-20 N=37				14.1 – 16.47	Yellowish brown (10YR5/6), moist, hard, SILT with some clay, little very fine- to very coarse-grained sand, and trace small to medium gravel.		606	
	0/6 0%	BD									

End of Boring = 16.47 ft bgs

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-01
Well ID: MW1D
Surface Elev: 607 ft. MSL
Completion: 40 ft. BGS
Station: 874,972.6N
2,513,478.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 34.00 - While drilling
▼ =
▽ = 36.28 - MW01D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	16/24 *67%*	SS	*1-1 1-2* N=2	22		0.78 *B*
2A	20/24 *83%*	SS	*2-3 5-5* N=8	13		3.71 *BSh*
3A	22/24 *92%*	SS	*2-2 3-6* N=5	14		2.62 *BSh*
4A	23/24 *96%*	SS	*8-12 19-19* N=31	13		3.30 *BSh*
5A	24/24 *100%*	SS	*4-9 13-19* N=22	13		4.80 *BSh*
6A	22/24 *92%*	SS	*3-6 12-15* N=18	12		8.73 *B*
7A	24/24 *100%*	SS	*14-19 23-30* N=42	12		7.86 *B*
8A	24/24 *100%*	SS	*4-8 12-14* N=20	13		7.56 *B*
9A	24/24 *100%*	SS	*16-16 20-21* N=36	14		7.01 *B*
10A	24/24 *100%*	SS	*3-5 8-11* N=13	14		5.24 *B*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–1.7	Very dark gray (10YR3/1), clayey SILT, trace sand			
1.7–4	Light gray (10YR7/1) with 40% yellowish brown (10YR5/8) mottles, clayey SILT, trace sand and gravel			
4–6	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand and gravel			
6–8	Yellowish brown (10YR5/6) with 20% black (10YR2/1) mottles, clayey SILT, little sand and gravel			
8–12	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, clayey SILT, trace sand and gravel			
12–16	Dark gray (N4/1) with 25% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand and gravel			
16–20	Dark gray (N4/1), clayey SILT, trace sand and gravel			

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 606, 604, 602, 600, 598, 596, 594, 592, 590, 588

NOTE(S): MW01D installed in SB-01.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-01
Well ID: MW1D
Surface Elev: 607 ft. MSL
Completion: 40 ft. BGS
Station: 874,972.6N
2,513,478.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 34.00 - While drilling
▼ =
▽ = 36.28 - MW01D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
11A	24/24 *100%*	SH		15		3.69 *B*
12A	24/24 *100%*	SS	*10-11 12-16* N=23	14		5.24 *B*
13A	6/24 *25%*	SH		14		3.69 *B*
14A	24/24 *100%*	SS	*10-12 18-18* N=30	15		4.27 *B*
15A	24/24 *100%*	SS	*5-9 11-16* N=20	14		4.27 *B*
16A	24/24 *100%*	SS	*5-8 10-12* N=18	17		2.72 *BSh*
17A	24/24 *100%*	SS	*8-14 14-16* N=28	14		5.62 *B*
18A	23/24 *96%*	SS	*8-28 40-65* N=68	14		
19A				13		
19B	24/24 *100%*	SS	*24-14 17-16* N=31	19		5.43 *B*
20A	24/24 *100%*	SS	*3-5 6-10* N=11	24		3.50 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
to 34	Dark gray (N4/1), clayey SILT, trace sand and gravel *[Continued from previous page]*	586, 584, 582, 580, 578, 576, 574	Shelby tube taken from shallow well borehole at indicated depth. (11A); Shelby tube taken from shallow well borehole at indicated depth. (13A)
34 – ~36.7	Gray (N4/1), silty, fine to medium SAND, little coarse sand, trace gravel, wet	572	
~36.7 – 38	Very dark gray (10YR3/1), silty CLAY	570	
38 – 40	Dark gray (N4/1) with 30% dark yellowish brown (10YR4/6) mottles, silty CLAY	568	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

End of Boring = 40.0 ft. BGS

NOTE(S): MW01D installed in SB-01.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02b
Well ID: MW2D
Surface Elev: 624 ft. MSL
Completion: 27 ft. BGS
Station: 876,414.0N
2,513,209.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0	Dark grayish brown (10YR4/2), clayey SILT, trace sand		624	
								Gray (10YR6/1), clayey SILT, trace sand			
								Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand			
							2	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand		622	
							4	Yellowish brown (10YR5/8) with 40% gray (10YR6/1)mottles, lean CLAY, trace sand		620	
							6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand		618	
							8	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand		616	
							10			614	
								Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel			
							12	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel		612	
								Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet			
							14	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet		610	
							16			608	
							18	Dark gray (10YR4/1), clayey SILT, little sand and gravel		606	
							20				

NOTE(S): MW02D installed in blind-drilled borehole within 10 ft of SB-02.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02b
Well ID: MW2D
Surface Elev: 624 ft. MSL
Completion: 27 ft. BGS
Station: 876,414.0N
2,513,209.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										604	
							22	Brown (10YR5/3), clayey SILT, little sand, trace gravel		602	
							24			600	
							26	Blueish gray (5B5/1), with 30% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace coal		598	

End of Boring = 27.22 ft. BGS
See SB-02 for sample & testing details

NOTE(S): MW02D installed in blind-drilled borehole within 10 ft of SB-02.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	24/24 *100%*	SS	*3-3* *4-5* N=7	23		
1B				18		1.96 *B*
1C				29		1.94 *B*
2A	24/24 *100%*	SS	*3-4* *4-6* N=8	25		2.89 *B*
3A	24/24 *100%*	SS	*3-5* *5-7* N=10	20		2.91 *B*
4A	24/24 *100%*	SS	*10-8* *8-10* N=16	17		2.91 *B*
5A	24/24 *100%*	SS	*3-3* *4-5* N=7	19		1.94 *B*
6A				18		2.13 *B*
6B	24/24 *100%*	SS	*2-3* *6-5* N=9	17		
7A	24/24 *100%*	SS	*4-4* *7-10* N=11	14		2.06 *B*
7B				17		
8A	24/24 *100%*	SS	*15-23* *33-68* N=56	10		
9A	10/10 *100%*	SS	*48-62/4"*	10		3.92 *Sh*
10A	12/12 *100%*	SS	*15-45*	9		8.07 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0	Dark grayish brown (10YR4/2), clayey SILT, trace sand	624	
	Gray (10YR6/1), clayey SILT, trace sand		
	Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand		
2	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand	622	
4	Yellowish brown (10YR5/8) with 40% gray (10YR6/1)mottles, lean CLAY, trace sand	620	
6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand	618	
8	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand	616	
10		614	
	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel		
12	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel	612	
	Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet		
14	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet	610	
16		608	
18	Dark gray (10YR4/1), clayey SILT, little sand and gravel	606	
20			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										604	
11A				9							
							22			602	
	36/60 *60%*	CS						Brown (10YR5/3), clayey SILT, little sand, trace gravel			
							24			600	
11B				11							
							26			598	
12A				21							
	60/60 *100%*	CS						Blueish gray (5B5/1), with 30% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace coal			
							28			596	
12B				23							
							30			594	
							32			592	
	60/60 *100%*	CS									
							34			590	
13A				14							
								Very dark gray (10Y3/1), lean CLAY, trace sand and gravel			
							36			588	
	60/60 *100%*	CS									
							38			586	
14A				14							
							40				

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										584	
	60/60 *100%*	CS					42			582	
15A				14			44			580	
							46	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel *[Continued from previous page]*		578	
	60/60 *100%*	CS					48			576	
16A				13			50				

End of Boring = 50.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02a
Well ID: MW2S
Surface Elev: 624 ft. MSL
Completion: 16 ft. BGS
Station: 876,408.9N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0	Dark grayish brown (10YR4/2), clayey SILT, trace sand		624	
								Gray (10YR6/1), clayey SILT, trace sand			
								Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand			
							2	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand		622	
							4	Yellowish brown (10YR5/8) with 40% gray (10YR6/1)mottles, lean CLAY, trace sand		620	
							6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand		618	
							8	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand		616	
							10			614	
								Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel			
							12	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel		612	
								Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet			
							14	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet		610	

End of Boring = 15.51 ft. BGS
See SB-02 for sample & testing details

NOTE(S): MW02S installed in blind-drilled borehole within 10 ft of SB-02.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	24/24 *100%*	SS	*3-3* *4-5* N=7	23			0	Dark grayish brown (10YR4/2), clayey SILT, trace sand	624	
1B				18		1.96 *B*		Gray (10YR6/1), clayey SILT, trace sand		
1C				29		1.94 *B*		Yellowish brown (10YR5/4) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand		
2A	24/24 *100%*	SS	*3-4* *4-6* N=8	25		2.89 *B*	2	Yellowish brown (10YR5/8) with 15% gray (10YR6/1) mottles, lean CLAY, trace sand	622	
3A	24/24 *100%*	SS	*3-5* *5-7* N=10	20		2.91 *B*	4	Yellowish brown (10YR5/8) with 40% gray (10YR6/1)mottles, lean CLAY, trace sand	620	
4A	24/24 *100%*	SS	*10-8* *8-10* N=16	17		2.91 *B*	6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, little sand	618	
5A	24/24 *100%*	SS	*3-3* *4-5* N=7	19		1.94 *B*	8	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand	616	
6A	24/24 *100%*	SS	*2-3* *6-5* N=9	18		2.13 *B*	10		614	
6B				17				Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, clayey SAND, trace gravel		
7A	24/24 *100%*	SS	*4-4* *7-10* N=11	14		2.06 *B*	12	Gray (10YR6/1) with 30% white (10YR8/1) mottles, sandy CLAY, trace gravel	612	
7B				17				Yellowish brown (10YR5/4), silty, fine SAND, little medium sand, wet		
8A	24/24 *100%*	SS	*15-23* *33-68* N=56	10			14		610	
9A	10/10 *100%*	SS	*48-62/4"*	10		3.92 *Sh*	16	Pale brown (10YR6/3), silty, fine SAND, trace gravel, wet	608	
10A	12/12 *100%*	SS	*15-45*	9		8.07 *BSh*	18	Dark gray (10YR4/1), clayey SILT, little sand and gravel	606	
							20			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	36/60 *60%*	CS		9			20–25	Brown (10YR5/3), clayey SILT, little sand, trace gravel		604–599	
11B				11							
12A	60/60 *100%*	CS		21			25–30	Blueish gray (5B5/1), with 30% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace coal		599–594	
12B				23							
	60/60 *100%*	CS					30–40	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel		594–584	
13A				14							
	60/60 *100%*	CS									
14A				14							

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 604, 602, 600, 598, 596, 594, 592, 590, 588, 586

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/5/2006
WEATHER: Partly cloudy, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-02
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 50 ft. BGS
Station: 876,410.0N
2,513,210.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 7.42 - MW02S on 6/1/06
▽ = 7.36 - MW02D on 6/1/06

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										584	
	60/60 *100%*	CS					42			582	
15A				14			44	Very dark gray (10Y3/1), lean CLAY, trace sand and gravel *[Continued from previous page]*		580	
							46			578	
	60/60 *100%*	CS					48			576	
16A				13			50				

End of Boring = 50.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	20/24 *83%*	SS	*2-2 4-6* N=6	17		2.07 *SP*	0	Very dark grayish brown (10YR3/2), lean CLAY	626	
1B				20				Grayish brown (10YR5/2), lean CLAY, trace sand		
1C				26		3.30 *B*		Yellowish brown (10YR5/6), lean CLAY, trace sand	624	
2A	17/24 *71%*	SS	*2-3 4-5* N=7	25		3.05 *B*	2	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, lean CLAY, trace sand	622	
3A	20/24 *83%*	SS	*2-3 3-5* N=6	16		1.96 *B*	4	Yellowish brown (10YR5/6) with 40% gray (N5/1) mottles, sandy SILT, trace gravel	620	
4A	24/24 *100%*	SS	*4-3 5-6* N=8	21		2.27 *B*	6	Yellowish brown (10YR5/6) with 50% gray (N5/1) mottles, lean CLAY, trace sand and gravel	618	
5A	21/24 *88%*	SS	*1-3 3-4* N=6	20		2.18 *B*	8	Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel	616	
5B				19				Dark gray (10YR4/1), sandy CLAY, trace gravel		
6A	18/24 *75%*	SS	*1-2 2-4* N=4	24		0.87 *B*	10	Gray (10YR6/1) with 50% yellowish brown (10YR5/8) mottles, lean CLAY, little sand, trace gravel	614	
7A	23/24 *96%*	SH		19			12		612	Shelby tube taken from shallow well borehole at indicated depth.
7B	16/24 *67%*	SS	*3-2 2-4* N=4	12						
8A	23/24 *96%*	SS	*3-12 29-50* N=41	13			14	Yellowish brown (10YR5/8), silty, fine SAND, little medium sand, trace gravel, wet	610	
8B				13				Yellowish brown (10YR5/8), silty, fine SAND, little clay, wet		
8C				12			16	Yellowish brown (10YR5/6), lean CLAY, little sand, trace gravel		
9A	14/24 *58%*	SS	*8-82 85-72* N=167	10		6.98 *B*		Yellowish brown (10YR5/6), silty SAND, trace gravel, wet	608	
9B				13		6.18 *BSh*	18	Yellowish brown (10YR5/4), clayey SILT, trace sand and gravel		
10A	18/24 *75%*	SS	*6-21 32-49* N=53	8		11.95 *Sh*	20	Gray (10YR5/1), sandy SILT, trace gravel	606	

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
11A	19/24 *79%*	SS	*3-20 35-29* N=55	10		5.36 *Sh*
12A	20/24 *83%*	SS	*15-25 89-69* N=114	8		13.00 *Sh*
13A	23/24 *96%*	SS	*14-19 24-22* N=43	9		
13B				13		6.98 *BSh*
14A	24/24 *100%*	SS	*19-21 26-32* N=47	15		7.01 *BSh*
15A	21/24 *88%*	SS	*10-25 25-23* N=50	12		
15B				13		8.53 *BSh*
16A	24/24 *100%*	SS	*7-12 19-30* N=31	13		9.16 *BSh*
17A	24/24 *100%*	SS	*29-35 39-42* N=74	14		6.59 *B*
17B				14		3.49 *Sh*
18A	23/24 *96%*	SS	*6-8 11-17* N=19	13		7.21 *BSh*
19A	24/24 *100%*	SS	*19-21 31-31* N=52	13		6.98 *BSh*
20A	24/24 *100%*	SS	*6-10 15-24* N=25	14		6.76 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
20–25.3	Gray (10YR5/1), sandy SILT, trace gravel *[Continued from previous page]*	604, 602	Wood fragments
25.3–26	Yellowish brown (10YR5/4), lean CLAY, trace sand and gravel	600	
26–27.8	Gray (10YR4/1), clayey SILT, trace sand and gravel	598	
27.8–29.5	Light gray (10YR6/1), SILT, trace sand	596	
29.5–36	Gray (10YR4/1), lean CLAY, trace sand and gravel	594, 592, 590	
36–38	Gray (10YR4/1), clayey SILT, trace sand and gravel	588	
38–40	Gray (10YR4/1), lean CLAY, trace sand and gravel	586	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/27/2006
WEATHER: Sunny, mild (high-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-03
Well ID: MW3D
Surface Elev: 626 ft. MSL
Completion: 58 ft. BGS
Station: 876,554.5N
2,514,535.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 7.03 - MW03S on 6/1/06
▽ = 55.40 - MW03D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
21A	19/24 *79%*	SS	*4-10 16-23* N=26	13		8.04 *BSh*	40–42	Gray (10YR4/1), lean CLAY, trace sand and gravel *[Continued from previous page]*	584	
22A	21/24 *88%*	SS	*19-27 28-32* N=55	13		7.56 *BSh*	42–48	Gray (10YR4/1), clayey SILT, trace sand and gravel	582	
23A	23/24 *96%*	SS	*4-9 14-18* N=23	14		6.98 *BSh*			580	
24A	24/24 *100%*	SS	*20-26 30-33* N=56	14		6.59 *BSh*			578	
25A	24/24 *100%*	SS	*6-10 13-12* N=23	20		3.30 *BSh*	48–53.3	Gray (10YR4/1), lean CLAY, trace sand and gravel	576	
26A	24/24 *100%*	SS	*4-7 6-7* N=13	22		2.91 *BSh*			574	
27A	24/24 *100%*	SS	*7-18 37-85* N=55	16		4.05 *BSh*	53.3–54	Gray (10Y4/1), silty, fine to medium SAND, wet	572	
27B				13			54–55.6	Gray (10YR4/1), silty, fine SAND, trace clay, wet		
28A	23/24 *96%*	SS	*15-34 34-19* N=68	11		3.22 *SP*			570	
28B				13		5.82 *B*	55.6–58	Very dark gray (10YR3/1), lean CLAY, trace sand and gravel		
29A	24/24 *100%*	SS	*19-22 28-18* N=50	20		4.36 *BSh*			568	

End of Boring = 58.0 ft. BGS

NOTE(S): MW03D installed in SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

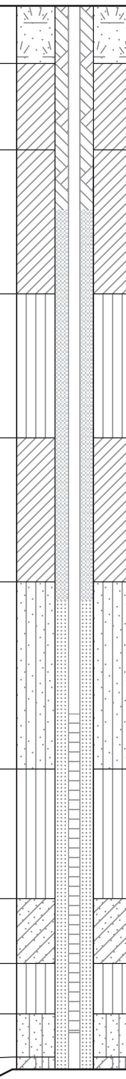
CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-04a
Well ID: MW4S
Surface Elev: 622 ft. MSL
Completion: 15 ft. BGS
Station: 877,999.7N
2,514,450.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 8.00 - While drilling
▼ = 5.67 - MW04S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Very dark gray (10YR3/1), clayey SILT, trace sand		622	
							2	Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/6) mottles, lean CLAY			
							4	Yellowish brown (10YR5/8) with 50% grayish brown (10YR5/2) mottles, lean CLAY		620	
							▼ 6	Dark gray (10YR4/1), clayey SILT, trace sand		618	
							▼ 8	Gray (10YR5/1), lean CLAY, trace sand and gravel		616	
							10	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, sandy SILT		614	
							12	Very dark gray (10YR3/1) with 35% gray (10YR6/1) mottles, clayey SILT, wet		612	
								Yellowish brown (10YR5/6), clayey SAND, trace gravel		610	
							14	Light gray (10YR7/1) with 20% brown (10YR5/3) mottles, clayey SILT, trace sand and gravel			
								Yellowish brown (10YR5/8), silty, fine to medium SAND, trace coarse sand, wet		608	
								Gray (10YR4/1), sandy SILT, trace gravel			



End of Boring = 14.77 ft. BGS
See SB-04 for sample & testing details

NOTE(S): MW04S installed in blind-drilled borehole within 10 ft of SB-03.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-04
Well ID: n/a
Surface Elev: 622 ft. MSL
Completion: 55 ft. BGS
Station: 878,000.0N
2,514,445.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 8.00 - While drilling
▼ = 5.67 - MW04S on 6/1/06
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Lithologic Description
1A	21/24 *88%*	SS	*1-2 2-4* N=4	24		1.09 *B*	(0–0.8 ft) Very dark gray (10YR3/1), clayey SILT, trace sand
1B				29			(0.8–2 ft) Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/6) mottles, lean CLAY
2A	18/24 *75%*	SS	*2-4 5-6* N=9	27		2.72 *BSh*	(2–4 ft) Yellowish brown (10YR5/8) with 50% grayish brown (10YR5/2) mottles, lean CLAY
3A	16/24 *67%*	SS	*2-3 4-6* N=7	23		1.71 *B*	(4–6 ft) Dark gray (10YR4/1), clayey SILT, trace sand
4A	24/24 *100%*	SS	*4-5 5-7* N=10	20		1.40 *BSP*	(6–8 ft) Gray (10YR5/1), lean CLAY, trace sand and gravel
5A	24/24 *100%*	SS	*1-2 2-2* N=4	23		0.70 *B*	(8–10.6 ft) Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, sandy SILT
6A	24/24 *100%*	SS	*0-1 2-3* N=3	24		0.31 *BSh*	(10.6–12.4 ft) Very dark gray (10YR3/1) with 35% gray (10YR6/1) mottles, clayey SILT, wet
6B				28			
7A	22/24 *92%*	SS	*0-1 3-7* N=4	20		0.08 *B*	(12.4–13.3 ft) Yellowish brown (10YR5/6), clayey SAND, trace gravel
7B				16			(13.3–14 ft) Light gray (10YR7/1) with 20% brown (10YR5/3) mottles, clayey SILT, trace sand and gravel
7C				12			(14–14.6 ft) Yellowish brown (10YR5/8), silty, fine to medium SAND, trace coarse sand, wet
8A	23/24 *96%*	SS	*4-9 22-35* N=31	14		4.36 *SP*	(14.6–20 ft) Gray (10YR4/1), sandy SILT, trace gravel
8B				11			
9A	24/24 *100%*	SS	*27-38 54-50* N=92	7			
10A	24/24 *100%*	SS	*24-29 39-34* N=68	9		2.18 *BSh*	

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 622, 620, 618, 616, 614, 612, 610, 608, 606, 604

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-04
Well ID: n/a
Surface Elev: 622 ft. MSL
Completion: 55 ft. BGS
Station: 878,000.0N
2,514,445.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 8.00 - While drilling
▼ = 5.67 - MW04S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										602	
							22				
	60/60 *100%*	CS								600	
							24				
11A				7						598	
							26			596	
	60/60 *100%*	CS									
							28			594	
12A				7							
							30	Gray (10YR4/1), sandy SILT, trace gravel *[Continued from previous page]*		592	
							32			590	
	60/60 *100%*	CS									
							34				
13A				8						588	
							36			586	
	60/60 *100%*	CS									
							38			584	
14A				13							
							40				

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-04
Well ID: n/a
Surface Elev: 622 ft. MSL
Completion: 55 ft. BGS
Station: 878,000.0N
2,514,445.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 8.00 - While drilling
▼ = 5.67 - MW04S on 6/1/06
▽ =

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
									582	
	60/60 *100%*	CS					42		580	
15A				13			44	Gray (10YR4/1), sandy SILT, trace gravel *[Continued from previous page]*	578	
	60/60 *100%*	CS					46		576	
							48		574	
16A				14						
16B				21			50		572	
	60/60 *100%*	CS					52	Greenish gray (10BG5/1) with 20% dark yellowish brown (10YR4/6) mottles, lean CLAY, trace sand	570	
17A				24			54		568	

End of Boring = 55.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	19/24 *79%*	ss	*0-2 3-4* N=5	29		
1B				28		
2A	22/24 *92%*	ss	*2-5 5-7* N=10	27		2.47 *BSh*
2B				22		2.13 *B*
3A	24/24 *100%*	ss	*2-2 3-6* N=5	21		2.33 *BSP*
4A	24/24 *100%*	ss	*7-6 6-8* N=12	21		1.90 *BSh*
5A	18/24 *75%*	ss	*1-3 4-5* N=7	22		1.78 *B*
6A	20/24 *83%*	ss	*0-1 3-4* N=4	16		
6B				22		0.70 *BSh*
7A	24/24 *100%*	ss	*3-6 17-20* N=23	19		
7B				16		
8A	20/24 *83%*	ss	*4-16 25-25* N=41	20		
8B				11		
9A	24/24 *100%*	ss	*14-18 38-62* N=56	12		
9B				8		
10A	18/24 *75%*	ss	*14-39 77* N=116	9		3.27 *Sh*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	Dark grayish brown (10YR4/2), clayey SILT, trace sand		622	
2	Gray (10YR5/1 with 50% yellowish brown (10YR5/6) mottles, clayey SILT		620	
4	Very dark brown (10YR2/2) with 20% dark gray (10YR4/1) mottles, clayey SILT, trace sand			
	Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY		618	
6	Gray (10YR6/1), lean CLAY, trace sand		616	
8	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
10	Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet			
	Yellowish brown (10YR5/6) with 50% gray 10YR5/1) mottles, sandy CLAY		612	
12	Gray 10YR6/1), clayey, fine to medium SAND, trace gravel, wet		610	
	Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand			
14	Yellowish brown (10YR5/6), silty, fine SAND, wet		608	
16	Brown (10YR5/3), silty SAND and GRAVEL, wet		606	
18	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		604	
20				

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark gray (10YR4/1), sandy SILT, trace clay and gravel *[Continued from previous page]*		602	
							22	Dark gray (10YR4/1), silty, fine SAND, trace medium sand		600	
11A	60/60 *100%*	CS		7							
11B				7			24			598	
							26			596	
	60/60 *100%*	CS					28			594	
12A				7			30	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		592	
	60/60 *100%*	CS					32			590	
13A				8			34			588	
							36			586	
14A	48/60 *80%*	CS		7				Gray (10YR6/1), fine to medium SAND			
							38	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		584	
14B				14			40				

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

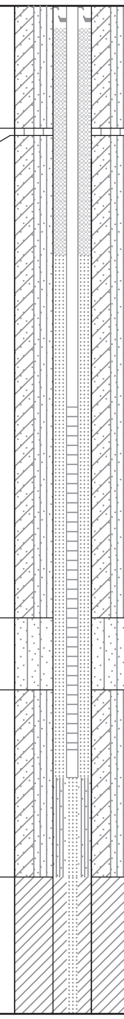
CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark gray (10YR4/1), sandy SILT, trace clay and gravel *[Continued from previous page]*		582	
							42	Gray (10YR4/1), clayey SILT, trace sand			
	60/60 *100%*	CS								580	
15A				16			44	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		578	
	60/60 *100%*	CS					46			576	
16A				14			48			574	
16B				20				Gray(10YR4/1), silty, fine to medium SAND, trace organics and coal			
17A	24/24 *100%*	SS	*7-10* *15-16* N=25	12			50 ▽	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		572	
18A	24/24 *100%*	SS	*17-18* *19-21* N=37	22			52	Greenish gray (5G5/1) with 40% yellowish brown (10YR5/6)mottles, lean CLAY		570	
							54				



End of Boring = 54.0 ft. BGS

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/17/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05a
Well ID: MW5S
Surface Elev: 623 ft. MSL
Completion: 18 ft. BGS
Station: 878,175.6N
2,513,285.5E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark grayish brown (10YR4/2), clayey SILT, trace sand		622	
							2	Gray (10YR5/1 with 50% yellowish brown (10YR5/6) mottles, clayey SILT		620	
								Very dark brown (10YR2/2) with 20% dark gray (10YR4/1) mottles, clayey SILT, trace sand			
							4	Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY		618	
							6	Gray (10YR6/1), lean CLAY, trace sand		616	
							8	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
							10	Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet			
								Yellowish brown (10YR5/6) with 50% gray 10YR5/1) mottles, sandy CLAY		612	
							12	Gray 10YR6/1), clayey, fine to medium SAND, trace gravel, wet		610	
								Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand			
							14	Yellowish brown (10YR5/6), silty, fine SAND, wet		608	
							16	Brown (10YR5/3), silty SAND and GRAVEL, wet		606	
								Dark gray (10YR4/1), sandy SILT, trace clay and gravel			

End of Boring = 17.71 ft. BGS
See SB-05 for sample & testing details

NOTE(S): MW05S installed in blind-drilled borehole within 10 ft of SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	19/24 *79%*	SS	*0-2 3-4* N=5	29		
1B				28		
2A	22/24 *92%*	SS	*2-5 5-7* N=10	27		2.47 *BSh*
2B				22		2.13 *B*
3A	24/24 *100%*	SS	*2-2 3-6* N=5	21		2.33 *BSP*
4A	24/24 *100%*	SS	*7-6 6-8* N=12	21		1.90 *BSh*
5A	18/24 *75%*	SS	*1-3 4-5* N=7	22		1.78 *B*
6A				16		
6B	20/24 *83%*	SS	*0-1 3-4* N=4	22		0.70 *BSh*
7A	24/24 *100%*	SS	*3-6 17-20* N=23	19		
7B				16		
8A	20/24 *83%*	SS	*4-16 25-25* N=41	20		
8B				11		
9A	24/24 *100%*	SS	*14-18 38-62* N=56	12		
9B				8		
10A	18/24 *75%*	SS	*14-39 77* N=116	9		3.27 *Sh*

Depth ft. BGS | Lithologic Description | Borehole Detail | Elevation ft. MSL | Remarks

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation (ft. MSL): 622, 620, 618, 616, 614, 612, 610, 608, 606, 604

- Dark grayish brown (10YR4/2), clayey SILT, trace sand
- Gray (10YR5/1 with 50% yellowish brown (10YR5/6) mottles, clayey SILT
- Very dark brown (10YR2/2) with 20% dark gray (10YR4/1) mottles, clayey SILT, trace sand
- Dark gray (10YR4/1) with 30% light gray (10YR7/1) mottles, lean CLAY
- Gray (10YR6/1), lean CLAY, trace sand
- Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand
- Yellowish brown (10YR5/6), clayey SAND, trace gravel, wet
- Yellowish brown (10YR5/6) with 50% gray 10YR5/1) mottles, sandy CLAY
- Gray 10YR6/1), clayey, fine to medium SAND, trace gravel, wet
- Brownish yellow (10YR6/6), silty, fine SAND, trace medium sand
- Yellowish brown (10YR5/6), silty, fine SAND, wet
- Brown (10YR5/3), silty SAND and GRAVEL, wet
- Dark gray (10YR4/1), sandy SILT, trace clay and gravel

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark gray (10YR4/1), sandy SILT, trace clay and gravel *[Continued from previous page]*		602	
							22	Dark gray (10YR4/1), silty, fine SAND, trace medium sand		600	
11A	60/60 *100%*	CS		7							
11B				7			24			598	
							26			596	
	60/60 *100%*	CS					28			594	
12A				7			30	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		592	
	60/60 *100%*	CS					32			590	
13A				8			34			588	
							36			586	
14A	48/60 *80%*	CS		7				Gray (10YR6/1), fine to medium SAND			
							38	Dark gray (10YR4/1), sandy SILT, trace clay and gravel		584	
14B				14			40				

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/12/2006
Finish: 5/17/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

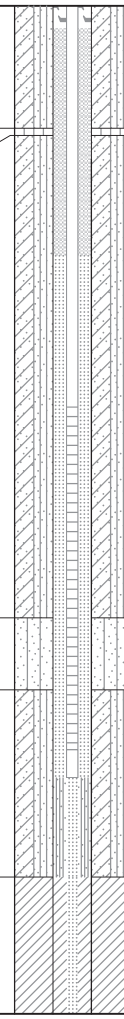
BOREHOLE ID: SB-05
Well ID: MW5D
Surface Elev: 623 ft. MSL
Completion: 54 ft. BGS
Station: 878,174.8N
2,513,290.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.00 - While drilling
▼ = 6.74 - MW05S on 6/1/06
▽ = 50.44 - MW05D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Dark gray (10YR4/1), sandy SILT, trace clay and gravel *[Continued from previous page]*	582	
							42	Gray (10YR4/1), clayey SILT, trace sand		
	60/60 *100%*	CS							580	
15A				16			44	Dark gray (10YR4/1), sandy SILT, trace clay and gravel	578	
	60/60 *100%*	CS					46		576	
16A				14			48			
16B				20				Gray(10YR4/1), silty, fine to medium SAND, trace organics and coal	574	
17A	24/24 *100%*	SS	*7-10* *15-16* N=25	12			50 ▽	Dark gray (10YR4/1), sandy SILT, trace clay and gravel	572	
18A	24/24 *100%*	SS	*17-18* *19-21* N=37	22			52	Greenish gray (5G5/1) with 40% yellowish brown (10YR5/6)mottles, lean CLAY	570	
							54			

Borehole Detail



End of Boring = 54.0 ft. BGS

NOTE(S): MW05D installed in SB-05.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-06a
Well ID: MW6S
Surface Elev: 623 ft. MSL
Completion: 16 ft. BGS
Station: 879,021.2N
2,513,189.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 9.30 - While drilling
▼ = 6.21 - MW06S on 6/1/06
▽ =

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark grayish brown (10YR4/2), clayey SILT, trace sand			
								Light brownish gray (10YR6/2) with 20% yellowish brown (10YR5/8) mottles, clayey SILT, trace sand		622	
							2	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		620	
							4	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand		618	
							▼ 6			616	
							8	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, clayey, fine SAND		614	
							▼	Yellowish brown (10YR5/6), silty, fine SAND, trace clay, wet			
							10	Dark yellowish brown (10YR4/6), silty, fine SAND, wet		612	
							12	Brownish yellow (10YR6/6), silty, fine to medium SAND, little coarse sand, trace gravel, wet		610	
								Yellowish brown (10YR5/4), sandy SILT, trace gravel, wet			
							14	Brown (10YR5/3), silty, fine SAND, little medium sand, trace gravel, wet			
								Gray (N5/1), clayey SILT, little sand, trace gravel		608	
							16	Dark gray (N4/1), clayey SILT, trace sand and gravel			

End of Boring = 16.08 ft. BGS
See SB-06 for sample & testing details

NOTE(S): MW06S installed in blind-drilled borehole within 10 ft of SB-06.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-06
Well ID: n/a
Surface Elev: 623 ft. MSL
Completion: 60 ft. BGS
Station: 879,015.0N
2,513,190.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 9.30 - While drilling
▼ = 6.21 - MW06S on 6/1/06
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	24/24 *100%*	SS	*2-3* *3-5* N=6	25		1.22 *SP*
1B				28		1.96 *B*
2A	24/24 *100%*	SS	*2-4* *5-6* N=9	27		1.94 *BSh*
2B				19		2.52 *BSh*
3A	24/24 *100%*	SS	*1-3* *4* N=7	21		1.36 *B*
4A	24/24 *100%*	SS	*4-6* *6* N=12	17		1.78 *B*
5A	22/24 *92%*	SS	*1-2* *3-3* N=5	18		0.85 *BSh*
5B				17		0.81 *None*
5C				21		0.31 *None*
6A	20/24 *83%*	SS	*0-1* *2-4* N=3	25		
7A	24/24 *100%*	SS	*2-4* *7-8* N=11	15		
7B				12		1.48 *BSh*
8B	22/24 *92%*	SS	*11-33* *57-35* N=90	8		7.18 *Sh*
9A	22/24 *92%*	SS	*30-39* *46-55* N=85	9		11.35 *Sh*
8A				11		
10A	24/24 *100%*	SS	*4-23* *50-51* N=73	7		11.64 *Sh*

Depth ft. BGS	Lithologic Description
0 – ~0.6	Dark grayish brown (10YR4/2), clayey SILT, trace sand
~0.6 – 2	Light brownish gray (10YR6/2) with 20% yellowish brown (10YR5/8) mottles, clayey SILT, trace sand
2 – 4	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand
4 – ~8.5	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, clayey SILT, trace sand
~8.5 – ~9.3	Gray (10YR6/1) with 20% yellowish brown (10YR5/8) mottles, clayey, fine SAND
~9.3 – 10	Yellowish brown (10YR5/6), silty, fine SAND, trace clay, wet
10 – 12	Dark yellowish brown (10YR4/6), silty, fine SAND, wet
12 – ~13.3	Brownish yellow (10YR6/6), silty, fine to medium SAND, little coarse sand, trace gravel, wet
~13.3 – 14	Yellowish brown (10YR5/4), sandy SILT, trace gravel, wet
14 – ~14.6	Brown (10YR5/3), silty, fine SAND, little medium sand, trace gravel, wet
~14.6 – 16	Gray (N5/1), clayey SILT, little sand, trace gravel
16 – 20	Dark gray (N4/1), clayey SILT, trace sand and gravel

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Elevation (ft. MSL): 622, 620, 618, 616, 614, 612, 610, 608, 606, 604

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-06
Well ID: n/a
Surface Elev: 623 ft. MSL
Completion: 60 ft. BGS
Station: 879,015.0N
2,513,190.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 9.30 - While drilling
▼ = 6.21 - MW06S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	20/24 *83%*	SS	*6-16 33-58* N=49	11		3.49 *BSh*	22	Dark gray (N4/1), clayey SILT, trace sand and gravel *[Continued from previous page]*	602	
12A	20/24 *83%*	SS	*45-56 54-50/3"* N=110	9		11.64 *Sh*	24		600	
13A	12/24 *50%*	SS	*26-78*	12		2.84 *Sh*	26		598	
14A	8/24 *33%*	SS	*52-48/2"*	9		5.43 *BSh*	28		596	
15A	24/24 *100%*	SS	*10-24 30-40* N=54	13		4.95 *BSh*	30		594	
16A	21/24 *88%*	SS	*10-16 37-38* N=53	8		10.91 *BSh*	32		592	
17A	17/24 *71%*	SS	*36-47 61/5"*	9			34		590	
18A	22/24 *92%*	SS	*11-36 45-60* N=81	9		10.04 *Sh*	36		588	
19A	22/24 *92%*	SS	*40-35 34-29* N=69	10		9.60 *Sh*			586	
19B				13		8.92 *B*	38	Very dark greenish gray (10Y3/1), lean CLAY, trace sand		
20A	24/24 *100%*	SS	*3-8 12-15* N=20	14		8.53 *BSh*	40		584	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-06
Well ID: n/a
Surface Elev: 623 ft. MSL
Completion: 60 ft. BGS
Station: 879,015.0N
2,513,190.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 9.30 - While drilling
▼ = 6.21 - MW06S on 6/1/06
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
21A	23/24 *96%*	SS	*3-5 8-12* N=13	15		4.27 *B*	42	Very dark greenish gray (10Y3/1), lean CLAY, trace sand and gravel	582	
22A	22/24 *92%*	SS	*6-6 7-8* N=13	14		3.49 *B*	44		580	
23A	24/24 *100%*	SS	*5-7 9-12* N=16	16		2.72 *B*	46		578	
24A	24/24 *100%*	SS	*4-8 10-11* N=18	15		4.07 *B*	48		576	
25A	24/24 *100%*	SS	*5-6 9-13* N=15	15		3.10 *B*	50		574	
26A	24/24 *100%*	SS	*5-6 8-12* N=14	22		1.94 *B*	52		572	
27A	24/24 *100%*	SS	*5-6 8-8* N=14	23		2.13 *B*	54	Dark greenish gray (10BG4/1), lean CLAY	570	
28A	24/24 *100%*	SS	*3-5 6-8* N=11	24		2.33 *BSh*	56		568	
29A	24/24 *100%*	SS	*12-10 12-14* N=22	24		3.30 *BSh*	58	Greenish gray (5G4/1) with 10% dark yellowish brown (10YR3/4) mottles, lean CLAY, trace sand	566	
30A	24/24 *100%*	SS	*5-8 12-13* N=20	27		2.13 *BSh*	60	Dark greenish gray (10G4/1), lean CLAY, trace sand	564	

End of Boring = 60.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: P. McIntire
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-07a
Well ID: MW7S
Surface Elev: 625 ft. MSL
Completion: 14 ft. BGS
Station: 879,181.1N
2,514,397.5E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.80 - While drilling
▼ = 4.90 - MW07S on 6/1/06
∇ =

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624	
								Dark gray (10YR4/1), moist, soft, silty CLAY with trace and and trace gravel.			
							2	Gray (10YR5/1) with 20% yellowish brown mottles, moist, soft, silty CLAY with trace sand and trace gravel.		622	
							4	Black (10YR2/1), very moist, soft, clayey SILT.		620	
							▼	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist soft, silty CLAY with trace sand and trace gravel.			
							6	Black (10YR2/1), moist, soft, silty CLAY with trace sand and trace gravel.		618	
							8	Dark gray (10YR4/1), very moist, soft, silty CLAY with some sand and trace gravel.		616	
							10	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and gravel.		614	
							▼	Yellowish brown (10YR5/8) wet, very soft, clayey, very fine- to fine-grained, SAND with trace gravel.			
							12	Yellowish brown (10YR5/8) wet, soft, clayey, very fine- to fine-grained, SAND with trace gravel.		612	
							14	Gray (10YR4/1), moist, very hard, sandy, clayey SILT with gravel.			

End of Boring = 14.39 ft. BGS
See SB-07 for sample & testing details

NOTE(S): MW07S installed in blind-drilled borehole within 10 ft of SB-07.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/8/2006
WEATHER: Partly cloudy, mild (mid-70s)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: P. McIntire
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-07
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,180.0N
2,514,390.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.80 - While drilling
▼ = 4.90 - MW07S on 6/1/06
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	18/24 *75%*	ss	*1-1 1-1* N=2	23		2.40 *B*
1B				24		
2A	24/24 *100%*	ss	*0-0 1-1* N=1	26		2.33 *B*
3A	24/24 *100%*	ss	*0-1 1-2* N=2	25		4.33 *BSh*
3B				25		2.52 *BSh*
3C				22		3.05 *B*
4A	24/24 *100%*	ss	*0-1 1-2* N=2	22		1.75 *B*
5A	24/24 *100%*	ss	*0-0 1-1* N=1	22		1.24 *B*
6A	24/24 *100%*	ss	*0-0 0-1* N=0	24		0.54 *B*
6B				20		1.65 *B*
7A	24/24 *100%*	ss	*0-0 1-2* N=1	24		
7B				13		2.89 *B*
8A	24/24 *100%*	ss	*2-5 7-9* N=12	8		5.04 *BSh*
9A	24/24 *100%*	ss	*3-6 6-8* N=12	9		9.27 *BSh*
10A	24/24 *100%*	ss	*3-6 8-11* N=14	9		11.13 *BSh*

Depth ft. BGS | Lithologic Description | Borehole Detail | Elevation ft. MSL | Remarks

Depth: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation: 624, 622, 620, 618, 616, 614, 612, 610, 608, 606

Lithologic Description
Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.
Dark gray (10YR4/1), moist, soft, silty CLAY with trace and and trace gravel.
Gray (10YR5/1) with 20% yellowish brown mottles, moist, soft, silty CLAY with trace sand and trace gravel.
Black (10YR2/1), very moist, soft, clayey SILT.
Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist soft, silty CLAY with trace sand and trace gravel.
Black (10YR2/1), moist, soft, silty CLAY with trace sand and trace gravel.
Dark gray (10YR4/1), very moist, soft, silty CLAY with some sand and trace gravel.
Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with sand and gravel.
Yellowish brown (10YR5/8) wet, very soft, clayey, very fine- to fine-grained, SAND with trace gravel.
Yellowish brown (10YR5/8) wet, soft, clayey, very fine- to fine-grained, SAND with trace gravel.
Gray (10YR4/1), moist, very hard, sandy, clayey SILT with gravel.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/8/2006
WEATHER: Partly cloudy, mild (mid-70s)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: P. McIntire
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-07
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,180.0N
2,514,390.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.80 - While drilling
▼ = 4.90 - MW07S on 6/1/06
∇ =

Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / RQD	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) / Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A				8				Gray (10YR4/1), moist, very hard, sandy, clayey SILT with gravel. [Continued from previous page]	604	
11B	35/48 *73%*	CS		14			22	Gray (10YR6/1), wet, loose, fine- to medium-grained SAND.	602	
							24		600	
	50/60 *83%*	CS					26		598	
12A				7			28	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.	596	
13A				6			30		594	
	56/60 *93%*	CS								
13B				6			32	Gray (10YR5/1), wet, loose, medium- to very coarse-grained SAND and GRAVEL.	592	
13C				8				Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.		
							34	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.	590	
	60/60 *100%*	CS					36		588	
14A				14			38	Gray (10YR5/1), moist, firm, sandy, clayey SILT with gravel.	586	
							40			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/5/2006
Finish: 5/8/2006
WEATHER: Partly cloudy, mild (mid-70s)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: P. McIntire
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-07
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,180.0N
2,514,390.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 10.80 - While drilling
▼ = 4.90 - MW07S on 6/1/06
∇ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
15A	60/60 *100%*	CS		14			40–49	Gray (10YR5/1), moist, firm, sandy, clayey SILT with gravel. *[Continued from previous page]*		
16A	60/60 *100%*	CS		15						
							49–51.2	Dark greenish gray (10BG4/1), moist, soft, silty CLAY with trace sand and trace gravel.		
17A	60/60 *100%*	CS		24			51.2–51.5	Very dark gray (10YR3/1), moist firm, clayey SILT.		
17B							51.5–54	Dark greenish gray (10BG4/1), moist, soft, silty CLAY with trace sand and trace gravel.		

Depth scale: 42, 44, 46, 48, 50, 52, 54
Elevation scale: 584, 582, 580, 578, 576, 574, 572

End of Boring = 54.0 ft BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-08a
Well ID: MW8S
Surface Elev: 625 ft. MSL
Completion: 17 ft. BGS
Station: 879,776.6N 2,514,478.8E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.70 - While drilling
▼ = 5.33 - MW08S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624	
							2	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		622	
							4	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.			
							▼	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		620	
							6	Gray (10YR5/1), moist, soft, clayey SILTwith little sand and trace gravel.		618	
							8	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.		616	
							10, 12, ▼	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.		614	
							14	Gray (10YR5/1), wet, soft, very silty, very fine- to coarse-grained SAND.		612	
								Light gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, wet, very dense, very fine- to fine-grained SAND.		610	
								Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, wet, dense, fine- to very coarse-grained SAND.			
							16	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		608	

End of Boring = 17.08 ft. BGS
See SB-08 for sample & testing details

NOTE(S): MW08S installed in blind-drilled borehole within 10 ft of SB-08.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-08
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 59 ft. BGS
Station: 879,770.0N
2,514,480.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.70 - While drilling
▼ = 5.33 - MW08S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	24/24 *100%*	SS	*1-1* *1* N=2				0–1.5	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.	624	
							1.5–3	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	622	
	24/24 *100%*	SS	*1-1* *1* N=2							
2A				25		1.59 *B*	3–4.5	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		
3A	24/24 *100%*	SS	*1-1* *1* N=2	20		1.86 *B*	4.5–5.5	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	620	
3B				21		1.20 *B*	5.5–7.5	Gray (10YR5/1), moist, soft, clayey SILTwith little sand and trace gravel.	618	
	24/24 *100%*	SS	*0-1* *1* N=2							
4A				25		1.01 *None*	7.5–9.5	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.	616	
	24/24 *100%*	SS	*0-1* *1* N=2							
5A				21			9.5–12.7	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, soft, sandy CLAY with sl. trace gravel.	614	
6A	24/24 *100%*	SS	*0-1* *1* N=2	21		0.70 *BSh*				
6B				31						
7A	20/24 *83%*	SS	*0-1* *3* N=4	13			12.7–14.5	Gray (10YR5/1), wet, soft, very silty, very fine- to coarse-grained SAND.	612	
7B				15						
8A	23/24 *96%*	SS	*7-11* *16* N=27	9		5.45 *Sh*	14.5–15.1	Light gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, wet, very dense, very fine- to fine-grained SAND.	610	
							15.1–15.8	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, wet, dense, fine- to very coarse-grained SAND.		
8B				8						
	24/30 *80%*	CS					15.8–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	608	
9A				5					606	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-08
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 59 ft. BGS
Station: 879,770.0N
2,514,480.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.70 - While drilling
▼ = 5.33 - MW08S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
10A	60/60 *100%*	CS		7		
11A	36/60 *60%*	CS		10		
12A	60/60 *100%*	CS		6		
13A	60/60 *100%*	CS		7		

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
22 – 40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		604 – 586	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 604, 602, 600, 598, 596, 594, 592, 590, 588, 586

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-08
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 59 ft. BGS
Station: 879,770.0N
2,514,480.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.70 - While drilling
▼ = 5.33 - MW08S on 6/1/06
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	60/60 *100%*	CS						Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	584	
14A				14			42	Greenish gray (10BG5/1) with 10% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel		
14B				11				Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	582	
15A				12			44	Dark yellowish brown (10YR4/4), moist, firm, clayey SILT with some sand and trace gravel.		
15B	60/60 *100%*	CS		15			46	Gray (10YR4/1), moist, hard, clayey, sandy SILT with trace gravel.	580, 578	
15C				13			48	Gray (10YR4/1) with 50% very dark grayish brown (10YR3/2), moist, firm, silty CLAY with sand and trace gravel.		
16A	60/60 *100%*	CS		14			50, 52	Gray (10YR4/1), moist, hard, clayey, sandy SILT with trace gravel.	576, 574	
16B				19			54	Greenish gray (10BG4/1), moist, soft, silty CLAY with little sand and sl. trace gravel.	572, 570	
17A	60/60 *100%*	CS		24						
17B				19			56, 58	Yellowish brown (10YR5/6) with 20% Greenish gray (10BG4/1) mottles, moist, soft, silty CLAY with little sand and sl. trace gravel.	568	

End of Boring = 58.5 ft.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	22/24 *92%*	SS	*0-1 1-1* N=2	24		1.65 *B*	0–1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.	624	
2A	20/24 *83%*	SS	*1-2 1-1* N=3	27		2.06 *B*	1–4.9	Yellowish brown (10YR5/6), moist, soft, silty CLAY with little sand.	622, 620	
3A	24/24 *100%*	SS	*1-1 1-1* N=2	24		1.65 *B*	4.9–7.5	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	618	
4A	24/24 *100%*	SS	*1-1 1-2* N=2	23		1.57 *B*	7.5–9	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with sand.	616	
5A	24/24 *100%*	SS	*0-1 1-1* N=2	27		1.85 *B*	9–11.5	Yellowish brown (10YR5/6) with 10% Gray (10YR5/1) mottles, moist, soft, silty CLAY with sand.	614	
6A	24/24 *100%*	SS	*0-0 0-0* N=0	22		1.44 *B*	11.5–12.5	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with trace gravel.		
7A	24/24 *100%*	SS	*0-0 1-2* N=1	21		0.93 *BSh*	12.5–13.6	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist to very moist, clayey SILT with sand and trace gravel.	612	
7B				18		0.97 *BSh*				
7C				15			13.6–14	Gray (10YR5/1), wet, soft, clayey very fine- to fine-grained SAND.		
8A	24/24 *100%*	SS	*1-3 6-6* N=9	18			14–14.5	Gray (10YR5/1), wet, loose, fine- to very coarse-grained SAND with trace gravel.	610	
8B				18			14.5–15.7	Gray (10YR5/1), wet, dense, silty very fine- to fine-grained SAND.		
9A	24/24 *100%*	SS	*7-13 19-25* N=32	8		7.86 *Sh*	15.7–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	608, 606	
	12/12 *100%*	CS								

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	60/60 *100%*	CS		2			20.5–35.5	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		
12A	49/60 *82%*	CS		3						2" Sand stringer
13A	60/60 *100%*	CS		3						
14A	60/60 *100%*	CS		10			35.5–37	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist, very hard, clayey SILT with little sand and occasional dry, silt stringers (<1").		
14B				11			37–39	Gray (10YR5/1), moist, very hard, clayey SILT with little sand and trace gravel.		
							39–40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		DRILLER NOTE: Appears more plastic

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 604, 602, 600, 598, 596, 594, 592, 590, 588, 586

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

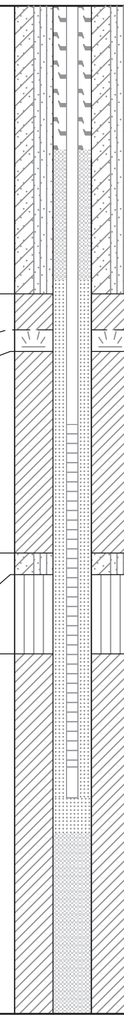
BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
									584	
	60/60 *100%*	CS					42	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		
15A				12					582	
							44	Very dark grayish brown (10YR3/2), moist, hard, silty CLAY with trace sand and trace organic matter.		
								Very dark grayish brown (10YR3/2), moist, firm, PEAT.	580	
19	60/60 *100%*	CS		22			46	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.	578	
							48	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		
16A				17				Dark gray (10YR3/1), moist, hard, clayey SILT.	576	
							50		574	
17A	60/60 *100%*	CS					52 ▽	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.	572	
							54			

Borehole Detail



End of Boring = 54.0 ft.

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

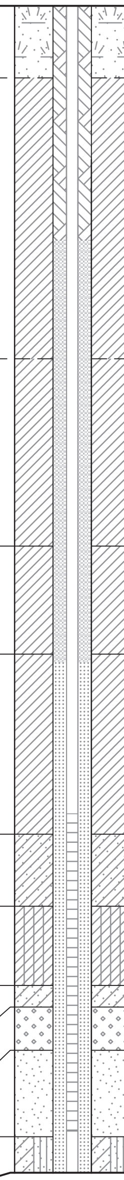
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-09a
Well ID: MW9S
Surface Elev: 625 ft. MSL
Completion: 16 ft. BGS
Station: 879,684.9N
2,515,666.2E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0–1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		624	
							1–4.9	Yellowish brown (10YR5/6), moist, soft, silty CLAY with little sand.		622, 620	
							4.9–7.4 (▼ 5.23)	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		618	
							7.4–8.9	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with sand.		616	
							8.9–11.4	Yellowish brown (10YR5/6) with 10% Gray (10YR5/1) mottles, moist, soft, silty CLAY with sand.		614	
							11.4–12.4	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with trace gravel.		612	
							12.4–13.5	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist to very moist, clayey SILT with sand and trace gravel.			
							13.5–14.1 (▼ 14)	Gray (10YR5/1), wet, soft, clayey very fine- to fine-grained SAND.			
							14.1–14.8	Gray (10YR5/1), wet, loose, fine- to very coarse-grained SAND with trace gravel.		610	
							14.8–15.7	Gray (10YR5/1), wet, dense, silty very fine- to fine-grained SAND.			
							15.7–16.2	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.			



End of Boring = 16.20 ft. BGS
See SB-09 for sample & testing details

NOTE(S): MW09S installed in blind-drilled borehole within 10 ft of SB-09.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

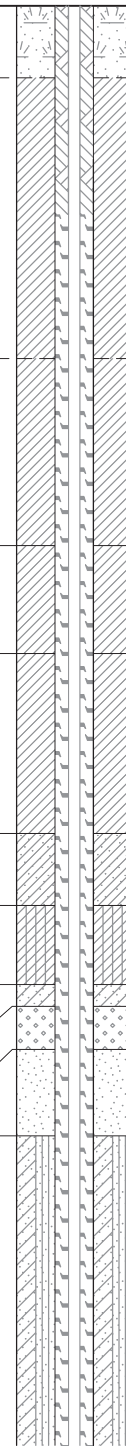
BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	22/24 *92%*	SS	*0-1 1-1* N=2	24		1.65 *B*
2A	20/24 *83%*	SS	*1-2 1-1* N=3	27		2.06 *B*
3A	24/24 *100%*	SS	*1-1 1-1* N=2	24		1.65 *B*
4A	24/24 *100%*	SS	*1-1 1-2* N=2	23		1.57 *B*
5A	24/24 *100%*	SS	*0-1 1-1* N=2	27		1.85 *B*
6A	24/24 *100%*	SS	*0-0 0-0* N=0	22		1.44 *B*
7A	24/24 *100%*	SS	*0-0 1-2* N=1	21		0.93 *BSh*
7B				18		0.97 *BSh*
7C				15		
8A	24/24 *100%*	SS	*1-3 6-6* N=9	18		
8B				18		
9A	24/24 *100%*	SS	*7-13 19-25* N=32	8		7.86 *Sh*
	12/12 *100%*	CS				

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – 1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.	624
1 – 4.9	Yellowish brown (10YR5/6), moist, soft, silty CLAY with little sand.	622, 620
4.9 – 7.5	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	618
7.5 – 9	Gray (10YR5/1) with 50% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with sand.	616
9 – 11.5	Yellowish brown (10YR5/6) with 10% Gray (10YR5/1) mottles, moist, soft, silty CLAY with sand.	614
11.5 – 12.5	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with trace gravel.	
12.5 – 13.6	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist to very moist, clayey SILT with sand and trace gravel.	612
13.6 – 13.9	Gray (10YR5/1), wet, soft, clayey very fine- to fine-grained SAND.	
13.9 – 14.5	Gray (10YR5/1), wet, loose, fine- to very coarse-grained SAND with trace gravel.	610
14.5 – 15.7	Gray (10YR5/1), wet, dense, silty very fine- to fine-grained SAND.	
15.7 – 20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	608, 606



NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

HANSON

BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	60/60 *100%*	CS		2			20–24	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		
12A	49/60 *82%*	CS		3			24–29			2" Sand stringer
13A	60/60 *100%*	CS		3			29–35.5			
14A	60/60 *100%*	CS		10			35.5–37	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist, very hard, clayey SILT with little sand and occasional dry, silt stringers (<1").		
14B				11			37–39	Gray (10YR5/1), moist, very hard, clayey SILT with little sand and trace gravel.		
							39–40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		DRILLER NOTE: Appears more plastic

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40. Elevation scale: 604, 602, 600, 598, 596, 594, 592, 590, 588, 586.

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/3/2006
Finish: 5/3/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

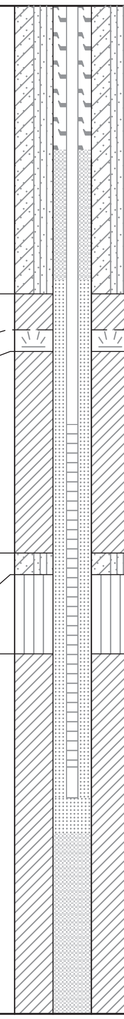
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-09
Well ID: MW9D
Surface Elev: 625 ft. MSL
Completion: 54 ft. BGS
Station: 879,679.7N
2,515,666.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 5.23 - MW09S on 6/1/06
▽ = 52.46 - MW09D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	60/60 *100%*	CS					40–44	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	584, 582	
15A				12						
							44	Very dark grayish brown (10YR3/2), moist, hard, silty CLAY with trace sand and trace organic matter.	580	
								Very dark grayish brown (10YR3/2), moist, firm, PEAT.		
19	60/60 *100%*	CS		22			46	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.	578	
							48	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		
16A				17				Dark gray (10YR3/1), moist, hard, clayey SILT.	576	
17A	60/60 *100%*	CS					50–54	Dark greenish gray (10BG4/1), moist, firm, silty CLAY with little sand and trace gravel.	574, 572	



▽ (52.46)

End of Boring = 54.0 ft.

NOTE(S): MW09D installed in SB-09.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL
1A	17/24 *71%*	SS	*1-1 1-1* N=2	23		2.33 *B*	0–1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.	620
							1–2	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	
2A	24/24 *100%*	SS	*1-1 2-2* N=3	25		2.47 *BSh*	2–6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	618
3A	24/24 *100%*	SS	*1-2 1-2* N=3	24		2.33 *B*			616
4A	24/24 *100%*	SS	*1-1 1-1* N=2	23		1.55 *B*	6–6.7	Gray (10YR5/1), moist, soft, clayey, very fine- to fine-grained SAND.	
4B							6.7–10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand and trace gravel.	614
5A	17/24 *71%*	SS	*1-1 1-2* N=2	23		2.06 *B*			612
6A	24/24 *100%*	SS	*0-1 1-1* N=2	17		1.16 *B*	10–13	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, clayey, very fine- to medium-grained SAND with trace gravel.	610
7A	23/24 *96%*	SS	*1-1 3-3* N=4	17		2.84 *B*	13–14.5	Grayish brown (10YR5/2), wet, loose, very fine- to medium-grained SAND with trace coarse- to very coarse-grained sand.	608
7B				18					
8A	24/24 *100%*	SS	*3-5 9-9* N=14	10		7.64 *BSP*	14.5–15	Yellowish brown (10YR5/6), moist, firm, silty CLAY with little sand and trace gravel.	606
10A	12/33 *36%*	CS		16			15–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	604, 602

Depth markers: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Borehole Detail | Remarks

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	Blows / 6 in N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							20–27	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		600, 598, 596	
11A	56/60 *93%*	CS		12							2" Gravel stringer
11B				13			26.7–27.3	Dark grayish brown (10YR4/2), very moist, soft, PEAT.		594	
11C				196							
12A	60/60 *100%*	CS		13			27.3–40	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		592, 590, 588, 586, 584, 582	
13A	60/60 *100%*	CS		12							

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
14A	60/60 *100%*	CS		14				Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	580	
14B				23			42	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.	578	1" Gravel stringer
15A	60/60 *100%*	CS		13			44	Greenish gray (5G5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with little sand and sl. trace gravel.	576	
15B				25			46, ▽, 48	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.	574	

End of Boring = 48.75 ft.

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/2/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10a
Well ID: MW10S
Surface Elev: 621 ft. MSL
Completion: 16 ft. BGS
Station: 878,250.5N
2,515,914.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0–1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.		620	
							1–2	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.			
							2–5.9	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.		618, 616	
							5.9–6.6	Gray (10YR5/1), moist, soft, clayey, very fine- to fine-grained SAND.			
							6.6–10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand and trace gravel.		614, 612	
							10–13	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, clayey, very fine- to medium-grained SAND with trace gravel.		610	
							13–14.5	Grayish brown (10YR5/2), wet, loose, very fine- to medium-grained SAND with trace coarse- to very coarse-grained sand.		608	
							14.5–15	Yellowish brown (10YR5/6), moist, firm, silty CLAY with little sand and trace gravel.			
							15–16.3	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		606	

End of Boring = 16.30 ft. BGS
See SB-10 for sample & testing details

NOTE(S): MW10S installed in blind-drilled borehole within 10 ft of SB-10.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	17/24 *71%*	SS	*1-1 1-1* N=2	23		2.33 *B*
2A	24/24 *100%*	SS	*1-1 2-2* N=3	25		2.47 *BSh*
3A	24/24 *100%*	SS	*1-2 1-2* N=3	24		2.33 *B*
4A	24/24 *100%*	SS	*1-1 1-1* N=2	23		1.55 *B*
4B						
5A	17/24 *71%*	SS	*1-1 1-2* N=2	23		2.06 *B*
6A	24/24 *100%*	SS	*0-1 1-1* N=2	17		1.16 *B*
7A	23/24 *96%*	SS	*1-1 3-3* N=4	17		2.84 *B*
7B				18		
8A	24/24 *100%*	SS	*3-5 9-9* N=14	10		7.64 *BSP*
10A	12/33 *36%*	CS		16		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–1	Very dark gray (10YR3/1), moist, soft, clayey SILT with trace sand and trace gravel.	620
1–2	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	
2–5.9	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand.	618, 616
5.9–6.6	Gray (10YR5/1), moist, soft, clayey, very fine- to fine-grained SAND.	
6.6–10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with little sand and trace gravel.	614, 612
10–13	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, clayey, very fine- to medium-grained SAND with trace gravel.	610
13–14.5	Grayish brown (10YR5/2), wet, loose, very fine- to medium-grained SAND with trace coarse- to very coarse-grained sand.	608
14.5–15	Yellowish brown (10YR5/6), moist, firm, silty CLAY with little sand and trace gravel.	
15–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	606, 604, 602

Borehole Detail | Remarks

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	Blows / 6 in N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							20–26.7	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		601–594.3	
11A				12							
	56/60 *93%*	CS									2" Gravel stringer
							26.7–27.3	Dark grayish brown (10YR4/2), very moist, soft, PEAT.			
11B				13							
11C				196							
	60/60 *100%*	CS					27.3–40	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		594–581	
12A				13							
	60/60 *100%*	CS									
13A				12							

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/1/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-10
Well ID: MW10D
Surface Elev: 621 ft. MSL
Completion: 49 ft. BGS
Station: 878,245.1N
2,515,914.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.80 - While drilling
▼ = 4.91 - MW10S on 6/1/06
▽ = 47.48 - MW10D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
14A	60/60 *100%*	CS		14				Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	580	
14B				23			42	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.	578	1" Gravel stringer
15A	60/60 *100%*	CS		13			44	Greenish gray (5G5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with little sand and sl. trace gravel.	576	
15B				25			46 ▽ 48	Greenish gray (5G5/1), moist, firm, silty CLAY with little sand and sl. trace gravel.	574	

End of Boring = 48.75 ft.

NOTE(S): MW10D installed in SB-10.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-11
Well ID: MW11D
Surface Elev: 622 ft. MSL
Completion: 36 ft. BGS
Station: 876,749.6N
2,515,976.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 5.42 - MW11S on 6/1/06
▽ = 6.03 - MW11D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	24/24 *100%*	SS	*3-3 4-4* N=7	16			0–1	Very dark grey (10YR3/1), moist, soft, clayey SILT.		
1B				34		1.09 *B*	1–2	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist , soft, silty CLAY.	620	
2A	24/24 *100%*	SS	*4-7 14-21* N=21	27		2.13 *BSh*	2–4.2	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist , soft, silty CLAY.	618	
3A	24/24 *100%*	SS	*4-6 7-8* N=13	24		2.27 *BSh*	4.2–4.7	Gray (10YR5/1), moist, soft, clayey SILT.		
3B				19		2.33 *B*			616	
4A	24/24 *100%*	SS	*7-8 13-14* N=21	21		2.13 *None*	4.7–11.7	Gray (10YR4/1), moist, firm, silty CLAY with little sand and trace gravel.	614	
5A	24/24 *100%*	SS	*3-4 4-4* N=8	20		1.55 *Sh*			612	
6A	24/24 *100%*	SS	*3-2 2-3* N=4	19		0.78 *BSh*				
6B				18			11.7–12	Gray (10YR4/1), wet, soft, sandy CLAY.	610	
7A	24/24 *100%*	SS	*3-6 14-21* N=20	16			12–13	Yellowish brown (10YR5/6) with 50% gray (10YR5/1) mottles, wet, soft, sandy CLAY with trace gravel.		
7B				9		5.45 *BSP*	13–14.3	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.	608	
8A	11/12 *92%*	SS	*41-61/5"*	7			14.3–15	Gray (10YR5/1), moist, hard, silty CLAY with little sand and trace gravel.		
							15–16	Light gray (10YR7/1) with 10% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with little sand and trace gravel.	606	
9A	48/54 *89%*	CS		8			16–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	604, 602	DRILLER NOTE: sampler recovered wet.

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-11
Well ID: MW11D
Surface Elev: 622 ft. MSL
Completion: 36 ft. BGS
Station: 876,749.6N 2,515,976.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 5.42 - MW11S on 6/1/06
▽ = 6.03 - MW11D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
10A	54/60 *90%*	CS		6		
11A	58/60 *97%*	CS		8		
12A	32/60 *53%*	CS		9		
12B				9		
13B	22/22 *100%*	SS	*7-19 41-50/4"* N=60	14		4.85 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
20.5–29.5	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	600 (22), 598 (24), 596 (26), 594 (28)	DRILLER NOTE: soft drilling 20.5' to 21.0' Wet, gravelly zone from 22.4' to 22.8'
29.5–33	Gray (10YR5/1), wet, loose, clayey, very fine- to medium-grained SAND with little coarse-grained sand and trace gravel.	592 (30), 590 (32)	
33–35.4	Gray (10YR6/1) with occasional black (10YR2/1) varves, dry, dense, SILT with trace sand.	588 (34)	
35.4–36.33	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	586 (36)	

End of Boring = 36.33 ft.

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/28/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-11a
Well ID: MW11S
Surface Elev: 622 ft. MSL
Completion: 14 ft. BGS
Station: 876,749.4N
2,515,971.2E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 5.42 - MW11S on 6/1/06
▽ = 6.03 - MW11D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0–1.1	Very dark grey (10YR3/1), moist, soft, clayey SILT.		
							1.1–2	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist , soft, silty CLAY.	620	
							2–4.2	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist , soft, silty CLAY.	618	
							4.2–4.7	Gray (10YR5/1), moist, soft, clayey SILT.		
							4.7–11.7	Gray (10YR4/1), moist, firm, silty CLAY with little sand and trace gravel.	616, 614, 612	
							11.7–12.1	Gray (10YR4/1), wet, soft, sandy CLAY.	610	
							12.1–13	Yellowish brown (10YR5/6) with 50% gray (10YR5/1) mottles, wet, soft, sandy CLAY with trace gravel.		
							13–14	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.	608	

End of Boring = 14.08 ft. BGS
See SB-11 for sample & testing details

NOTE(S): MW11S installed in blind-drilled borehole within 10 ft of SB-11.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-11
Well ID: MW11D
Surface Elev: 622 ft. MSL
Completion: 36 ft. BGS
Station: 876,749.6N
2,515,976.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 5.42 - MW11S on 6/1/06
▽ = 6.03 - MW11D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	24/24 *100%*	SS	*3-3 4-4* N=7	16		
1B				34		1.09 *B*
2A	24/24 *100%*	SS	*4-7 14-21* N=21	27		2.13 *BSh*
3A	24/24 *100%*	SS	*4-6 7-8* N=13	24		2.27 *BSh*
3B				19		2.33 *B*
4A	24/24 *100%*	SS	*7-8 13-14* N=21	21		2.13 *None*
5A	24/24 *100%*	SS	*3-4 4-4* N=8	20		1.55 *Sh*
6A	24/24 *100%*	SS	*3-2 2-3* N=4	19		0.78 *BSh*
6B				18		
7A	24/24 *100%*	SS	*3-6 14-21* N=20	16		
7B				9		5.45 *BSP*
8A	11/12 *92%*	SS	*41-61/5"*	7		
9A	48/54 *89%*	CS		8		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
	Very dark grey (10YR3/1), moist, soft, clayey SILT.	
	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist , soft, silty CLAY.	
2	Yellowish brown (10YR5/6) with 40% gray (10YR5/1) mottles, moist , soft, silty CLAY.	620
4	Gray (10YR5/1), moist, soft, clayey SILT.	618
6	Gray (10YR4/1), moist, firm, silty CLAY with little sand and trace gravel.	616
8		614
10		612
12	Gray (10YR4/1), wet, soft, sandy CLAY.	610
	Yellowish brown (10YR5/6) with 50% gray (10YR5/1) mottles, wet, soft, sandy CLAY with trace gravel.	
14	Gray (10YR5/1), moist, very hard, sandy, clayey SILT with gravel.	608
	Gray (10YR5/1), moist, hard, silty CLAY with little sand and trace gravel.	
	Light gray (10YR7/1) with 10% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY with little sand and trace gravel.	
16	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	606
18		604
20		602

Remarks: DRILLER NOTE: sampler recovered wet.

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/27/2006
Finish: 4/28/2006
WEATHER: Partly cloudy, mild (mid-60's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-11
Well ID: MW11D
Surface Elev: 622 ft. MSL
Completion: 36 ft. BGS
Station: 876,749.6N
2,515,976.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

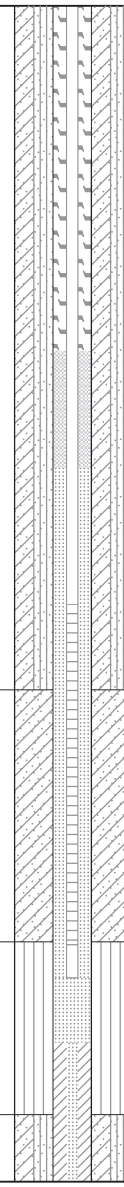
WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 5.42 - MW11S on 6/1/06
▽ = 6.03 - MW11D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
	54/60 *90%*	CS				
10A				6		
11A	58/60 *97%*	CS		8		
12A	32/60 *53%*	CS		9		
12B				9		
	22/22 *100%*	SS	*7-19* *41-50/4"* N=60			
13B				14		4.85 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
22		600
24	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	598
26		596
28		594
30	Gray (10YR5/1), wet, loose, clayey, very fine- to medium-grained SAND with little coarse-grained sand and trace gravel.	592
32		590
34	Gray (10YR6/1) with occasional black (10YR2/1) varves, dry, dense, SILT with trace sand.	588
36	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	586

End of Boring = 36.33 ft.

Borehole Detail



Remarks

DRILLER NOTE: soft drilling 20.5' to 21.0'

Wet, gravelly zone from 22.4' to 22.8'

NOTE(S): MW11D installed in SB-11.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	24"/24	ss	*2-3 4-5* N=7	22		1.27 *Sh*	0–1.3	Very dark gray (10YR3/1), clayey SILT, trace sand	622	
1B				27		2.33 *B*	1.3–2	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		
2A	19"/24	ss	*2-4 5-7* N=9	24		2.91 *B*	2–4	Yellowish brown (10YR5/8) with 40% grayish brown (10YR5/2) mottles, lean CLAY	620	
3A	20"/24	ss	*2-2 3-4* N=5	21		2.13 *B*	4–6	Gray (10YR5/1), lean CLAY, trace sand and gravel	618	
4A	24/24 *100%*	ss	*4-5 5-6* N=10	21		1.36 *BSh*	6–8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand	616	
5A	24"/24	ss	*1-2 2-5* N=4	20		1.47 *BSh*	8–10	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand and gravel	614	
6A	20"/24	ss	*0-1 3-3* N=4	21		0.62 *B*	10–12	Yellowish brown (10YR 5/8) with 25% gray (10YR6/1) mottles, clayey SAND, trace gravel	612	
7A	21"/24	ss	*2-2 3-5* N=5	22		0.19 *B*	12–12.7	Gray (10YR6/1), clayey SAND, trace gravel, wet	610	
7B				22			12.7–13.6	Dark yellowish brown (10YR4/6), clayey SAND, trace gravel, wet		
7C				15		3.71 *B*	13.6–14	Light yellowish brown (10YR6/4) with 30% brownish yellow (10YR6/6) mottles, clayey SILT, trace sand and gravel	608	
8A	24"/24	ss	*4-13 18-29* N=31	9		5.15 *BSh*	14–16	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel	606	
9A	24"/24	ss	*26-32 46-50* N=78	9		6.59 *Sh*	16–18		604	
10A	24"/24	ss	*21-31 63-71* N=94	11		6.39 *Sh*	18–20			

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										602	
	60/60 *100%*	CS					22	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel *[Continued from previous page]*		600	
11A				6			24			598	
	60/60 *100%*	CS					26			596	
							28			594	
12A				7			30	Dark greenish gray (N4/1), sandy SILT, trace gravel		592	
	60/60 *100%*	CS					32			590	
13A				13			34			588	
							36			586	
	60/60 *100%*	CS					38	Very dark gray (N3/1), clayey SILT, trace sand and gravel		584	
14A				16			40				

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
15A	60/60 *100%*	CS		14			40–45	Very dark gray (N3/1), clayey SILT, trace sand and gravel *[Continued from previous page]*	582–577	
							45–45.5	Very dark gray (N3/1), PEAT		
16A	60/60 *100%*	CS		45			45.5–50	Gray (N5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY	576.5–572	

End of Boring = 50.0 ft. BGS

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

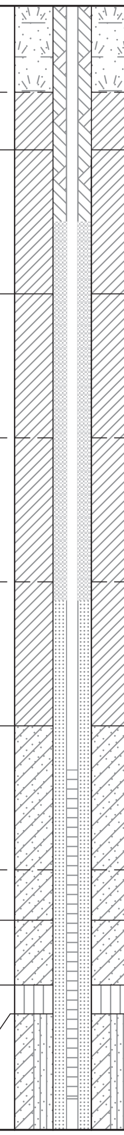
CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12a
Well ID: MW12S
Surface Elev: 622 ft. MSL
Completion: 16 ft. BGS
Station: 875,520.1N
2,515,900.5E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Very dark gray (10YR3/1), clayey SILT, trace sand		622	
							2	Dark gray (10YR4/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		620	
							4	Yellowish brown (10YR5/8) with 40% grayish brown (10YR5/2) mottles, lean CLAY		618	
							6	Gray (10YR5/1), lean CLAY, trace sand and gravel		616	
							8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		614	
							10	Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand and gravel		612	
							12	Yellowish brown (10YR 5/8) with 25% gray (10YR6/1) mottles, clayey SAND, trace gravel		610	
								Gray (10YR6/1), clayey SAND, trace gravel, wet			
								Dark yellowish brown (10YR4/6), clayey SAND, trace gravel, wet			
							14	Light yellowish brown (10YR6/4) with 30% brownish yellow (10YR6/6) mottles, clayey SILT, trace sand and gravel		608	
								Dark greenish gray (N4/1), clayey SILT, trace sand and gravel			



End of Boring = 15.61 ft. BGS
See SB-12 for sample & testing details

NOTE(S): MW12S installed in blind-drilled borehole within 10 ft of SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0		622	
1A	24"/24	ss	*2-3 4-5* N=7	22		1.27 *Sh*		Very dark gray (10YR3/1), clayey SILT, trace sand		
1B				27		2.33 *B*		Dark gray (10YR4/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY		
							2		620	
2A	19"/24	ss	*2-4 5-7* N=9	24		2.91 *B*		Yellowish brown (10YR5/8) with 40% grayish brown (10YR5/2) mottles, lean CLAY		
							4		618	
3A	20"/24	ss	*2-2 3-4* N=5	21		2.13 *B*		Gray (10YR5/1), lean CLAY, trace sand and gravel		
							6		616	
4A	24/24 *100%*	ss	*4-5 5-6* N=10	21		1.36 *BSh*	▼	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		
							8		614	
5A	24"/24	ss	*1-2 2-5* N=4	20		1.47 *BSh*		Yellowish brown (10YR5/8) with 20% gray (10YR6/1) mottles, lean CLAY, trace sand and gravel		
							10		612	
6A	20"/24	ss	*0-1 3-3* N=4	21		0.62 *B*		Yellowish brown (10YR 5/8) with 25% gray (10YR6/1) mottles, clayey SAND, trace gravel		
							▼ 12		610	
7A	21"/24	ss	*2-2 3-5* N=5	22		0.19 *B*		Gray (10YR6/1), clayey SAND, trace gravel, wet		
7B				22				Dark yellowish brown (10YR4/6), clayey SAND, trace gravel, wet		
7C				15		3.71 *B*		Light yellowish brown (10YR6/4) with 30% brownish yellow (10YR6/6) mottles, clayey SILT, trace sand and gravel		
							14		608	
8A	24"/24	ss	*4-13 18-29* N=31	9		5.15 *BSh*				
							16		606	
9A	24"/24	ss	*26-32 46-50* N=78	9		6.59 *Sh*		Dark greenish gray (N4/1), clayey SILT, trace sand and gravel		
							18		604	
10A	24"/24	ss	*21-31 63-71* N=94	11		6.39 *Sh*				
							20			

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
11A	60/60 *100%*	CS		6		
12A	60/60 *100%*	CS		7		
13A	60/60 *100%*	CS		13		
14A	60/60 *100%*	CS		16		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
20–25	Dark greenish gray (N4/1), clayey SILT, trace sand and gravel *[Continued from previous page]*	602–597	
25–35	Dark greenish gray (N4/1), sandy SILT, trace gravel	597–587	
35–40	Very dark gray (N3/1), clayey SILT, trace sand and gravel	587–582	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 602, 600, 598, 596, 594, 592, 590, 588, 586, 584

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/10/2006
Finish: 5/10/2006
WEATHER: Foggy to partly sunny, mild (hi-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

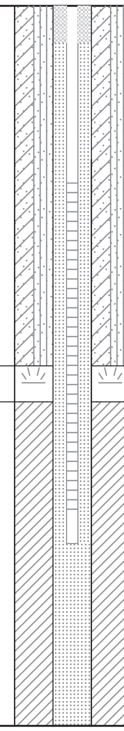
BOREHOLE ID: SB-12
Well ID: MW12D
Surface Elev: 622 ft. MSL
Completion: 50 ft. BGS
Station: 875,515.1N
2,515,900.6E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW12S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
15A	60/60 *100%*	CS		14			40–45.0	Very dark gray (N3/1), clayey SILT, trace sand and gravel *[Continued from previous page]*	582–577	
							45.0–45.5	Very dark gray (N3/1), PEAT		
16A	60/60 *100%*	CS		45			45.5–50	Gray (N5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY	576–572	

Depth scale: 42, 44, 46, 48, 50 (▽ at ~46.9). Elevation scale: 582, 580, 578, 576, 574.



End of Boring = 50.0 ft. BGS

NOTE(S): MW12D installed in SB-12.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	22/24 *92%*	SS	*4-5 4-4* N=9	21		
1B				15		
1C				28		2.13 *B*
2A	21/24 *88%*	SS	*3-4 5-8* N=9	25		2.13 *BSh*
3A	24/24 *100%*	SS	*4-5 6-8* N=11	22		2.84 *Sh*
3B				21		2.91 *BSh*
4A	24/24 *100%*	SS	*9-12 10-10* N=22	23		2.33 *B*
5A	24/24 *100%*	SS	*3-4 6-7* N=10	21		2.72 *Sh*
6A	19/24 *79%*	SS	*1-3 6-8* N=9	23		1.94 *Sh*
7A	21/24 *88%*	SS	*6-8 10-12* N=18	18		1.94 *Sh*
7B				13		1.55 *BSh*
8A	22/24 *92%*	SS	*7-21 29-30* N=50	11		
8B				9		
9A	23/24 *96%*	SS	*25-28 28-45* N=56	9		9.16 *Sh*
10A	24/24 *100%*	SS	*18-27 31-36* N=58	8		12.00 *Sh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–0.7	Grayish brown (10YR5/2), clayey SILT, trace sand	622
0.7–1.3	Light gray (10YR7/2), clayey SILT, trace sand	
1.3–2	Light brownish gray (10YR6/2) with 15%yellowish brown (10YR5/6) mottles, lean CLAY, trace sand	
2–5.2	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand	620, 618
5.2–6	Dark gray (10YR4/1), lean CLAY, trace sand and gravel	
6–12.4	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel	616, 614, 612
12.4–15	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet	610, 608
15–16	Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel	
16–20	Dark gray (10YR4/1), sandy SILT, trace gravel	606, 604

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Borehole Detail | Remarks

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	60/60 *100%*	CS		13			20–25	Dark gray (10YR4/1), sandy SILT, trace gravel *[Continued from previous page]*		
12A	60/60 *100%*	CS					25–30			
13A	60/60 *100%*	CS		15			30–35			
14A	60/60 *100%*	CS		15			35–40	Dark gray (10YR4/1), lean CLAY, trace sand and gravel		

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 602, 600, 598, 596, 594, 592, 590, 588, 586, 584

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										582	
	60/60 *100%*	CS					42			580	
15A				15			44			578	
							46	Dark gray (10YR4/1), lean CLAY, trace sand and gravel *[Continued from previous page]*		576	
	60/60 *100%*	CS					48			574	
16A				15			50			572	
17A	60/60 *100%*	CS		14			52	Gray (10YR4/1), silty, fine to medium SAND, wet			
17B				20				Gray (10YR4/1), sandy SILT		570	
17C				14			54	Dark greenish gray (5GY4/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY			
17D				22						568	

End of Boring = 55.0 ft. BGS

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13a
Well ID: MW13S
Surface Elev: 623 ft. MSL
Completion: 17 ft. BGS
Station: 874,695.7N
2,513,925.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.00 - While drilling
▼ = 6.76 - MW13S on 6/1/06
▽ = 46.90 - MW12D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Grayish brown (10YR5/2), clayey SILT, trace sand			
								Light gray (10YR7/2), clayey SILT, trace sand		622	
							2	Light brownish gray (10YR6/2) with 15%yellowish brown (10YR5/6) mottles, lean CLAY, trace sand			
							4	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand		620, 618	
							6	Dark gray (10YR4/1), lean CLAY, trace sand and gravel			
							▼ 8, 10, ▼ 12	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel		616, 614, 612	
							14	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet		610, 608	
								Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel			
							16	Dark gray (10YR4/1), sandy SILT, trace gravel			

End of Boring = 16.62 ft. BGS
See SB-13 for sample & testing details

NOTE(S): MW13S installed in blind-drilled borehole within 10 ft of SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	22/24 *92%*	SS	*4-5 4-4* N=9	21		
1B				15		
1C				28		2.13 *B*
2A	21/24 *88%*	SS	*3-4 5-8* N=9	25		2.13 *BSh*
3A	24/24 *100%*	SS	*4-5 6-8* N=11	22		2.84 *Sh*
3B				21		2.91 *BSh*
4A	24/24 *100%*	SS	*9-12 10-10* N=22	23		2.33 *B*
5A	24/24 *100%*	SS	*3-4 6-7* N=10	21		2.72 *Sh*
6A	19/24 *79%*	SS	*1-3 6-8* N=9	23		1.94 *Sh*
7A	21/24 *88%*	SS	*6-8 10-12* N=18	18		1.94 *Sh*
7B				13		1.55 *BSh*
8A	22/24 *92%*	SS	*7-21 29-30* N=50	11		
8B				9		
9A	23/24 *96%*	SS	*25-28 28-45* N=56	9		9.16 *Sh*
10A	24/24 *100%*	SS	*18-27 31-36* N=58	8		12.00 *Sh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0 – ~0.7	Grayish brown (10YR5/2), clayey SILT, trace sand	622
~0.7 – ~1.3	Light gray (10YR7/2), clayey SILT, trace sand	
~1.3 – 2	Light brownish gray (10YR6/2) with 15%yellowish brown (10YR5/6) mottles, lean CLAY, trace sand	
2 – ~5.2	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand	620, 618
~5.2 – 6	Dark gray (10YR4/1), lean CLAY, trace sand and gravel	
6 – ~12.4	Gray (10YR5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY, trace sand and gravel	616, 614, 612
~12.4 – ~15	Yellowish brown (10YR5/6), silty SAND, trace gravel, wet	610, 608
~15 – 16	Yellowish brown (10YR5/8) with 30% light brownish gray (10YR6/2) mottles, sandy SILT, trace gravel	
16 – 20	Dark gray (10YR4/1), sandy SILT, trace gravel	606, 604

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										602	
	60/60 *100%*	CS					22			600	
11A				13			24			598	
							26			596	
	60/60 *100%*	CS					28	Dark gray (10YR4/1), sandy SILT, trace gravel *[Continued from previous page]*		594	
12A							30			592	
	60/60 *100%*	CS					32			590	
13A				15			34			588	
							36			586	
	60/60 *100%*	CS					38	Dark gray (10YR4/1), lean CLAY, trace sand and gravel		584	
14A				15			40				

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/9/2006
Finish: 5/9/2006
WEATHER: Overcast, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler & 4¼" HSA overdrill

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

HANSON

BOREHOLE ID: SB-13
Well ID: MW13D
Surface Elev: 623 ft. MSL
Completion: 55 ft. BGS
Station: 874,694.3N
2,513,929.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.40 - While drilling
▼ = 8.24 - MW12S on 6/1/06
▽ = 56.03 - MW13D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	60/60 *100%*	CS					42–45		582, 580, 578	
15A				15						
	60/60 *100%*	CS					45–50	Dark gray (10YR4/1), lean CLAY, trace sand and gravel *[Continued from previous page]*	576, 574	
16A				15						
17A	60/60 *100%*	CS		14			50–52.2		572	
17B				20			52.2–52.5	Gray (10YR4/1), silty, fine to medium SAND, wet	570	
17C				14			52.5–53	Gray (10YR4/1), sandy SILT		
17D				22			53–55	Dark greenish gray (5GY4/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY	568	

End of Boring = 55.0 ft. BGS

NOTE(S): MW13D installed in SB-13.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/2/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: Sb-14a
Well ID: MW14S
Surface Elev: 625 ft. MSL
Completion: 17 ft. BGS
Station: 875,737.8N
2,514,125.9E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 4.49 - MW14S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0–1.2	Grayish brown (10YR5/2), clayey SILT, trace sand		624	
							1.2–2	Gray (10YR6/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand			
							2–4	Light gray (10YR7/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		622	
							4–10 (▼ 4.49)	Light gray (10YR7/1) with 15% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand		620, 618, 616	
							10–14	Yellowish brown (10YR5/8) with 50% light gray (10YR7/1) mottles, sandy CLAY		614, 612	
							14 (▼ 14.00)	Yellowish brown (10YR5/6), silty, fine SAND, trace medium sand and gravel, wet		610	
							–16	Yellowish brown (10YR5/6), sandy SILT, trace gravel			
							16–17.38	Yellowsh brown (10YR5/6) with 40% gray (10YR6/1) mottles, sandy SILT, trace gravel		608	

End of Boring = 17.38 ft. BGS
See SB-14 for sample & testing details

NOTE(S): MW14S installed in blind-drilled borehole within 10 ft of SB-14.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-14
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 60 ft. BGS
Station: 875,740.0N
2,514,130.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 4.49 - MW14S on 6/1/06
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	23/24 *96%*	ss	*2-3 2-3* N=5	16		
1B				26		2.33 *B*
2A	24/24 *100%*	ss	*3-4 5-7* N=9	23		3.10 *B*
3A	23/24 *96%*	ss	*3-3 5-5* N=8	19		2.33 *B*
4A	24/24 *100%*	ss	*5-6 5-7* N=11	23		2.68 *BSh*
5A	24/24 *100%*	ss	*2-2 3-4* N=5	26		1.83 *B*
6A	19/24 *79%*	ss	*2-2 3-5* N=5	17		2.18 *B*
7A	20/24 *83%*	ss	*2-3 3-3* N=6	22		1.16 *B*
8A	24/24 *100%*	ss	*5-14 14-20* N=28	16		1.36 *B*
8B				11		5.77 *BSh*
9A	12/24 *50%*	ss	*57-65*	10		
10A	24/24 *100%*	ss	*6-8 16-18* N=24	12		5.04 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–1.2	Grayish brown (10YR5/2), clayey SILT, trace sand	624
1.2–2	Gray (10YR6/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand	
2–4	Light gray (10YR7/1) with 30% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand	622
4–10	Light gray (10YR7/1) with 15% yellowish brown (10YR6/8) mottles, lean CLAY, trace sand	620, 618, 616
10–14	Yellowish brown (10YR5/8) with 50% light gray (10YR7/1) mottles, sandy CLAY	614, 612
14–14.6	Yellowish brown (10YR5/6), silty, fine SAND, trace medium sand and gravel, wet	
14.6–16	Yellowish brown (10YR5/6), sandy SILT, trace gravel	610
16–18	Yellowsh brown (10YR5/6) with 40% gray (10YR6/1) mottles, sandy SILT, trace gravel	608
18–20	Dark gray (10YR4/1), clayey SILT, trace sand and gravel	606

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-14
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 60 ft. BGS
Station: 875,740.0N
2,514,130.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 4.49 - MW14S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
11A	24/24 *100%*	SS	*2-7 13-30* N=20	13		9.70 *B*
12A	24/24 *100%*	SS	*26-40 36-40* N=76	9		13.09 *BSP*
13A	24/24 *100%*	SS	*8-18 28-34* N=46	9		8.73 *BSP*
14A	22/24 *92%*	SS	*20-18 24-30* N=42	9		7.42 *BSP*
15A	19/24 *79%*	SS	*8-27 33-67* N=60	9		
16A	24/24 *100%*	SS	*8-25 27-33* N=52	10		9.60 *BSh*
17A	20/24 *83%*	SS	*11-15 20-24* N=35	14		6.80 *B*
18A	24/24 *100%*	SS	*3-4 7-9* N=11	16		3.88 *B*
19A	24/24 *100%*	SS	*8-12 13-15* N=25	16		6.18 *B*
20A	24/24 *100%*	SS	*3-7 10-13* N=17	14		3.10 *B*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
20–34 (22, 24, 26, 28, 30, 32)	Dark gray (10YR4/1), clayey SILT, trace sand and gravel *[Continued from previous page]*		604, 602, 600, 598, 596, 594, 592	
34–40 (34, 36, 38, 40)	Dark gray (N4/1), lean CLAY, trace sand and gravel		590, 588, 586	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/1/2006
Finish: 5/2/2006
WEATHER: Sunny, mild (mid-60's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-14
Well ID: n/a
Surface Elev: 625 ft. MSL
Completion: 60 ft. BGS
Station: 875,740.0N
2,514,130.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.00 - While drilling
▼ = 4.49 - MW14S on 6/1/06
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
21A	23/24 *96%*	SS	*3-6 8-13* N=14	15		4.80 *B*
22A	24/24 *100%*	SS	*13-15 16-18* N=31	14		5.62 *B*
23A	24/24 *100%*	SS	*4-8 11-13* N=19	15		4.65 *B*
24A	24/24 *100%*	SS	*18-18 20-20* N=38	15		4.65 *B*
25A	24/24 *100%*	SS	*4-7 9-11* N=16	19		2.13 *BSh*
26A	22/24 *92%*	SS	*3-5 6-8* N=11	22		3.30 *BSh*
27A	24/24 *100%*	SS	*3-5 5-7* N=10	25		2.89 *BSh*
28A	21/24 *88%* 0/24 *0%*	SS SH	*4-6 7-8* N=13	22		3.71 *BSh*
29A	14/24 *58%*	SS	*0-0 0-0* N=0	22		3.09 *BSh*
30A	22/24 *92%*	SS	*5-6 8-12* N=14	19		4.46 *BSh*

Depth ft. BGS	Lithologic Description
40 – 48	Dark gray (N4/1), lean CLAY, trace sand and gravel *[Continued from previous page]*
48 – 49.5	Dark gray (N4/1), clayey SILT, trace sand and gravel
49.5 – 49.8	Gray (N4/1), wet, loose, fine- to medium-grained SAND
49.8 – 50	Dark gray (N4/1), clayey SILT, trace sand and gravel
50 – 52	Greenish gray (5BG5/1), lean CLAY
52 – 54	Greenish gray (5BG5/1) with 15% yellowish brown (10YR5/6) mottles, lean CLAY
54 – 56	Greenish gray (5BG5/1) with 25% yellowish brown (10YR5/6) mottles, lean CLAY
56 – 58	Greenish gray (5BG5/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY
58 – 60	Yellowish brown (10YR4/6) with 10% greenish gray (5BG5/1) mottles, lean CLAY

End of Boring = 60.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15b
Well ID: MW15D
Surface Elev: 624 ft. MSL
Completion: 39 ft. BGS
Station: 875,970.5N
2,515,080.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark brown (10YR3/3), clayey SILT			
								Dark grayish brown (10YR3/2), clayey SILT, trace sand			
							2	Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand		622	
								Gray (10YR6/1), lean CLAY, trace sand			
							4			620	
								Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand			
							6			618	
								Gray (10YR6/1), lean CLAY, trace sand			
							8			616	
							10			614	
								Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel			
							12			612	
								Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, silty, fine to medium SAND, trace coarse sand and gravel, wet		610	
							14				
								Pale brown (10YR6/3), clayey SILT, little sand, trace gravel			
							16	Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet		608	
								Yellowish brown (10YR5/4) silty fine SAND, wet			
								Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel		606	
							18				
								Dark gray (10YR4/1), clayey SILT, little sand, trace gravel			
							20			604	

NOTE(S): MW15D installed in blind-drilled borehole within 10 ft of SB-15.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15b
Well ID: MW15D
Surface Elev: 624 ft. MSL
Completion: 39 ft. BGS
Station: 875,970.5N
2,515,080.7E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							22			602	
							24			600	
							26			598	
							28	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel *[Continued from previous page]*		596	
							30			594	
							32			592	
							34			590	
							36	Dark gray (10YR4/1), silty, fine to medium SAND, trace coarse sand and gravel, wet		588	
							38	Very dark gray (10YR3/1), clayey SILT, little sand, trace gravel		586	

End of Boring = 38.80 ft. BGS
See SB-15 for sample & testing details

NOTE(S): MW15D installed in blind-drilled borehole within 10 ft of SB-15.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	24/24 *100%*	SS	*2-2 3-4* N=5	19		
1B				27		1.94 *B*
2A	24/24 *100%*	SS	*2-2 4-6* N=6	25		3.10 *B*
3A	20/24 *83%*	SS	*2-3 3-5* N=6	29		2.10 *B*
4A	24/24 *100%*	SS	*4-6 5-5* N=11	24		1.75 *B*
5A	22/24 *92%*	SS	*1-2 3-4* N=5	26		1.55 *B*
6A	22/24 *92%*	SS	*2-3 3-4* N=6	22		1.85 *B*
	19/24 *79%*	SH				
7A	24/24 *100%*	SS	*4-4 5-5* N=9	23		1.22 *B*
7B				17		
8A	21/24 *88%*	SS	*2-6 15-19* N=21	11		3.22 *BSP*
9A	24/24 *100%*	SS	*18-29 40-50* N=69	20		
9B				21		
9C				9		
10A	17/24 *71%*	SS	*11-43 59/5"*	7		7.42 *B*

Depth ft. BGS | Lithologic Description | Borehole Detail | Elevation ft. MSL | Remarks

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 622, 620, 618, 616, 614, 612, 610, 608, 606, 604

- Dark brown (10YR3/3), clayey SILT
- Dark grayish brown (10YR3/2), clayey SILT, trace sand
- Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand
- Gray (10YR6/1), lean CLAY, trace sand
- Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand
- Gray (10YR6/1), lean CLAY, trace sand
- Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel
- Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, silty, fine to medium SAND, trace coarse sand and gravel, wet
- Pale brown (10YR6/3), clayey SILT, little sand, trace gravel
- Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet
- Yellowish brown (10YR5/4) silty fine SAND, wet
- Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel
- Dark gray (10YR4/1), clayey SILT, little sand, trace gravel

Remarks: Shelby tube taken from shallow well borehole at indicated depth.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	14/24 *58%*	SS	*14-55 45/2"*	8				Dark gray (10YR4/1), clayey SILT, little sand, trace gravel *[Continued from previous page]*		
							22		602	
12A	8/24 *33%*	SS	*100/8"*	8		6.76 *SP*				
							24		600	
13A	23/24 *96%*	SS	*12-28 43-57/5"* N=71	5						
							26		598	
14A	8/24 *33%*	SS	*59-41/2"*	6		7.95 *BSh*				
							28		596	
15A	16/24 *67%*	SS	*11-26 74/4"*	12		4.74 *BSh*				
							30		594	
16A	12/24 *50%*	SS	*39-61*	7						
							32		592	
17A	10/24 *42%*	SS	*49-51/4"*	9		5.43 *B*				
							34		590	
18A	11/24 *46%*	SS	*100-95*	11						
							36	Dark gray (10YR4/1), silty, fine to medium SAND, trace coarse sand and gravel, wet	588	
19A	8/24 *33%*	SS	*61-39/2"*	10						
							38	Very dark gray (10YR3/1), clayey SILT, little sand, trace gravel	586	
20A	24/24 *100%*	SS	*21-41 21-24* N=62	12		16.00 *None*				
20B				13		9.38	40	Very dark gray (10YR3/1) with 20% dark grayish brown (10YR4/2) mottles, clayey SILT, trace sand and gravel	584	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) / *% Recovery*	Type	TESTING: *Blows / 6 in* / N - Value / **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) / *Failure Type*
						BSh
21A	22/24 *92%*	SS	*3-7* *11-18* N=18	19		6.11 *BSh*
22A	24/24 *100%*	SS	*4-7* *8-10* N=15	23		4.46 *B*
23A	24/24 *100%*	SS	*3-6* *6-10* N=12	21		
23B				16		3.69 *B*
24A	24/24 *100%*	SS	*10-12* *10-15* N=22	16		4.58 *B*
25A	24/24 *100%*	SS	*2-4* *7-9* N=11	16		4.65 *B*
26A	19/24 *79%*	SS	*3-5* *7-13* N=12	21		3.88 *B*
27A	24/24 *100%*	SS	*8-10* *8-13* N=18	25		3.49 *BSh*
28A	24/24 *100%*	SS	*4-5* *8-12* N=13	22		3.49 *BSh*
29A	24/24 *100%*	SS	*5-9* *15-18* N=24	20		
30A	24/24 *100%*	SS	*8-9* *14-18* N=23	18		5.82 *BSh*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
to 42	Dark gray (10YR4/1), clayey SILT, trace sand and gravel		582 (at 42)	
42 – ~44.4	Dark greenish gray (5GY4/1) with 30% dark gray (N4/1) mottles, lean CLAY, trace sand		580 (at 44)	
~44.4 – 52	Dark gray (N4/1), lean CLAY, trace sand and gravel		578, 576, 574, 572	
52 – 54	Dark yellowish brown (10YR3/4) with 50% dark grayish brown (10YR4/2) mottles, lean CLAY, trace sand and gravel		570 (at 54)	
54 – 58	Greenish gray (10YR5/1) with 20% dark yellowish brown (10YR4/4) mottles, lean CLAY, trace sand and gravel		568, 566	
58 – 60	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel		564 (at 60)	

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
$\blacktriangledown$ = 13.40 - While drilling
$\underline{\blacktriangledown}$ = 4.99 - MW15S on 6/1/06
$\underline{\triangledown}$ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*
31A	24/24 *100%*	SS	*4-7 13-15* N=20	18		5.42 *BSh*
32A	24/24 *100%*	SS	*10-15 11-16* N=26	20		4.74 *BSh*
33A	24/24 *100%*	SS	*6-10 11-13* N=21	16		6.98 *BSh*
34A	24/24 *100%*	SS	*11-14 18-31* N=32	18		6.98 *BSh*
35A	23/24 *96%*	SS	*9-18 27-40* N=45	15		11.95 *BSh*
36A	24/24 *100%*	SS	*4-12 18-24* N=30	16		7.15 *BSh*
37A	24/24 *100%*	SS	*17-29 36-47* N=65	17		8.24 *BSh*
38A	20/24 *83%*	SS	*12-18 23-28* N=41	17		6.59 *BSh*
39A	9/24 *38%*	SS	*29-39 48-66* N=87	16		
40A	24/24 *100%*	SS	*5-9 13-18* N=22	18		6.21 *B*

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
60–64	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel *[Continued from previous page]*			
64–66	Greenish gray (10Y5), lean CLAY, trace sand and gravel			
66–80	Dark yellowish brown (10YR4/4), lean CLAY, trace sand and gravel			

Depth scale (ft. BGS): 62, 64, 66, 68, 70, 72, 74, 76, 78, 80

Elevation scale (ft. MSL): 562, 560, 558, 556, 554, 552, 550, 548, 546, 544

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
41A	24/24 *100%*	SS	*6-8* *13-16* N=21	17		5.82 *B*	82	Dark yellowish brown (10YR4/4), lean CLAY, trace sand and gravel *[Continued from previous page]*		542	
42A	24/24 *100%*	SS	*18-28* *25-25* N=53	18		5.82 *BSh*	84			540	

End of Boring = 84.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/25/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15a
Well ID: MW15S
Surface Elev: 624 ft. MSL
Completion: 20 ft. BGS
Station: 875,971.1N
2,515,076.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark brown (10YR3/3), clayey SILT			
								Dark grayish brown (10YR3/2), clayey SILT, trace sand			
							2	Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand		622	
								Gray (10YR6/1), lean CLAY, trace sand			
							4	Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand		620	
							6	Gray (10YR6/1), lean CLAY, trace sand		618	
							8	Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel		616	
							10			614	
							12			612	
								Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, silty, fine to medium SAND, trace coarse sand and gravel, wet		610	
							14	Pale brown (10YR6/3), clayey SILT, little sand, trace gravel			
							16	Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet		608	
								Yellowish brown (10YR5/4) silty fine SAND, wet			
								Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel		606	
							18	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel			
								See SB-15 for sample & testing details			
								End of Boring = 19.62 ft. BGS			

NOTE(S): MW15S installed in blind-drilled borehole within 10 ft of SB-15.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0	Dark brown (10YR3/3), clayey SILT	624	
1A	24/24 *100%*	SS	*2-2 3-4* N=5	19				Dark grayish brown (10YR3/2), clayey SILT, trace sand		
1B				27		1.94 *B*	2	Grayish brown (10YR5/2), with 50% very dark gray (10YR3/1) mottles, lean CLAY, trace sand	622	
2A	24/24 *100%*	SS	*2-2 4-6* N=6	25		3.10 *B*		Gray (10YR6/1), lean CLAY, trace sand		
							4		620	
3A	20/24 *83%*	SS	*2-3 3-5* N=6	29		2.10 *B*		Yellowish brown (10YR5/6) with 40% gray (10YR6/1) mottles, lean CLAY, trace sand		
							6		618	
4A	24/24 *100%*	SS	*4-6 5-5* N=11	24		1.75 *B*		Gray (10YR6/1), lean CLAY, trace sand		
							8		616	
5A	22/24 *92%*	SS	*1-2 3-4* N=5	26		1.55 *B*				
							10		614	
6A	22/24 *92%*	SS	*2-3 3-4* N=6	22		1.85 *B*		Gray (10YR6/1) with 50% yellowish brown (10YR5/6) mottles, lean CLAY, little sand, trace gravel		
	19/24 *79%*	SH					12		612	Shelby tube taken from shallow well borehole at indicated depth.
7A	24/24 *100%*	SS	*4-4 5-5* N=9	23		1.22 *B*		Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, silty, fine to medium SAND, trace coarse sand and gravel, wet	610	
7B				17			14			
8A	21/24 *88%*	SS	*2-6 15-19* N=21	11		3.22 *BSP*		Pale brown (10YR6/3), clayey SILT, little sand, trace gravel		
							16	Yellowish brown (10YR5/4), silty, fine to coarse SAND, wet	608	
9A	24/24 *100%*	SS	*18-29 40-50* N=69	20				Yellowish brown (10YR5/4) silty fine SAND, wet		
9B				21				Gray (10YR6/1), sandy SILT, trace medium to coarse sand and trace gravel	606	
9C				9			18			
10A	17/24 *71%*	SS	*11-43 59/5"*	7		7.42 *B*		Dark gray (10YR4/1), clayey SILT, little sand, trace gravel		
							20		604	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE			TESTING			
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
11A	14/24 *58%*	SS	*14-55 45/2"*	8		
12A	8/24 *33%*	SS	*100/8"*	8		6.76 *SP*
13A	23/24 *96%*	SS	*12-28 43-57/5"* N=71	5		
14A	8/24 *33%*	SS	*59-41/2"*	6		7.95 *BSh*
15A	16/24 *67%*	SS	*11-26 74/4"*	12		4.74 *BSh*
16A	12/24 *50%*	SS	*39-61*	7		
17A	10/24 *42%*	SS	*49-51/4"*	9		5.43 *B*
18A	11/24 *46%*	SS	*100-95*	11		
19A	8/24 *33%*	SS	*61-39/2"*	10		
20A	24/24 *100%*	SS	*21-41 21-24* N=62	12		16.00 *None*
20B				13		9.38

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
20 – 36	Dark gray (10YR4/1), clayey SILT, little sand, trace gravel *[Continued from previous page]*		604 – 588	
36 – 38	Dark gray (10YR4/1), silty, fine to medium SAND, trace coarse sand and gravel, wet		588 – 586	
38 – 39.3	Very dark gray (10YR3/1), clayey SILT, little sand, trace gravel		586 – 584.7	
39.3 – 40	Very dark gray (10YR3/1) with 20% dark grayish brown (10YR4/2) mottles, clayey SILT, trace sand and gravel		584.7 – 584	

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 602, 600, 598, 596, 594, 592, 590, 588, 586, 584

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) / *% Recovery*	Type	TESTING: *Blows / 6 in* / N - Value / **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) / *Failure Type*
						BSh
21A	22/24 *92%*	SS	*3-7 11-18* N=18	19		6.11 *BSh*
22A	24/24 *100%*	SS	*4-7 8-10* N=15	23		4.46 *B*
23A				21		
	24/24 *100%*	SS	*3-6 6-10* N=12			
23B				16		3.69 *B*
24A	24/24 *100%*	SS	*10-12 10-15* N=22	16		4.58 *B*
25A	24/24 *100%*	SS	*2-4 7-9* N=11	16		4.65 *B*
26A	19/24 *79%*	SS	*3-5 7-13* N=12	21		3.88 *B*
27A	24/24 *100%*	SS	*8-10 8-13* N=18	25		3.49 *BSh*
28A	24/24 *100%*	SS	*4-5 8-12* N=13	22		3.49 *BSh*
29A	24/24 *100%*	SS	*5-9 15-18* N=24	20		
30A	24/24 *100%*	SS	*8-9 14-18* N=23	18		5.82 *BSh*

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
40–42	Dark gray (10YR4/1), clayey SILT, trace sand and gravel	582
42–52	Dark greenish gray (5GY4/1) with 30% dark gray (N4/1) mottles, lean CLAY, trace sand	580
	Dark gray (N4/1), lean CLAY, trace sand and gravel	578, 576, 574, 572
52–54	Dark yellowish brown (10YR3/4) with 50% dark grayish brown (10YR4/2) mottles, lean CLAY, trace sand and gravel	570
54–58	Greenish gray (10YR5/1) with 20% dark yellowish brown (10YR4/4) mottles, lean CLAY, trace sand and gravel	568, 566
58–60	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel	564

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

Borehole Detail | Remarks

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
31A	24/24 *100%*	SS	*4-7 13-15* N=20	18		5.42 *BSh*	62	Olive (5Y4/3) with 15% greenish gray (10GY5/1) mottles, lean CLAY, trace sand and gravel *[Continued from previous page]*	562	
32A	24/24 *100%*	SS	*10-15 11-16* N=26	20		4.74 *BSh*	64		560	
33A	24/24 *100%*	SS	*6-10 11-13* N=21	16		6.98 *BSh*	66	Greenish gray (10Y5), lean CLAY, trace sand and gravel	558	
34A	24/24 *100%*	SS	*11-14 18-31* N=32	18		6.98 *BSh*	68		556	
35A	23/24 *96%*	SS	*9-18 27-40* N=45	15		11.95 *BSh*	70		554	
36A	24/24 *100%*	SS	*4-12 18-24* N=30	16		7.15 *BSh*	72		552	
37A	24/24 *100%*	SS	*17-29 36-47* N=65	17		8.24 *BSh*	74	Dark yellowish brown (10YR4/4), lean CLAY, trace sand and gravel	550	
38A	20/24 *83%*	SS	*12-18 23-28* N=41	17		6.59 *BSh*	76		548	
39A	9/24 *38%*	SS	*29-39 48-66* N=87	16			78		546	
40A	24/24 *100%*	SS	*5-9 13-18* N=22	18		6.21 *B*	80		544	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/24/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (lo-50's)

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" HSA w/SS sampler

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-15
Well ID: n/a
Surface Elev: 624 ft. MSL
Completion: 84 ft. BGS
Station: 875,970.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.40 - While drilling
▼ = 4.99 - MW15S on 6/1/06
▽ = 5.24 - MW15D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
41A	24/24 *100%*	SS	*6-8 13-16* N=21	17		5.82 *B*	82	Dark yellowish brown (10YR4/4), lean CLAY, trace sand and gravel *[Continued from previous page]*		542	
42A	24/24 *100%*	SS	*18-28 25-25* N=53	18		5.82 *BSh*	84			540	

End of Boring = 84.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16b
Well ID: MW16D
Surface Elev: 626 ft. MSL
Completion: 51 ft. BGS
Station: 877,354.9N
2,515,079.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0	Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.		626	
							2	Brown (10YR4/3), sl. moist, firm, silty CLAY with trace sand.		624	
							4	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very soft, very silty CLAY with trace sand.		622	
							6	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.		620	
							8–12	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.		618–614	
								Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.			
							14	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.		612	
								Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.			
								Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.			
							16	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.		610	
								Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.			
							18	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
								Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.			
							20	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.			

NOTE(S): MW16D installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16b
Well ID: MW16D
Surface Elev: 626 ft. MSL
Completion: 51 ft. BGS
Station: 877,354.9N
2,515,079.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										606	
							22			604	
							24			602	
							26			600	
							28			598	
							30	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		596	
							32			594	
							34			592	
							36			590	
							38			588	
							40				

NOTE(S): MW16D installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16b
Well ID: MW16D
Surface Elev: 626 ft. MSL
Completion: 51 ft. BGS
Station: 877,354.9N
2,515,079.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Gray (10YR5/1) with 50% black (10YR2/1) varves, very moist, soft SILT.		586	
							42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		584	
							44 46 48	Very dark greenish gray (10Y3/1), moist, hard, silty CLAY with sand and trace gravel.		582 580 578	
							50	Very dark bluish gray (5BG3/1), moist, firm, silty CLAY with trace sand and trace gravel.		576	

End of Boring = 51.00 ft. BGS
See SB-16 for sample & testing details

NOTE(S): MW16D installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station	**CONTRACTOR:** Reynolds Drilling Corp.		
Site: CCB Management Facility	**Rig mfg/model:** CME-850 Track Rig	**BOREHOLE ID:**	SB-16
Location: Coffeen, Illinois	**Drilling Method:** 4¼" HSA w/SS & CME samplers	**Well ID:**	n/a
Project: 05S3004A		**Surface Elev:**	626 ft. MSL
DATES: Start: 4/21/2006	**FIELD STAFF: Driller:** K. Doetzel	**Completion:**	92 ft. BGS
Finish: 4/25/2006	**Helper:** S. McCartney	**Station:**	877,355.0N
WEATHER: Overcast, cool (mid-40's)	**Eng/Geo:** R. Hasenyager		2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE			TESTING			
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*
1A	21/24 *88%*	SS	*4-4 6-7* N=10	22		
1B				29		2.13 *B*
2A	24/24 *100%*	SS	*4-6 7-9* N=13	25		2.13 *B*
3A	20/24 *83%*	SS	*3-4 5-7* N=9	21		2.33 *B*
4A	24/24 *100%*	SS	*2-3 4-6* N=7	25		2.13 *B*
5A	24/24 *100%*	SS	*3-4 5-5* N=9	24		2.33 *B*
6A	24/24 *100%* 24/24 *100%*	SS SH	*2-4 4-5* N=8	24		1.75 *B*
7A	24/24 *100%*	SS	*4-7 7-7* N=14	22		1.94 *BSh*
7B				18		
8A	21/24 *88%*	SS	*1-2 2-4* N=4	20		
9A	18/24 *75%*	SS	*4-3 4-10* N=7	14		
9B				15		
10A				10		
10B	20/24 *83%*	SS	*27-54 59-59* N=113	17		

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation ft. MSL: 626, 624, 622, 620, 618, 616, 614, 612, 610, 608

Lithologic Description
Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.
Brown (10YR4/3), sl. moist, firm, silty CLAY with trace sand.
Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very soft, very silty CLAY with trace sand.
Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.
Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.
Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.
Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.
Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.
Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.
Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.
Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.
Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.
Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.
Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.

Remarks: Shelby tube taken from shallow well borehole at indicated depth.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
11A	10/24 *42%*	SS	*10-96*	8		
	14/24 *58%*	SS	*84-132*			
12A				10		3.10 *BSh*
13A				10		7.56 *B*
	20/24 *83%*	SS	*41-68 82* N=150			
14A	12/24 *50%*	SS	*58-119*	10		9.89 *B*
	24/24 *100%*	SS	*30-48 70-71* N=118			
15A				9		5.62 *B*
	24/24 *100%*	SS	*50-54 68-93* N=122			
16A				9		
17A				17		
	35/36 *97%*	CS				
	60/60 *100%*	CS				
18A				10		

Depth ft. BGS: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation ft. MSL: 606, 604, 602, 600, 598, 596, 594, 592, 590, 588

Lithologic Description:

Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.
[Continued from previous page]

Remarks:

Dusky red (7.5YR3/4) staining.

Wood fragments.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
									586	
19A				19				Gray (10YR5/1) with 50% black (10YR2/1) varves, very moist, soft SILT.		
	60/60 *100%*	CS					42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.	584	
19B				11			44		582	
							46	Very dark greenish gray (10Y3/1), moist, hard, silty CLAY with sand and trace gravel.	580	
20A	60/60 *100%*	CS		13			48		578	
	24/24 *100%*	SS	*6-14* *18-22* N=32				50		576	
21A				19		1.94 *B*	▽			
	0/48 *0%*	CS					52	Very dark bluish gray (5BG3/1), moist, firm, silty CLAY with trace sand and trace gravel.	574	Possible rock at end of auger.
							54		572	
	24/24 *100%*	SS	*2-7* *7-15* N=14				56		570	
22A				21		3.71 *BSh*		Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand.		
	24/24 *100%*	SS	*4-8* *11-13* N=19				58		568	
23A				26		2.13 *BSh*				
	0/12 *0%*	BD					60			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	0/48 *0%*	RC					60–62.7	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand. *[Continued from previous page]*	566–563.3	
26A	24/24 *100%*	SS	*32-34 42-51* N=76	25		2.72 *BSh*	62.7–70	Yellowish brown (10YR5/6) with 20% greenish gray (5G6/1) mottles, moist, hard, silty CLAY with trace sand and trace coal fragments.	563.3–556	
	0/24 *0%*	RC								
	24/24 *100%*	SS	*15-21 21-21* N=42							
28A				18		2.72 *BSh*				
	24/24 *100%*	SS	*14-17 21-25* N=38							
29A				20		2.91 *BSh*	70–80	Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel.	556–546	70' to 79.5' - possible oxidation rinds.
	24/24 *100%*	SS	*12-21 34-35* N=55							
30A				18		5.04 *BSh*				
	24/24 *100%*	SS	*16-21 27-35* N=48							
31A				16		8.15 *BSh*				
	60/60 *100%*	CS								
32A				19						

Depth scale: 62, 64, 66, 68, 70, 72, 74, 76, 78, 80. Elevation scale: 566, 564, 562, 560, 558, 556, 554, 552, 550, 548.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel. *[Continued from previous page]*	546	
	60/60 *100%*	CS					82		544	
33A				16			84	Yellow brown (10YR5/6), very moist, very soft, clayey, very fine-grained SAND and SILT.	542	
							86		540	
	0/60 *0%*	CS					88	Yellowish brown (10YR5/6), moist, hard, silty CLAY with sand and trace gravel.	538	Possible rock at end of auger.
							90		536	
35A	24/24 *100%*	SS	*9* *11-16* N=20			2.72 *BSh*	92	Dark gray (10YR3/1), moist, firm, silty CLAY with sand and trace gravel.		

End of Boring = 92.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/25/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16a
Well ID: MW16S
Surface Elev: 626 ft. MSL
Completion: 20 ft. BGS
Station: 877,355.1N
2,515,088.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.			
							2	Brown (10YR4/3), sl. moist, firm, silty CLAY with trace sand.		624	
							4	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very soft, very silty CLAY with trace sand.		622	
							6	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.		620	
							8, 10, 12	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.		618, 616, 614	
								Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.			
							14	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.		612	
								Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.			
							16	Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.		610	
								Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.			
								Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.			
							18	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.		608	
								Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.			
								Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.			

End of Boring = 19.90 ft. BGS
See SB-16 for sample & testing details

NOTE(S): MW16S installed in blind-drilled borehole within 10 ft of SB-16.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	21/24 *88%*	SS	*4-4 6-7* N=10	22			0–1	Black (10YR2/1), sl. moist, firm, clayey SILT with trace sand and trace gravel.	626	
1B				29		2.13 *B*	1–2.7	Brown (10YR4/3), sl. moist, firm, silty CLAY with trace sand.	624	
2A	24/24 *100%*	SS	*4-6 7-9* N=13	25		2.13 *B*	2.7–6	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, moist, very soft, very silty CLAY with trace sand.	622	
3A	20/24 *83%*	SS	*3-4 5-7* N=9	21		2.33 *B*	▼ 5.74		620	
4A	24/24 *100%*	SS	*2-3 4-6* N=7	25		2.13 *B*	6–7.3	Gray (10YR5/1) with 15% dark yellowish brown (10YR4/6) mottles, moist, very soft, very silty CLAY with trace sand.	618	
5A	24/24 *100%*	SS	*3-4 5-5* N=9	24		2.33 *B*	7.3–12.8	Gray (10YR5/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with some sand and trace gravel.	616	
6A	24/24 *100%* 24/24 *100%*	SS SH	*2-4 4-5* N=8	24		1.75 *B*			614	Shelby tube taken from shallow well borehole at indicated depth.
7A	24/24 *100%*	SS	*4-7 7-7* N=14	22		1.94 *BSh*	▼ 12.8–13.8	Dark yellowish brown (10YR4/6), wet, sl. dense, silty, very fine- to fine-grained SAND.		
7B				18			13.8–14.3	Dark yellowish brown (10YR4/6), moist, firm, silty CLAY with sand and trace gravel.	612	
							14.3–15	Dark yellowish brown (10YR4/6), wet, loose, silty, very fine- to fine-grained SAND.		
8A	21/24 *88%*	SS	*1-2 2-4* N=4	20			15–16.2	Dark yellowish brown (10YR4/6), wet, soft, silty CLAY with sand and trace gravel.	610	
9A	18/24 *75%*	SS	*4-3 4-10* N=7	14			16.2–17	Yellowish brown (10YR5/6), wet, loose, very fine- to very coarse-grained SAND.		
							17–17.8	Gray (10YR5/1), wet, loose, fine- to medium-grained SAND.		
9B				15			17.8–18.4	Gray (10YR5/1), moist, hard, clayey SILT with sand and trace gravel.	608	
10A	20/24 *83%*	SS	*27-54 59-59* N=113	10			18.4–19.4	Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.		
10B				17			19.4–20	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.		

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
									606	
11A	10/24 *42%*	SS	*10-96*	8						
							22		604	
	14/24 *58%*	SS	*84-132*							
12A				10		3.10 *BSh*				
							24		602	
13A				10		7.56 *B*				
	20/24 *83%*	SS	*41-68 82* N=150							
							26		600	
14A	12/24 *50%*	SS	*58-119*	10		9.89 *B*				Dusky red (7.5YR3/4) staining.
							28		598	
	24/24 *100%*	SS	*30-48 70-71* N=118							
15A				9		5.62 *B*				
							30	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	596	
	24/24 *100%*	SS	*50-54 68-93* N=122							
16A				9						
							32		594	
17A				17						
	35/36 *97%*	CS								
							34		592	
							36		590	
	60/60 *100%*	CS								
18A				10			38		588	
							40			Wood fragments.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
19A				19		
	60/60 *100%*	CS				
19B				11		
20A	60/60 *100%*	CS		13		
	24/24 *100%*	SS	*6-14* *18-22* N=32			
21A				19		1.94 *B*
	0/48 *0%*	CS				
	24/24 *100%*	SS	*2-7* *7-15* N=14			
22A				21		3.71 *BSh*
	24/24 *100%*	SS	*4-8* *11-13* N=19			
23A				26		2.13 *BSh*
	0/12 *0%*	BD				

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	Gray (10YR5/1) with 50% black (10YR2/1) varves, very moist, soft SILT.	586	
42	Gray (10YR4/1), moist, very hard, clayey, sandy SILT with trace gravel.	584	
44		582	
46	Very dark greenish gray (10Y3/1), moist, hard, silty CLAY with sand and trace gravel.	580	
48		578	
50		576	
52	Very dark bluish gray (5BG3/1), moist, firm, silty CLAY with trace sand and trace gravel.	574	Possible rock at end of auger.
54		572	
56		570	
58	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand.	568	
60			

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
	0/48 *0%*	RC				
26A	24/24 *100%*	SS	*32-34 42-51* N=76	25		2.72 *BSh*
	0/24 *0%*	RC				
	24/24 *100%*	SS	*15-21 21-21* N=42			
28A				18		2.72 *BSh*
29A	24/24 *100%*	SS	*14-17 21-25* N=38	20		2.91 *BSh*
30A	24/24 *100%*	SS	*12-21 34-35* N=55	18		5.04 *BSh*
31A	24/24 *100%*	SS	*16-21 27-35* N=48	16		8.15 *BSh*
32A	60/60 *100%*	CS		19		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
to ~62.7	Greenish gray (5G6/1) with 40% yellowish brown (10YR5/6) mottles, moist, hard, silty CLAY with sl. trace sand. *[Continued from previous page]*	566–564	
~62.7–70	Yellowish brown (10YR5/6) with 20% greenish gray (5G6/1) mottles, moist, hard, silty CLAY with trace sand and trace coal fragments.	562–556	
70–80	Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel.	556–546	70' to 79.5' - possible oxidation rinds.

Depth scale: 62, 64, 66, 68, 70, 72, 74, 76, 78, 80
Elevation scale: 566, 564, 562, 560, 558, 556, 554, 552, 550, 548

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 4/21/2006
Finish: 4/25/2006
WEATHER: Overcast, cool (mid-40's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-850 Track Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-16
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 92 ft. BGS
Station: 877,355.0N
2,515,080.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.80 - While drilling
▼ = 5.74 - MW16S on 6/1/06
▽ = 51.37 - MW16D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Yellowish brown (10YR5/6) with zones of gray (10YR4/1) mottles, moist, hard, clayey SILT with some sand and trace gravel. *[Continued from previous page]*	546	
33A	60/60 *100%*	CS		16			82		544	
							84	Yellow brown (10YR5/6), very moist, very soft, clayey, very fine-grained SAND and SILT.	542	
	0/60 *0%*	CS					86		540	
							88	Yellowish brown (10YR5/6), moist, hard, silty CLAY with sand and trace gravel.	538	Possible rock at end of auger.
							90		536	
35A	24/24 *100%*	SS	*9* *11-16* N=20			2.72 *BSh*	92	Dark gray (10YR3/1), moist, firm, silty CLAY with sand and trace gravel.		

End of Boring = 92.0 ft. BGS

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		
1A	20/24 *83%*	SS	*1-1 1-1* N=2	29				Yellowish brown (10YR5/8), moist, soft, silty CLAY.	626	
							2			
2A	24/24 *100%*	SS	*1-1 2-2* N=3	26		1.71 *None*		Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel.	624	
							4			
3A	24/24 *100%*	SS	*1-1 1-3* N=2	16		2.62 *BSh*		Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.	622	
							6			
4A	24/24 *100%*	SS	*1-2 2-3* N=4	18		2.33 *B*	▼	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.	620	
							8			
5A	24/24 *100%*	SS	*1-1 2-3* N=3	18					618	
							10	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.		
6A	24/24 *100%*	SS	*1-1 1-1* N=2	21		0.58 *B*	▼	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, very moist, soft, very sandy, clayey SILT.	616	
6B				18			12	Moderate yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND.		
7A	24/24 *100%*	SS	*1-1 3-7* N=4	21				Yellowish brown (10YR5/6), wet, dense, silty, very fine- to fine-grained SAND.	614	
7B				19				Yellowish brown (10YR5/6), very moist, dense, silty, very fine-grained SAND.		
8A				15			14	Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.		
	24/24 *100%*	SS	*2-5 5-7* N=10					Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.	612	
8B				13				Yellowish brown (10YR5/6), moist, clayey SILT and very fine-grained SAND with trace gravel.		
8C				13			16			
9A	24/24 *100%*	SS	*0-6 6-6* N=12	17				Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND.	610	
							18	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.		
10A	24/24 *100%*	SS	*0-2 2-3* N=4	19				Yellowish brown (10YR5/6), wet, sl. dense, SILT with some very fine-grained SAND.	608	
10B				23			20	Gray (10YR5/1), wet, sl. dense, SILT with some very		

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

SAMPLE: Number	SAMPLE: Recov / Total (in) *% Recovery*	SAMPLE: Type	TESTING: *Blows / 6 in* N - Value **RQD**	TESTING: Moisture (%)	TESTING: Dry Den. (lb/ft^3)	TESTING: Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								fine-grained SAND.		
11A	12/24 *50%*	SS	*0-1* *1-2* N=2	21			22	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.	606	
12A	24/24 *100%*	SS	*2-2* *5-7* N=7	18				Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.	604	
12B				9		4.65 *BSh*	24			
13A	25/60 *42%*	CS					26, 28		602, 600, 598	
14A	60/60 *100%*	CS		9			30, 32, 34	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	596, 594, 592	
15A	60/60 *100%*	CS		16			36, 38	Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.	590	
15B				8			40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	588	

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

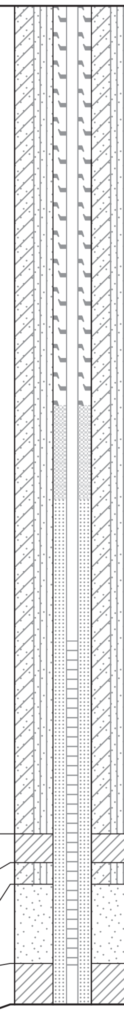
WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
	48/60 *80%*	CS				
16A				14		
16B				8		
	60/60 *100%*	CS				
17A				13		
	60/60 *100%*	CS				
18A				22		
18B				16		
18C				11		

Depth ft. BGS	Lithologic Description
41–51.6	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*
	Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.
	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.
	Gray (10YR5/1), moist, firm, silty, very fine-grained to fine-grained SAND.
	Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.

End of Boring = 53.87 ft.

Borehole Detail



Depth ft. BGS: 42, 44, 46, 48, 50, 52

Elevation ft. MSL: 586, 584, 582, 580, 578, 576, 574

Remarks

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17a
Well ID: MW17S
Surface Elev: 627 ft. MSL
Completion: 24 ft. BGS
Station: 878,658.5N
2,515,084.8E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.			
								Yellowish brown (10YR5/8), moist, soft, silty CLAY.		626	
							2	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel.		624	
							4	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		622	
							6	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.		620	
							8			618	
							10	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.			
								Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, very moist, soft, very sandy, clayey SILT.		616	
							12	Moderate yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND.			
								Yellowish brown (10YR5/6), wet, dense, silty, very fine- to fine-grained SAND.		614	
								Yellowish brown (10YR5/6), very moist, dense, silty, very fine-grained SAND.			
							14	Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.			
								Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.		612	
								Yellowish brown (10YR5/6), moist, clayey SILT and very fine-grained SAND with trace gravel.			
							16	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND.		610	
							18	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.			
								Yellowish brown (10YR5/6), wet, sl. dense, SILT with some very fine-grained SAND.		608	
							20	Gray (10YR5/1), wet, sl. dense, SILT with some very			

NOTE(S): MW17S installed in blind-drilled borehole within 10 ft of SB-17.

FIELD BORING LOG

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

HANSON

BOREHOLE ID: SB-17a
Well ID: MW17S
Surface Elev: 627 ft. MSL
Completion: 24 ft. BGS
Station: 878,658.5N
2,515,084.8E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								fine-grained SAND.			
							22	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.		606	
								Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.		604	
							24	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.			

End of Boring = 24.11 ft. BGS
See SB-17 for sample & testing details

NOTE(S): MW17S installed in blind-drilled borehole within 10 ft of SB-17.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0	Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		
1A	20/24 *83%*	SS	*1-1 1-1* N=2	29				Yellowish brown (10YR5/8), moist, soft, silty CLAY.	626	
2A	24/24 *100%*	SS	*1-1 2-2* N=3	26		1.71 *None*	2	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY with little sand and trace gravel.	624	
3A	24/24 *100%*	SS	*1-1 1-3* N=2	16		2.62 *BSh*	4	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.	622	
4A	24/24 *100%*	SS	*1-2 2-3* N=4	18		2.33 *B*	6 ▼	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, firm sandy, clayey SILT.	620	
5A	24/24 *100%*	SS	*1-1 2-3* N=3	18			8	Yellowish brown (10YR5/6), moist, soft, very sandy, clayey SILT.	618	
6A	24/24 *100%*	SS	*1-1 1-1* N=2	21		0.58 *B*	10 ▼	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, very moist, soft, very sandy, clayey SILT.	616	
6B				18				Moderate yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND.		
7A	24/24 *100%*	SS	*1-1 3-7* N=4	21			12	Yellowish brown (10YR5/6), wet, dense, silty, very fine- to fine-grained SAND.	614	
7B				19				Yellowish brown (10YR5/6), very moist, dense, silty, very fine-grained SAND.		
8A	24/24 *100%*	SS	*2-5 5-7* N=10	15			14	Yellowish brown (10YR5/6) wet, dense, fine- to medium-grained SAND.		
8B				13				Moderate yellowish brown (10YR5/4), wet, dense, SILT and very fine-grained SAND.	612	
8C				13				Yellowish brown (10YR5/6), moist, clayey SILT and very fine-grained SAND with trace gravel.		
9A	24/24 *100%*	SS	*0-6 6-6* N=12	17			16	Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND.	610	
							18	Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.		
10A	24/24 *100%*	SS	*0-2 2-3* N=4	19				Yellowish brown (10YR5/6), wet, sl. dense, SILT with some very fine-grained SAND.	608	
10B				23			20	Gray (10YR5/1), wet, sl. dense, SILT with some very		

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description
								fine-grained SAND.
11A	12/24 *50%*	SS	*0-1* *1-2* N=2	21				Yellowish brown (10YR5/6), wet, loose, very fine- to fine-grained SAND.
							22	
12A	24/24 *100%*	SS	*2-2* *5-7* N=7	18				Gray (10YR5/1), wet, loose, very fine- to fine-grained SAND.
12B				9		4.65 *BSh*	24	
13A	25/60 *42%*	CS					26, 28	
14A	60/60 *100%*	CS		9			30, 32, 34	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.
15A	60/60 *100%*	CS		16			36	Gray (10YR5/1), wet, dense, very fine- to fine-grained SAND.
15B				8			38, 40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.

Borehole Detail | Elevation ft. MSL: 606, 604, 602, 600, 598, 596, 594, 592, 590, 588 | Remarks

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/4/2006
Finish: 5/4/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-17
Well ID: MW17D
Surface Elev: 627 ft. MSL
Completion: 54 ft. BGS
Station: 878,659.0N
2,515,090.4E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.70 - While drilling
▼ = 6.89 - MW17S on 6/1/06
▽ = 54.45 - MW17D on 6/1/06

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
	48/60 *80%*	CS								586	
16A				14			42				
16B				8						584	
							44			582	
	60/60 *100%*	CS					46	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		580	
17A				13			48			578	
							50			576	
18A	60/60 *100%*	CS		22				Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.			
18B				16			52	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.			
18C				11				Gray (10YR5/1), moist, firm, silty, very fine-grained to fine-grained SAND.		574	
								Dark bluish gray (10BG4/1), moist, hard, silty CLAY with little sand.			

End of Boring = 53.87 ft.

NOTE(S): CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-18a
Well ID: MW18S
Surface Elev: 626 ft. MSL
Completion: 16 ft. BGS
Station: 878,604.7N
2,513,745.2E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.20 - While drilling
▼ = 6.87 - MW18S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.			
								Yellowish brown (10YR5/6) with 50% gray (10YR4/1) mottles, moist, silty CLAY with little sand.		624	
							2	Yellowish brown (10YR5/6) with 10% gray (10YR4/1) mottles, moist, silty CLAY with little sand.		622	
							4				
							6			620	
							▼				
							8	Gray (10YR4/1)with 10% Yellowish brown (10YR5/6) mottles, moist, silty CLAY with little sand.		618	
							10			616	
							▼ 12	Light gray (10YR6/1) moist, soft, clayey, very fine- to fine-grained SAND.		614	
								Light gray (10YR6/1) moist, soft, silty, very fine- to fine-grained SAND.			
								Yellowish brown (10YR5/6), very moist, soft, silty, very fine- to fine-grained, SAND with trace gravel.		612	
							14	Yellowish brown (10YR5/6), wet, loose, fine- to medium-grained SAND.			
								Yellowish brown (10YR5/6), very moist, soft, sandy (very fine- to fine-grained) SILT.			
							16	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		610	

End of Boring = 16.40 ft. BGS
See SB-18 for sample & testing details

NOTE(S): MW18S installed in blind-drilled borehole within 10 ft of SB-18.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-18
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 54 ft. BGS
Station: 878,605.0N
2,513,750.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.20 - While drilling
▼ = 6.87 - MW18S on 6/1/06
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0–0.6	Dark grayish brown (10YR4/2), moist, soft, clayey SILT with trace sand and trace gravel.		
1A	18/24 *75%*	SS	*0-1 1-1* N=2	24		1.31 *BSh*	0.6–2	Yellowish brown (10YR5/6) with 50% gray (10YR4/1) mottles, moist, silty CLAY with little sand.	624	
2A	24/24 *100%*	SS	*1-2 2-2* N=4	28		1.78 *Sh*	2–4	Yellowish brown (10YR5/6) with 10% gray (10YR4/1) mottles, moist, silty CLAY with little sand.	622	
3A	24/24 *100%*	SS	*1-2 2-2* N=4	23		1.32 *BSh*	4–11.2	Gray (10YR4/1)with 10% Yellowish brown (10YR5/6) mottles, moist, silty CLAY with little sand.	620	
4A	24/24 *100%*	SS	*1-1 1-2* N=2	24		1.09 *B*			618	
5A	24/24 *100%*	SS	*1-1 1-2* N=2	28		0.54 *BSh*			616	
6A	24/24 *100%*	SS	*0-0 1-2* N=1	21		0.39 *B*	11.2–12.4	Light gray (10YR6/1) moist, soft, clayey, very fine- to fine-grained SAND.	614	
7A	24/24 *100%*	SS	*3-5 9-15* N=14	17			12.4–13.0	Light gray (10YR6/1) moist, soft, silty, very fine- to fine-grained SAND.		
							13.0–14	Yellowish brown (10YR5/6), very moist, soft, silty, very fine- to fine-grained, SAND with trace gravel.	612	
7B				15			14–14.6	Yellowish brown (10YR5/6), wet, loose, fine- to medium-grained SAND.		
8A	24/24 *100%*	SS	*8-9 9-10* N=18	14			14.6–15.2	Yellowish brown (10YR5/6), very moist, soft, sandy (very fine- to fine-grained) SILT.		
8B				11					610	
8C				9			15.2–20	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.	608	
9A	24/36 *67%*	CS							606	

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-18
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 54 ft. BGS
Station: 878,605.0N
2,513,750.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.20 - While drilling
▼ = 6.87 - MW18S on 6/1/06
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
10A	60/60 *100%*	CS					20–25	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*		
11A	60/60 *100%*	CS		5			25–30			
12A	60/60 *100%*	CS		11			30–35			Coal fragment seam
13A	60/60 *100%*	CS		10			37–38	Gray (10YR5/1), moist, dense, SILT.		
13B				12			38–40	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel.		

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 604, 602, 600, 598, 596, 594, 592, 590, 588, 586

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 5/11/2006
Finish: 5/11/2006
WEATHER: Partly sunny, cool (mid-50's)

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-1050 ATV Rig
Drilling Method: 4¼" HSA w/SS & CME samplers

FIELD STAFF: Driller: K. Doetzel
Helper: S. McCartney
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB-18
Well ID: n/a
Surface Elev: 626 ft. MSL
Completion: 54 ft. BGS
Station: 878,605.0N
2,513,750.0E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 12.20 - While drilling
▼ = 6.87 - MW18S on 6/1/06
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	60/60 *100%*	CS					42	Gray (10YR5/1), moist, very hard, clayey, sandy SILT with trace gravel. *[Continued from previous page]*	584	Appears more clayey
14A				13			44		582	
	60/60 *100%*	CS					46		580	
15A				13			48		578	
16A				13			50		576	
	60/60 *100%*	CS					52	Greenish gray (10BG5/1), moist, firm, silty CLAY with little sand and trace gravel.	574	
16B				22			54		572	

End of Boring = 54.0 ft.

NOTE(S): Borehole abandoned using bentonite grout pumped from bottom of borehole.
CME-1050 had 280# hammer for SPT.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: Ash Pond Investigation
Location: Coffeen, IL
Project: 05S3004B
DATES: Start: 5/1/2007
Finish: 5/1/2007
WEATHER: Partly sunny, warm

CONTRACTOR: Reynolds Drilling Corp.
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" Hollow stem auger with split spoon sampler
FIELD STAFF: Driller: A. Rachford
Helper: M. Brown
Eng/Geo: R. Hasenyager

BOREHOLE ID: SB20
Well ID: MW20S
Surface Elev: 620.30 ft. MSL
Completion: 16.00 ft. BGS
Station: 874,226.44N
2,515,867.87E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 4.28 - 05/10/2007
▼ =
▽ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
1A	12/24 *50%*	SS		24.9		
1B				19.9		
2A	23/24 *96%*	SS		28.9		2.33 BSh
3A	13/24 *54%*	SS		17.2		
4A	24/24 *100%*	SS		20.5		2.52 B
4B				20.6		2.33 B
5A	24/24 *100%*	SS		23.1		1.63 B
5B				24.0		1.07 B
6A				16.4		
	24/24 *100%*	SS				
6B				19.1		0.39 B
6C				17.5		
7A				19.1		
	13/16 *81%*	SS				
7B				11.7		1.75 BSh
	22/24 *92%*	SS				
8A				9.0		4.80 BSh

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
	Black (10YR2/1), moist, firm, clayey SILT with slight trace sand (TOPSOIL)	620	
2	Gray (10YR6/1),moist, form, clayey SILT with roots and slight trace sand	618	
4	Gray (10YR5/1) with 40% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY	616	
6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with slight trace sand	614	
	Gray (10YR5/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel		
8	Gray (10YR6/1), moist, firm, silty CLAY with trace sand and slight trace gravel	612	
	Yellowish brown (10YR5/8) with 10% gray (10YR6/1) mottles, moist, firm, silty CLAY with trace sand and slight trace gravel		
10	Yellowish brown (10YR5/8), very moist, soft, sandy CLAY with some silt	610	
	Yellowish brown (10YR5/8), very moist, soft, clayey, very fine- to medium-grained SAND		
12	Gray (10YR6/1), wet, loose, very fine- to medium-grained SAND with trace coarse-grained sand	608	
	Brown (10YR5/3), moist, very hard, very silty CLAY with sand and gravel		
14	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel	606	
16			

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/8/2010
Finish: 10/8/2010
WEATHER: Sunny, mild

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA (blind drill)

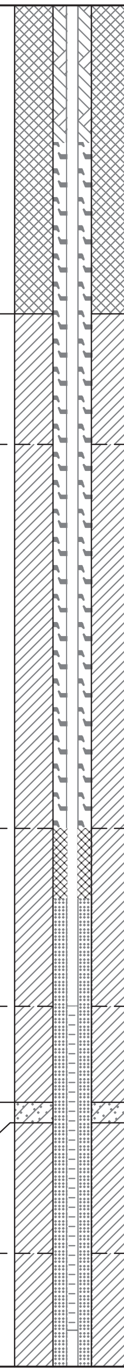
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: R. Hasenyager

BOREHOLE ID: R104
Well ID: R104
Surface Elev: 629.03 ft. MSL
Completion: 19.85 ft. BGS
Station: 875,857.80N
2,514,503.41E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

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
							0–4.5	FILL - Brown (10YR5/3) with 5% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with slight trace sand and gravel.			
							4.5–6.4	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.			
							6.4–12	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.			
							12–14.6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.			
							14.6–16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.			
							16–16.6	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.			
							16.6–18.2	Brown (10YR5/3), slightly moist, hard, very silty CLAY with trace sand and gravel.			
							18.2–19.85	Gray (10YR4/1), slightly moist, hard, very silty CLAY with sand and gravel.			

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18
Elevation scale (ft. MSL): 628, 626, 624, 622, 620, 618, 616, 614, 612, 610



End of Boring = 19.85 ft. BGS

NOTE(S): R104 blind drilled in borehole approximately 8 ft. north of G104. Lithology taken from G104.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/15/2010
Finish: 2/15/2010
WEATHER: Overcast, cold, windy (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Suzanna Simpson

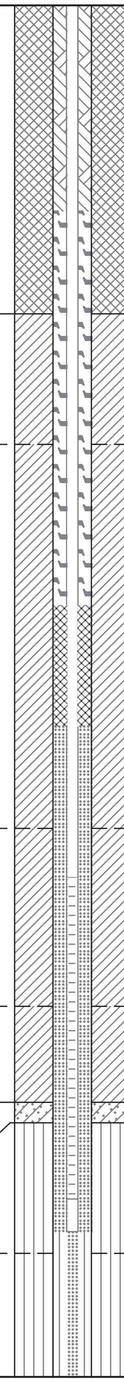
BOREHOLE ID: G104
Well ID: G104
Surface Elev: 627.96 ft. MSL
Completion: 20.00 ft. BGS
Station: 875,849.26N
2,514,504.98E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ =
▽ = 15.40 - 3/1/2010

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	16/24 *67%*	SS	*9-11 12-14* N=23	16		
2A	20/24 *83%*	SS	*3-5 9-12* N=14	21		
3A	19/24 *79%*	SS	*3-6 8-9* N=14	21		
4A	17/24 *71%*	SS	*2-3 4-7* N=7	25		
5A	22/24 *92%*	SS	*1-2 5-8* N=7	24		
6A	18/24 *75%*	SS	*1-2 3-5* N=5	21		
7A	23/24 *96%*	SS	*woh-2 3-4* N=5	23		
8A	22/24 *92%*	SS	*1-3 3-3* N=6	24		
9A				16		
9B	17/24 *71%*	SS	*woh-6 27-40* N=33	13		
10A	22/24 *92%*	SS	*10-24 44-66* N=68	7		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–4.5	FILL - Brown (10YR5/3) with 5% gray (10YR5/1) and 5% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY with slight trace sand and gravel.	627.96–623.5
4.5–6.4	Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.	
6.4–12	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with slight trace sand.	
12–14.6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.	
14.6–16	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel. (▽ 15.4)	
16–16.3	Gray (10YR6/1), moist, very soft, clayey, very fine- to coarse-grained SAND with trace gravel.	
16.3–18.2	Brown (10YR5/3), slightly moist, hard, clayey SILT with trace sand and gravel.	
18.2–20	Gray (10YR4/1), slightly moist, hard, clayey SILT with sand and gravel.	608



Borehole Detail | Remarks

End of Boring = 20.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/15/2010
Finish: 10/15/2010
WEATHER: Sunny (mid-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: R. Hasenyager

BOREHOLE ID: R201
Well ID: R201
Surface Elev: 624.02 ft. MSL
Completion: 17.22 ft. BGS
Station: 877,925.26N
2,514,841.96E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 2, **Tier** 7N; **Range** 3W

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
								Very dark grayish brown (10YR3/2), moist, soft, friable, clayey SILT, slight trace sand and gravel			
							2	Dark brown (10YR3/3), moist, soft, silty CLAY		622	
							4	Yellowish brown (10YR5/8) with 20% gray (10YR5/1) mottles, moist, firm, silty CLAY, trace sand, slight trace gravel		620	
							6	Gray (10YR5/1) with 5% yellowish brown (10YR5/6) mottles, moist, firm, silty CLAY, sand and trace gravel		618	
							8	Gray (10YR5/1), moist, firm, sandy CLAY, trace silt and slight trace gravel		616	
							10	Yellowish brown (10YR5/8) with 10% gray (10YR5/1) mottles, moist, firm, sandy CLAY, trace gravel		614	
							12	Yellowish brown (10YR5/8), wet, soft, silty SAND, trace gravel		612	
								Yellowish brown (10YR5/8), moist, firm, clayey SILT			
							14	Greenish gray (5GY6/1), moist, firm, interbedded clayey SILT and SILT		610	
							16	Yellowish brown (10YR5/8), wet, soft, fine- to coarse-grained SAND, slight trace gravel		608	
								Yellowish brown (10YR5/8), wet, firm, very fine- to fine-grained silty SAND			
								Gray (10YR5/1), wet, soft, SILT			
								Gray (10YR5/1), wet, soft, fine- to coarse-grained SAND, slight trace gravel			
								Gray (10YR5/1), moist, hard, very silty CLAY, trace sand and gravel			

End of Boring = 17.22 ft. BGS

NOTE(S): R201 blind drilled in borehole approximately 8 ft. west of G201. Lithology taken from G201.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Power Station - Gypsum Mgmt Facility
Location: Coffeen, IL
Project: 15E0161A
DATES: Start: 3/20/2017
Finish: 3/20/2017
WEATHER: Sunny, mild, (mid-60s)

CONTRACTOR: Bulldog Drilling
Rig mfg/model: CME-550 ATV Drill
Drilling Method: 4¼" HSA (blind drill)

FIELD STAFF: Driller: J. Gates
Helper: C. Clines
Eng/Geo: R. Hasenyager

BOREHOLE ID: R205
Well ID: R205
Surface Elev: 621.91 ft. MSL
Completion: 16.42 ft. BGS
Station: 875,548.77N
2,515,910.12E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - Upon Completion
▼ = 2.50 - 3/21/2017
▽ =

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
							0–1.3	Very dark grayish brown (10YR3/2), moist, firm, clayey SILT		
							1.3–2.3	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand	620	
							2.3–5.7	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY, slight trace sand	618	
							5.7–8.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel	616, 614	
							8.4–11.1	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel	612	
							11.1–12.3	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel	610	
							12.3–14.5	Yellowish brown (10YR 5/4), moist, soft, silty SAND, trace gravel	608	
							14.5–16.42	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel	606	

End of Boring = 16.42 ft. BGS

NOTE(S): R205 installed in blind drilled boring approximately 5 ft. west of G205. Lithologies from boring G205.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/21/2008
Finish: 2/21/2008
WEATHER: Overcast, cold

CONTRACTOR: Testing Service Corp.
Rig mfg/model: CME-650 Track Drill
Drilling Method: 3¼" HSA w/SS & CME samplers
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: .

BOREHOLE ID: G205
Well ID: G205
Surface Elev: 622.15 ft. MSL
Completion: 16.00 ft. BGS
Station: 875,550.19N
2,515,914.87E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 11.10 - While drilling
▼ = 5.06 - 3/12/08
▽ =

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	Elevation ft. MSL	Remarks
1A	24/24 *100%*	SS	*4-3 4-4* N=7	22			0–1.3	Very dark grayish brown (10YR3/2), moist, firm, clayey SILT	622	
1B				30		1.67 Sh	1.3–2.3	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY, slight trace sand	620	
2A	19/24 *79%*	SS	*3-5 6-5* N=11	24		1.86 B	2.3–5.7	Yellowish brown (10YR5/4) with 30% yellowish brown (10YR5/8) mottles, moist, hard, silty CLAY, slight trace sand	618	
3A	20/24 *83%*	SS	*2-2 5-5* N=7	19		1.55 B				
4A	19/24 *79%*	SS	*5-6 7-8* N=13	20		1.12 B	5.7–8.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand, slight trace gravel	616	
5A	16/24 *67%*	SS	*2-2 3-5* N=5	20		0.62 BSh	8.4–11.1	Yellowish brown (10YR5/6), moist, firm, silty CLAY with sand, trace gravel	614, 612	
6A	22/24 *92%*	SS	*1-2 3-3* N=5	17		0.62 BSh	11.1–12.3	Yellowish brown (10YR5/6), moist, soft, sandy SILT, slight trace gravel	610	
6B				17						
7A				25						
7B	23/24 *96%*	SS	*3-3 5-6* N=8	17		1.36 BSh	12.3–14.5	Yellowish brown (10YR 5/4), moist, soft, silty SAND, trace gravel	608	
8A				15						
8B	17/24 *71%*	SS	*5-19 26-35* N=45	10			14.5–16	Gray (10YR5/1), moist, hard, silty CLAY, trace sand and gravel		

End of Boring = 16.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 2/10/2010
Finish: 2/10/2010
WEATHER: Overcast, wind 15mph, ~10-20F

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: .

BOREHOLE ID: T127
Well ID: T127
Surface Elev: 625.53 ft. MSL
Completion: 19.80 ft. BGS
Station: 875,359.21N
2,513,911.02E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 15.30 - While drilling
▼ = 18.00 - Upon completion
▽ = 11.26 - 3/1/10

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
1	24/24 *100%*	SS	*8-5 5-8* N=10				0–4.8	FILL - yellowish brown (10YR5/6) with 20% grayish brown (10YR5/2) mottles, moist, stiff, silty CLAY with trace sand and gravel.			
2	10/24 *42%*	SS	*5-6 7-11* N=13								
3	20/24 *83%*	SS	*1-4 5-7* N=9				4.8–7.0	Dark yellowish brown (10YR4/6) with 30% brownish yellow (10YR6/6) and 10% very dark gray (10YR3/1) mottles, moist, medium, clayey SILT with trace sand.			
4	24/24 *100%*	SS	*2-4 5-6* N=9				7.0–8.5	Grayish brown (10YR5/2) with 20% dark yellowish brown (10YR4/6) mottles, moist, medium, clayey SILT with sand.			
5	24/24 *100%*	SS	*2-4 5-6* N=9				8.5–11.8	Grayish brown (10YR5/2) with 20% dark yellowish brown (10YR4/6) and 5% very dark brown (10YR2/2) mottles, moist, medium, clayey SILT with sand and slight trace gravel.			
6	24/24 *100%*	SS	*3-3 5-7* N=8				11.8–13.0	Dark yellowish brown (10YR4/6) with 5% light brownish gray (10YR6/2) mottles, moist, medium, sandy SILT with gravel.			
7	24/24 *100%*	SS	*1-2 3-3* N=5				13.0–15.3	Light brownish gray (10YR6/2) with 30% yellowish brown (10YR5/6) mottles, very moist, medium, clayey SAND with silt.			
8	24/24 *100%*	SS	*1-1 2-1* N=3				15.3–17.0	Light brownish gray (10YR6/2) with 30% brownish yellow (10YR6/8) mottles, wet, very loose, silty SAND trace with gravel.			
9	24/24 *100%*	SS	*8-12 28-30* N=40				17.0–18.4	Brownish yellow (10YR6/8), wet, medium dense, silty SAND with gravel.			
10	22/22 *100%*	SS	*8-44 65-60/4"* N=109				18.4–19.8	Grayish brown (10YR5/2), slightly moist, hard, clayey SILT with sand and gravel.			

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18
Elevation scale (ft. MSL): 624, 622, 620, 618, 616, 614, 612, 610, 608, 606

End of Boring = 19.8 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/9/2010
Finish: 2/9/2010
WEATHER: Cold, windy, snow (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers

FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: T128
Well ID: T128
Surface Elev: 626.27 ft. MSL
Completion: 22.00 ft. BGS
Station: 875,509.70N
2,513,909.45E

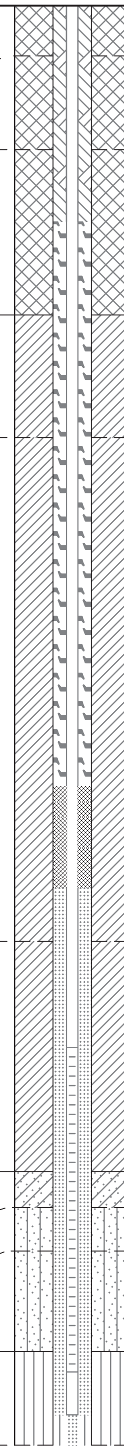
TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.84 - While drilling
▼ =
▽ = 12.35 - 3/1/10

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	12/24 *50%*	SS	*37-17 15-18* N=32	14		
2A	7/24 *29%*	SS	*4-7 7-13* N=14			
3A	12/24 *50%*	SS	*3-4 6-8* N=10	26		
4A	19/24 *79%*	SS	*2-4 5-7* N=9	24		
5A	22/24 *92%*	SS	*1-3 4-5* N=7	20		
6A	22/24 *92%*	SS	*1-3 5-5* N=8	20		
7A	22/24 *92%*	SS	*2-3 4-5* N=7	19		
8A	20/24 *83%*	SS	*2-2 3-3* N=5	18		
9A	22/24 *92%*	SS	*woh-1 8-7* N=9	19		
9B				18		
10A						
10B	18/24 *75%*	SS	*3-10 13-11* N=23	17		

Depth ft. BGS	Lithologic Description
0	FILL - Brown (10YR5/3) with 5% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, hard (frozen), silty CLAY with trace sand and slight trace gravel.
	FILL - Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, hard (frozen), silty CLAY with slight trace sand and gravel.
2	FILL - Brown (10YR5/3) with 10% gray (10YR5/1) and 5% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand and gravel.
4	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with slight trace sand, slight trace roots.
6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY with trace sand and slight trace gravel.
12 ▽	
	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, medium, silty CLAY with trace sand and slight trace gravel.
16	Brown (10YR5/3), moist, soft, clayey SAND with slight trace gravel.
▼	Gray (10YR6/1), wet, loose, silty, very fine- to coarse-grained SAND.
	Brown (10YR5/3), wet, loose, silty, very fine- to fine-grained SAND.
18	Brown (10YR5/3), slightly moist, very stiff, clayey SILT with trace sand and gravel.
20	

Borehole Detail



Elevation ft. MSL	Remarks
626	
624	
622	
620	
618	
616	
614	
612	
610	
608	

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project:
DATES: Start: 2/9/2010
Finish: 2/9/2010
WEATHER: Cold, windy, snow (lo-20's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: T. List
Helper: M. Herbst/S. Hamby
Eng/Geo: S. Simpson

BOREHOLE ID: T128
Well ID: T128
Surface Elev: 626.27 ft. MSL
Completion: 22.00 ft. BGS
Station: 875,509.70N
2,513,909.45E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 16.84 - While drilling
▼ =
▽ = 12.35 - 3/1/10

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	TESTING *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
										606	
11A	24/24 *100%*	SS	*8-16 18-25* N=34	16				Dark gray (10YR4/1), slightly moist, hard, clayey SILT with trace sand and gravel.			
							22				

End of Boring = 22.0 ft. BGS

NOTE(S): Well completed prior to construction of berm road. Boring surface elevation is as of the well install date and not the final constructed elevation.

FIELD BORING LOG

HANSON

CLIENT: AEG Coffeen Power Station
Site: CCB Management Facility
Location: Coffeen, Illinois
Project: 05S3004A
DATES: Start: 10/15/2010
Finish: 10/15/2010
WEATHER: Sunny (mid-50's)

CONTRACTOR: Layne-Western Co
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4¼" HSA w/SS samplers
FIELD STAFF: Driller: D. Mahurin
Helper: J. Litsch/D. Smail
Eng/Geo: R. Hasenyager

BOREHOLE ID: T202
Well ID: T202
Surface Elev: 626.22 ft. MSL
Completion: 18.00 ft. BGS
Station: 876,699.42N
2,514,895.01E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - While drilling
▼ = 15.42 - Upon completion
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*
1A	23/24 *96%*	SS	*6-4 5-7* N=9	27		
2A	24/24 *100%*	SS	*3-4 6-6* N=10	25		
2B				26		
3A	22/24 *92%*	SS	*2-4 5-6* N=9	22		
4A	23/24 *96%*	SS	*1-2 3-3* N=5	21		
5A	23/24 *96%*	SS	*1-1 3-2* N=4	22		
6A	24/24 *100%*	SS	*woh-1 3-3* N=4	23		
6B				21		
7A	24/24 *100%*	SS	*1-2 1-2* N=3	21		
7B				25		
8A	24/24 *100%*	SS	*woh-2 1-8* N=3	17		
9A	24/24 *100%*	SS	*6-15 20-24* N=35	9		

Depth ft. BGS	Lithologic Description
0–0.6	FILL - Yellowish brown (10YR5/6), slightly moist, hard, silty CLAY with trace sand and gravel.
0.6–3.2	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, hard, silty CLAY with slight trace sand and gravel.
3.2–6.2	Yellowish brown (10YR5/8) with 35% gray (10YR5/1) and 15% very dark brown (10YR2/2) mottles, moist, hard, silty CLAY with trace sand and slight trace gravel.
6.2–10	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, soft, silty CLAY with trace sand and slight trace gravel.
10–11	Gray (10YR6/1) with 15% yellowish brown (10YR5/8) mottles, very moist, soft, silty CLAY with sand and slight trace gravel.
11–13.3	Yellowish brown (10YR5/8) with 10% gray (10YR6/1) mottles, very moist, firm, silty CLAY with sand and trace gravel.
13.3–14.4	Gray (10YR6/1) with 10% brownish yellow (10YR6/6) mottles, very moist, soft, sandy CLAY with silt and slight trace gravel.
14.4–15.8	Gray (10YR5/1), wet, loose, very fine- to medium-grained SAND with trace gravel.
15.8–18	Gray (10YR6/1), moist, hard, very silty CLAY with sand and trace gravel.

Depth scale (ft. BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18
Elevation scale (ft. MSL): 626, 624, 622, 620, 618, 616, 614, 612, 610

Borehole Detail | Remarks

End of Boring = 18.0 ft. BGS

NOTE(S): T202 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/17/2016
Finish: 8/17/2016
WEATHER: Hazy, (low-80s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: T408
Well ID: T408
Surface Elev: 621.09 ft. MSL
Completion: 25.92 ft. BGS
Station: 2,515,314.91N
2,515,314.91E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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	Elevation ft. MSL	Remarks
	0/60 *0%*	BD					0–2.3	Black (10YR2/1), moist, soft, clayey SILT (TOPSOIL)	620	
							2.3–5	Gray (10YR6/1) with 30% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY	618	
	0/60 *0%*	BD					5–5.9	Gray (10YR6/1), moist, firm, silty CLAY slight trace sand	616	
							5.9–6	Gray (10YR5/1), very moist, soft, clayey, very fine- to fine-grained SAND		
							6–8	Gray (10YR6/1) with 25% yellowish brown (10YR5/8) mottles, moist, firm, silty CLAY with sand and trace gravel	614	
							8–10.7	Yellowish brown (10YR5/8) with 40% gray (10YR6/1) mottles, moist, firm, silty CLAY with sand and trace gravel	612	
	0/60 *0%*	BD					10.7–11	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND	610	
							11–11.6	Dark brown (10YR3/3), very moist, soft, clayey, fine- to very coarse-grained SAND with slight trace gravel		
							11.6–12	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		
							12	Dark yellowish brown (10YR4/4), moist, soft, sandy SILT with trace gravel	608	
							12–14	Yellowish brown (10YR5/4), wet, loose, very fine- to fine-grained SAND		
							14	Gray (10YR5/1), moist, very hard, very silty CLAY with sand and gravel		
4A	22/24 *92%*	SS	*8-16* *33-35* N=49			*4.50*	14–18	Dark gray (10YR4/1), moist, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.	606, 604	
	0/36 *0%*	BD					18–20	Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and trace small gravel.	602	

NOTE(S): T408 installed in boring.
Boring was blind drilled to 26.0 feet bgs. Blind drill lithologies from boring G405 and G405D.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/17/2016
Finish: 8/17/2016
WEATHER: Hazy, (low-80s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: T408
Well ID: T408
Surface Elev: 621.09 ft. MSL
Completion: 25.92 ft. BGS
Station: 2,515,314.91N
2,515,314.91E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
								Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.			
								Dark gray (10YR4/1), moist, dense, fine- to coarse-grained SAND.		600	
	0/36 *0%*	BD					22				
7-1								Dark gray (10YR4/1), dry, hard, SILT with few fine- to coarse-grained sand, little clay and little small gravel.		598	
7-2	20/24 *83%*	DS					24				
7-3											
7-4										596	
	0/12 *0%*	BD									

End of Boring = 25.92 ft. BGS

NOTE(S): T408 installed in boring.
Boring was blind drilled to 26.0 feet bgs. Blind drill lithologies from boring G405 and G405D.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Cloudy, (70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: T409
Well ID: T409
Surface Elev: 621.85 ft. MSL
Completion: 26.99 ft. BGS
Station: 2,514,693.89N
2,514,693.89E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
								Dark brown (10YR3/3), moist, stiff, SILT with few clay and trace organics.			
	0/60 *0%*	BD					2	Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay and trace small gravel.		620	
								Brown (10YR5/3) with 10% dark brown (10YR3/3) mottles, SILT with some clay.			
							4	Grayish brown (10YR5/2) with 5% dark yellowish brown (10YR4/6) mottles, moist, stiff, CLAY with few silt and little fine-grained sand.		618	
								Very pale brown (10YR7/4) with 25% yellowish brown (10YR5/6) mottles, moist, medium, CLAY with trace silt.			
	0/60 *0%*	BD					6	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt and trace fine- to medium-grained sand.		616	
							8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with little silt, little fine- to medium-grained sand and trace small gravel.		614	
							10	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) and 5% very dark gray (10YR3/1) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.		612	
	0/60 *0%*	BD					12	Gray (10YR6/1) with 25% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with few fine- to medium-grained sand, little silt, and trace small gravel.		610	
							14	Gray (10YR6/1) with 10% brownish yellow (10YR6/8) and 5% strong brown (7.5YR4/6) mottles, moist, stiff, CLAY with some fine- to medium-grained sand, little silt, and trace small gravel.		608	
							16	Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, wet, loose, fine-grained SAND with some clay.		606	
								Gray (10YR6/1) with 5% brownish yellow (10YR6/6) mottles, moist, loose, fine-grained SAND with some clay.			
	0/60 *0%*	BD					18	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel.		604	
							20			602	

NOTE(S): T409 installed in boring.
Boring was blind drilled to 27.0 feet bgs. Blind drill lithologies from boring G406D.

FIELD BORING LOG

HANSON

CLIENT: Natural Resources Technology, Inc.
Site: Coffeen Power Station - Ash Pond 2
Location: 134 CIPS Lane, Coffeen, IL 62017
Project: 16E0080
DATES: Start: 8/19/2016
Finish: 8/19/2016
WEATHER: Cloudy, (70s)

CONTRACTOR: Bulldog Drilling, Inc.
Rig mfg/model: CME-750 ATV Drill
Drilling Method: 4 1/4" Hollow Stem Auger

FIELD STAFF: Driller: J. Dittmaier
Helper: M. Hill
Eng/Geo: K. Theesfeld

BOREHOLE ID: T409
Well ID: T409
Surface Elev: 621.85 ft. MSL
Completion: 26.99 ft. BGS
Station: 2,514,693.89N
2,514,693.89E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen
Township: East Fork
Section 11, **Tier** 7 N.; **Range** 3 W.

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
	0/36 *0%*	BD					22	Gray (10YR5/1), dry, hard, SILT with few clay, few fine- to coarse-grained sand and trace small gravel. *[Continued from previous page]*		600	
6-1 6-2 6-3 6-4	0/24 *0%*	DS					24	Pale brown (10YR6/3), wet, loose, fine-grained SAND.		598	
								Pale brown (10YR6/3), wet, loose, fine-grained SAND and small GRAVEL.			
								Gray (10YR5/1), dry, hard, SILT with some clay, trace fine- to coarse-grained sand and trace small gravel.		596	
	0/24 *0%*	BD					26	Dark gray (10YR4/1), dry, hard, CLAY with some silt, trace fine- to coarse-grained sand and trace small gravel.			

End of Boring = 26.99 ft. BGS

NOTE(S): T409 installed in boring.
Boring was blind drilled to 27.0 feet bgs. Blind drill lithologies from boring G406D.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Holdings
Site: Coffeen Power Station
Location: Coffeen, Montgomery County, Illinois
Project: 14E0078
DATES: Start: 10/28/2014
Finish: 10/28/2014
WEATHER: Overcast, mild - mid 50's

CONTRACTOR: Ramsey
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: 4¼" Hollow Stem Auger with Split spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: TA31
Well ID: TA31
Surface Elev: 623.89 ft. MSL
Completion: 20.19 ft. BGS
Station: 876,542.25N
2,513,856.77E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 8.11 - 10/30/2014
▼ =
▽ =

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
1	24/24 *100%*	SS	*1-2 2-2* N=4	26		
2	22/24 *92%*	SS	*2-3 3-4* N=6	28		1.44 B
3	23/24 *96%*	SS	*2-3 4-4* N=7	20		1.71 Sh
4	24/24 *100%*	SS	*6-7 6-6* N=13	22		1.55 Sh
5	22/24 *92%*	SS	*2-2 2-4* N=4	22		1.55 Sh
6	24/24 *100%*	SS	*2-1 3-2* N=4	20		0.93 B
7A	24/24 *100%*	SS	*2-3 3-3* N=6	19		
7B				22		
8A	24/24 *100%*	SS	*4-5 8-7* N=13	12		
8B				13		
9	22/24 *92%*	SS	*5-4 4-4* N=8	18		
10	16/24 *67%*	SS	*2-4 3-5* N=7	12		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–7.5	Yellowish brown (10YR5/4), moist, soft, SILT with little clay and trace very fine sand. Brown (10YR4/3), moist, soft, SILT with little clay and trace very fine sand.	622, 620, 618
7.5–10	Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, soft, CLAY with few silt and trace very fine to fine sand.	616, 614
10–13.1	Brownish yellow (10YR6/6) with 20% gray (10YR6/1) mottles, moist, soft, CLAY with few silt and little very fine to fine sand and trace small gravel.	612
13.1–14	Brownish yellow (10YR6/6), wet, slightly dense, SAND (very fine to coarse) with little sand and silt and trace clay and small gravel.	610
14–14.7	Brownish yellow (10YR6/6), moist, soft, CLAY with few silt and trace very fine to fine sand and small gravel.	
14.7–15.4	Brownish yellow (10YR6/6) wet, loose, SAND (very fine to very coarse) and trace small gravel.	
15.4–16	Brownish yellow (10YR6/6) very moist, soft, SAND (very fine to medium) with few clay and silt.	608
16–17	Yellowish brown (10YR5/8), moist, soft, CLAY with few silt and trace sand (very fine to very coarse) and small gravel.	
17–19.5	Yellowish brown (10YR5/8), wet, loose, very fine to very coarse SAND.	606
19.5–20.19	Gray (10YR5/1), moist, hard, CLAY with few silt and (very fine to very coarse) sand and small gravel.	604

End of Boring at 20.19 ft.

Borehole Detail | Remarks

NOTE(S): Monitoring well TA31 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Holdings
Site: Coffeen Power Station
Location: Coffeen, Montgomery County, Illinois
Project: 14E0078
DATES: Start: 10/27/2014
Finish: 10/27/2014
WEATHER: Partly sunny, mild - mid 70's

CONTRACTOR: Ramsey
Rig mfg/model: D-50 Turbo Tracked MST 800ATV
Drilling Method: 4¼" Hollow Stem Auger with Split spoon
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: TA32
Well ID: TA32
Surface Elev: 618.93 ft. MSL
Completion: 16.47 ft. BGS
Station: 877,532.57N
2,513,605.19E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 14.05 - 10/30/2014
▼ =
▽ =

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
1	18/24 *75%*	ss	*2-1 2-3* N=3	21		
	21/24 *88%*	ss	*2-1 1-1* N=2			
2				28		
3A				24		
	14/24 *58%*	ss	*1-1 3-3* N=4			
3B				22		1.15 Sh
4	20/24 *83%*	ss	*4-5 4-7* N=9	22		0.96 B
	21/24 *88%*	ss	*4-7 12-22* N=19			
5				9		8.45 Sh
	21/24 *88%*	ss	*6-16 27-42* N=43			
6				8		10.47 Sh
7	12/24 *50%*	ss	*36-55 50/4"*	6		
8	16/24 *67%*	ss	*16-35 69* N=104	8		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0 – ~3.1	Dark yellowish brown (10YR4/4), moist, soft, clayey SILT with trace sand (very fine).	618, 616	
~3.1 – ~4.8	Black (10YR2/1), moist, soft, clayey SILT with trace sand (very fine).		
~4.8 – ~7.2	Very dark gray (10YR3/1), moist, soft, CLAY with little silt and trace sand (very fine to fine).	614, 612	
~7.2 – ~8.6	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, medium, CLAY with little silt and trace sand (very fine to very coarse) and gravel (small).		
~8.6 – ~13	Yellowish brown (10YR5/8) with 30% Gray (10YR5/1) mottles, slightly moist, very hard, CLAY with silt and little sand (very fine to very coarse) trace gravel (small).	610, 608, 606	
~13 – ~13.5	Yellowish brown (10YR5/8), slightly moist, loose, SAND (very fine to very coarse) and few gravel (small to medium).		
~13.5 – ~14.4	Gray (10YR5/1), slightly moist, very hard, CLAY with silt and few gravel (small to medium). ▼ 14		
~14.4 – ~14.9	Gray (10YR5/1), moist, dense, SAND (very fine to coarse).	604	
~14.9 – 16.47	Gray (10YR5/1), slightly moist, very hard, CLAY with silt and few gravel (small to medium).		

End of Boring at 16.47 ft.

NOTE(S): Monitoring well TA32 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Well Sealing & Assmt Well Install
Location: Coffeen, Illinois
Project: 14E0078A
DATES: Start: 6/2/2015
Finish: 6/2/2015
WEATHER: Sunny, calm, hi-60s

CONTRACTOR: Ramsey
Rig mfg/model: Diedrich D-50
Drilling Method: 3 ¼" HSA, blind drill
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: TA33b
Well ID: TA33
Surface Elev: 622.51 ft. MSL
Completion: 17.44 ft. BGS
Station: 876,605.45N
2,513,248.73E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = Dry - during drilling
▼ = 7.00 - 6/16/15
▽ =

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	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0 – 0.6	Yellowish brown (10YR5/4), moist, stiff, clayey SILT, trace very fine-grained sand, roots.		622	
							– 2.6	Light brownish gray (10YR6/2) with 35% yellowish brown (10YR5/6) mottles, moist, stiff to very stiff, clayey SILT, trace very fine- to fine-grained sand.		620	
							– 4.5	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, very stiff, clayey SILT, little fine- to medium-grained sand, trace coarse-grained sand.		618	
							– 7.8 (water ▼ 7.00)	Gray (10YR5/1) with 5-10% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY, little fine- to medium-grained sand, trace coarse-grained sand.		616	
							– 8.7	Dark yellowish brown (10YR4/6) with 3% gray (10YR6/1) mottles, moist, very stiff, silty CLAY, little fine- to coarse-grained sand, trace small gravel.		614	
							– 10.4	Gray (10YR6/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY, little fine- to coarse-grained sand, trace small gravel.		612	
							– 11.9	Gray (10YR6/1) moist, medium, fine- to coarse-grained sandy CLAY, little silt, trace small to large gravel.			
							– 13.6	Brown (10YR5/3) with 5% dark yellowish brown (10YR4/6) mottles, slightly moist, very stiff, very fine- to fine-grained sandy SILT, trace medium- to coarse-grained sand, trace small to large gravel, friable.		610	
							– 14.3	Dark yellowish brown (10YR4/6), very moist, dense, silty,very fine- to medium-grained SAND.		608	
							– 17.44	Brown (10YR5/3), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.		606	

End of boring = 17.44 feet

NOTE(S): TA33 installed in bore hole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Well Sealing & Assmt Well Install
Location: Coffeen, Illinois
Project: 14E0078A
DATES: Start: 6/2/2015
Finish: 6/2/2015
WEATHER: Sunny, calm, hi-60s

CONTRACTOR: Ramsey
Rig mfg/model: Diedrich D-50
Drilling Method: 3 ¼" HSA, split spoon sampler

FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: TA33a
Well ID: n/a
Surface Elev: 622.5 ft. MSL
Completion: 30.0 ft. BGS
Station: 876,610.00N
2,513,248.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.80 - 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
							0–0.3	Yellowish brown (10YR5/4), moist, stiff, clayey SILT, trace very fine-grained sand, roots.		
1A	21/24 *88%*	SS	*2-3 5-5* N=8				0.3–2.6	Light brownish gray (10YR6/2) with 35% yellowish brown (10YR5/6) mottles, moist, stiff to very stiff, clayey SILT, trace very fine- to fine-grained sand.	622	
2A	20/24 *83%*	SS	*3-4 4-5* N=8				2.6–4.5	Gray (10YR5/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, very stiff, clayey SILT, little fine- to medium-grained sand, trace coarse-grained sand.	620	
3A	23/24 *96%*	SS	*5-6 6-9* N=12				4.5–7.8	Gray (10YR5/1) with 5-10% dark yellowish brown (10YR4/6) mottles, moist, very stiff, silty CLAY, little fine- to medium-grained sand, trace coarse-grained sand.	618	
4A	24/24 *100%*	SS	*10-10 10-10* N=20						616	
							7.8–8.7	Dark yellowish brown (10YR4/6) with 3% gray (10YR6/1) mottles, moist, very stiff, silty CLAY, little fine- to coarse-grained sand, trace small gravel.	614	
5A	21/24 *88%*	SS	*2-4 6-6* N=10				8.7–10.4	Gray (10YR6/1) with 30% dark yellowish brown (10YR4/6) mottles, moist, stiff, silty CLAY, little fine- to coarse-grained sand, trace small gravel.		
6A	24/24 *100%*	SS	*0-3 4-8* N=7				10.4–11.9	Gray (10YR6/1) moist, medium, fine- to coarse-grained sandy CLAY, little silt, trace small to large gravel.	612	
7A	24/24 *100%*	SS	*15-27 32-41* N=59				11.9–13.6	Brown (10YR5/3) with 5% dark yellowish brown (10YR4/6) mottles, slightly moist, very stiff, very fine- to fine-grained sandy SILT, trace medium- to coarse-grained sand, trace small to large gravel, friable.	610	
7B							13.6–14.3	Dark yellowish brown (10YR4/6), very moist, dense, silty,very fine- to medium-grained SAND.		
8A	20/24 *83%*	SS	*5-12 18-22* N=30				14.3–18.0	Brown (10YR5/3), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.	608	
9A	16/24 *67%*	SS	*23-44 50/5"*						606	
10A	22/24 *92%*	SS	*12-12 22-25* N=34				18.0–20	Dark gray (10YR4/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small to large gravel.	604	

NOTE(S): Borehole sealed with high-solids bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Well Sealing & Assmt Well Install
Location: Coffeen, Illinois
Project: 14E0078A
DATES: Start: 6/2/2015
Finish: 6/2/2015
WEATHER: Sunny, calm, hi-60s

CONTRACTOR: Ramsey
Rig mfg/model: Diedrich D-50
Drilling Method: 3 ¼" HSA, split spoon sampler
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: TA33a
Well ID: n/a
Surface Elev: 622.5 ft. MSL
Completion: 30.0 ft. BGS
Station: 876,610.00N
2,513,248.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 3, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.80 - 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	Elevation ft. MSL	Remarks
11A	24/24 *100%*	SS	*11-17* *25-32* N=42					Dark gray (10YR4/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small to large gravel. *[Continued from previous page]*	602	
12A	23/24 *96%*	SS	*17-23* *35-44* N=58				22		600	
13A	21/24 *88%*	SS	*26-30* *30-37* N=60				24		598	
14A	18/24 *75%*	SS	*19-35* *47-50* N=82				26		596	
15A	24/24 *100%*	SS	*18-27* *34-35* N=61				28		594	
							30	**End of boring = 30.0 feet**		

NOTE(S): Borehole sealed with high-solids bentonite grout.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company
Site: Coffeen Well Sealing & Assmt Well Install
Location: Coffeen, Illinois
Project: 14E0078A
DATES: Start: 6/3/2015
Finish: 6/3/2015
WEATHER: Mostly cloudy, windy, mid-60s

CONTRACTOR: Ramsey
Rig mfg/model: Diedrich D-50
Drilling Method: 3 ¼" HSA, split spoon sampler
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: S. Keim

BOREHOLE ID: TA34
Well ID: TA34
Surface Elev: 624.10 ft. MSL
Completion: 16.10 ft. BGS
Station: 875,906.10N
2,513,466.73E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 10, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▼ = 13.00 - during drilling
▼ = 8.10 - 6/16/15
▽ =

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	Elevation ft. MSL	Remarks
1A	21/24 *88%*	SS	*3-3 3-3* N=6				0–0.7	Gray (10YR5/1) with 10% dark yellowish brown (10YR3/6) mottles, moist, stiff, SILT, some clay, trace very fine-grained, roots.	624	
							0.7–2	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, very stiff, silty CLAY, trace fine-grained sand.	622	
2A	17/24 *71%*	SS	*2-2 4-6* N=6				2–4	Light grayish brown (10YR6/2) with 15% yellowish brown (10YR5/6) mottles, slightly moist, very stiff, silty CLAY, trace fine-grained sand.	620	
3A	22/24 *92%*	SS	*3-3 3-4* N=6				4–8	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, little fine-grained sand, trace medium- to coarse-grained sand.	618	
4A	24/24 *100%*	SS	*3-4 6-7* N=10						616	
5A	24/24 *100%*	SS	*2-2 5-5* N=7				8–12	Grayish brown (10YR5/2) with 25% yellowish brown (10YR5/6) mottles, moist, stiff, silty CLAY, little fine-grained sand, trace medium- to coarse-grained sand, trace small gravel.	614	
6A	22/24 *92%*	SS	*3-3 4-5* N=7						612	
7A	21/24 *88%*	SS	*3-3 4-5* N=7				12–13.5	Dark yellowish brown (10YR4/6) with 15% light gray (10YR7/1) mottles, very moist, very soft, fine- to medium-grained sandy CLAY, trace coarse-grained sand.		
7B							13.5–14	Gray (10YR6/1), very moist, loose, clayey, silty, fine- to medium-grained SAND, trace coarse grained sand.	610	
8A	24/24 *100%*	SS	*18-28 25-32* N=53				14–14.7	Brown (10YR5/3), very moist, very dense, silty,fine- to coarse-grained SAND and small to large GRAVEL.		
							14.7–15.3	Yellowish brown (10YR5/6), slightly moist, hard, clayey SILT, little fine- to coarse-grained sand, trace small gravel.		
8B							15.3–16	Gray (10YR6/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.		
8C							16–16.1	Dark gray (10YR4/1), slightly moist, hard, clayey SILT, few fine- to coarse-grained sand, trace small gravel.	608	

End of boring = 16.1 feet

NOTE(S): TA34 installed in bore hole.

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: ______ Well #: TR32

Site Name: Coffeen Power Station Borehole #: TR32

State Plane Coordinate: X 2,513,605.0 Y 877,523.7 (or) Latitude: 39° 4' 2663.000" Longitude: 89° 24' 8.070"

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 7/2/2019 Date Finished: 7/2/2019

Report Form Completed By: Rhonald W. Hasenyager Date: 7/3/2019

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite

Installation Method: Gravity

Setting Time: 30 min.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

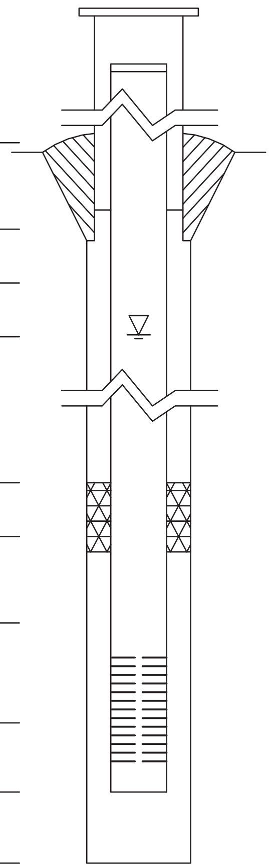
Type of Sand Pack: Quartz Sand

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.)
621.97	-2.69	Top of Protective Casing
621.68	-2.40	Top of Riser Pipe
619.28	0.00	Ground Surface
616.28	3.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
609.77	9.51	Top of Sand Pack
608.28	11.00	Top of Screen
603.60	15.68	Bottom of Screen
603.11	16.17	Bottom of Well
603.11	16.17	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)	13.40
Bottom of Screen to End Cap	(feet)	0.49
Screen Length (1st slot to last slot)	(feet)	4.68
Total Length of Casing	(feet)	18.57
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: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 10.90 - During Drilling
▽ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	21/24 *88%*	SS	*3-4 5-10* N=9					Dark yellowish brown (10YR4/4), moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel, trace roots. [FILL]	616	
2A	22/24 *92%*	SS	*3-4 6-9* N=10				2	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	614	
3A	19/24 *79%*	SS	*2-4 6-8* N=10				4	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	612	
4A	23/24 *96%*	SS	*2-5 5-6* N=10				6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) and 5% yellowish red (5YR4/6) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	610	
5A	24/24 *100%*	SS	*2-3 5-6* N=8				8			
5B								Dark yellowish brown (10YR3/6), moist, stiff, SILT, with some very fine- to medium-grained sand, few clay and small gravel.	608	
6A	24/24 *100%*	SS	*0-1 2-2* N=3				10	Gray (10YR6/1) with 10% dark yellowish brown (10YR3/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, few small gravel.		
6B							▽	Dark yellowish brown (10YR3/6), wet, loose, SILT, with some very fine- to fine-grained sand, few clay and small gravel.	606	
7A	18/24 *75%*	SH					12	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel.	604	
8A	14/14 *100%*	SS	*26-43 50/2"*				14	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel.	602	
9A	24/24 *100%*	SS	*5-12 18-22* N=30				16		600	
10A	24/24 *100%*	SS	*4-11 13-20* N=24				18	Brown (10YR5/3) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some clay and very fine- to fine-grained sand, few small gravel.	598	
							20			

NOTE(S): G275 installed in adjacent blind drill borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 10.90 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS
11A	24/24 *100%*	SS	*3-9 13-22* N=22				20–22
12A	24/24 *100%*	SS	*7-14 20-24* N=34				22–24
13A	24/24 *100%*	SS	*6-11 15-21* N=26				24–26
14A	18/24 *75%*	SS	*4-8 12-10* N=20				26–28
15A	24/24 *100%*	SS	*5-7 13-17* N=20				28–30
16A	23/24 *96%*	SS	*4-7 12-16* N=19				30–32
17A	2/24 *8%*	SS	*4-10 13-17* N=23				32–34
18A	21/24 *88%*	SH					34–36
19A	24/24 *100%*	SS	*3-6 10-14* N=16				36–38
20A	4/24 *17%*	SS	*3-8 11-17* N=19				38–40

Lithologic Description

(to 22 ft.) Brown (10YR5/3) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some clay and very fine- to fine-grained sand, few small gravel.
[Continued from previous page]

(22–40 ft.) Dark gray (10YR4/1) with frequent dark yellowish brown (10YR3/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.

Elevation ft. MSL: 596, 594, 592, 590, 588, 586, 584, 582, 580, 578

Remarks

Vertical fractures with oxidation from 22 to 24 ft, no oxidation below 24 ft.

Occasional thin SILT and SAND lenses from 25.3 to 25.8 ft.

Trace wood fragments below 28 ft.

NOTE(S): G275 installed in adjacent blind drill borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 10.90 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
21A	24/24 *100%*	SS	*4-8 11-15* N=19			
22A	24/24 *100%*	SS	*7-8 11-17* N=19			
23A	24/24 *100%*	SS	*5-8 13-40* N=21			
24A	23/24 *96%*	SS	*22-45 35-23* N=80			
25A	24/24 *100%*	SS	*7-9 14-21* N=23			
26A	24/24 *100%*	SS	*3-8 15-15* N=23			
27A	17/24 *71%*	SS	*12-27 13-15* N=40			
28A	24/24 *100%*	SS	*4-9 11-13* N=20			
29A	24/24 *100%*	SS	*5-9 13-12* N=22			
30A	24/24 *100%*	SS	*3-4 7-14* N=11			

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
42, 44	Dark gray (10YR4/1) with frequent dark yellowish brown (10YR3/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel. *[Continued from previous page]*	576, 574, 572	0.5" lignite fragment seam at 42.8 ft.
46, 48	Dark gray (10YR4/1), moist, hard, SILT, with some to little clay and very fine- to fine-grained sand, few small to medium gravel.	570	
	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.		
50	Very dark gray (10YR3/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel, trace wood fragments.	568	
	Dark gray (10YR3/1), moist, SILT, with some very fine-grained sand seams.		Methane deposit encountered at approx. 51 ft.
52	Dark gray (10YR4/1) with 15% dark grayish brown (10YR4/2) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand, small gravel and wood fragments.	566	
54	Gray (10YR5/1), moist, dense, very fine- to medium-grained SAND, with some silt, trace small gravel.	564	
56	Very dark grayish brown (10YR3/2), moist, hard, lean CLAY, with some silt, trace very fine-grained sand and organics.	562	
58	Very dark grayish brown (10YR3/2) with 10% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, trace very fine-grained sand and organics.	560	
	Very dark grayish brown (10YR3/2), wet, SAND, with some silt.		
60	Gray (GLEY15/1) with 20% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.	558	

NOTE(S): G275 installed in adjacent blind drill borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
$\underline{\nabla}$ = 10.90 - During Drilling
$\underline{\nabla}$ =
$\underline{\blacktriangledown}$ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
31A	24/24 100%	SS	0-4 5-7 N=9					Gray (GLEY15/) with 30% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.		556	
							62				
32A	24/24 100%	SS	4-6 8-11 N=14							554	
33A	24/24 100%	SH					64	Greenish gray (GLEY15/1) with 15% very dark gray (10YR3/1) mottles, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.		552	
							66				
34A	24/24 100%	SS	5-10 22-41 N=32							550	
							68				
35A	24/24 100%	SS	12-24 33-45 N=57							548	
							70	Yellowish brown (10YR5/4) with occasional thin greenish gray (GLEY15/1) seams, moist, hard, lean CLAY, with some silt, few small gravel, trace very fine-grained sand.			Trace medium gravel at 70 ft.
36A	23/24 96%	SS	6-14 25-30 N=39							546	
							72				
37A	24/24 100%	SS	8-18 24-32 N=42							544	
							74				
38A	24/24 100%	SS	7-16 25-29 N=41							542	
							76	Yellowish brown (10YR5/4) with 15% gray (10YR6/1) mottles, moist, hard, lean CLAY, with some silt, few small gravel, trace very fine-grained sand.			
39A	24/24 100%	SS	7-15 20-21 N=35							540	
							78				
	19/24 79%	SS	3-5 7-10 N=12								
40A								Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very		538	
							80				

NOTE(S): G275 installed in adjacent blind drill borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
$\underline{\nabla}$ = 10.90 - During Drilling
$\underline{\blacktriangledown}$ =
$\underline{\blacktriangledown}$ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type
41A	22/24 *92%*	SS	*1-5 7-11* N=12			
42A	24/24 *100%*	SS	*4-14 19-20* N=33			
43A	8/24 *33%*	SS	*6-20 22-23* N=42			
44A	24/24 *100%*	SS	*7-8 16-17* N=24			
45A	24/24 *100%*	SS	*5-13 16-21* N=29			
46A	24/24 *100%*	SS	*4-8 15-9* N=23			
47A						
47B	24/24 *100%*	SS	*5-6 8-10* N=14			
48A	24/24 *100%*	SS	*2-4 7-8* N=11			
49A	24/24 *100%*	SS	*2-6 7-11* N=13			
50A	18/20 *90%*	SS	*3-15 28-50/2"* N=43			

Depth ft. BGS | Lithologic Description | Borehole Detail | Elevation ft. MSL | Remarks

fine-grained sand.
Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.
[Continued from previous page]

Very dark gray (10YR3/1), moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.

Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.

Greenish gray (GLEY15/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.

Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.

Brown (10YR4/3) with 5% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, trace very fine-grained sand and small gravel.

Brown (10YR4/3) with 5% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, few small gravel, trace very fine-grained sand, medium gravel and black (10YR2/1) organics.

Brown (10YR4/3) with 5% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, few small gravel and wood fragments, trace very fine-grained sand, medium gravel and black (10YR2/1) organics.

Very dark grayish brown (10YR3/2), moist, stiff, fat CLAY, with some silt.

Dark grayish brown (10YR4/2), moist, stiff, fat CLAY, with some silt.

Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little to trace very fine-grained sand, trace small gravel.

Greenish gray (GLEY15/1) with 5% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt and very

Depth scale: 82, 84, 86, 88, 90, 92, 94, 96, 98
Elevation scale: 536, 534, 532, 530, 528, 526, 524, 522, 520, 518

NOTE(S): G275 installed in adjacent blind drill borehole.

FIELD BORING LOG

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/28/2021
Finish: 2/3/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G275D
Well ID: G275
Surface Elev: 617.52 ft. MSL
Completion: 99.70 ft. BGS
Station: 874,285.30N
2,516,366.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 10.90 - During Drilling
▽ =
▼ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								fine-grained sand, trace small gravel.			
								End of boring = 99.7 feet			

NOTE(S): G275 installed in adjacent blind drill borehole.

Identified as G206D

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/25/2021
Finish: 1/25/2021
WEATHER: Rain, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G282D
Well ID: 282D
Surface Elev: ft. MSL
Completion: 60.00 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 18.80 - During Drilling
= 55.90 - During Drilling
=

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	15/24 63%	SS	3-3 3-4 N=6				0–0.7	Gray (10YR6/1), wet, loose, GRAVEL, with some sand. [FILL]			
							0.7–2	Brown (10YR5/3), moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand. [FILL]			
2A	17/24 71%	SS	3-4 4-5 N=8				2–4.9	Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand and small gravel. [FILL]			
3A	22/24 92%	SS	2-3 5-6 N=8				4.9–6.5	Grayish brown (10YR5/2), moist, stiff, lean CLAY, with some silt, trace small gravel.			
4A	20/24 83%	SS	3-4 4-5 N=8				6.5–8	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/4) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			
5A	22/24 92%	SS	2-3 5-7 N=8				8–10.3	Grayish brown (10YR5/2) with 10% yellowish brown (10YR5/4) and 5% gray (10YR5/1) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			
6A	20/24 83%	SS	3-4 4-7 N=8				10.3–12.4	Grayish brown (10YR5/2) with 20% yellowish brown (10YR5/4) and 5% gray (10YR5/1) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			
7A	20/24 83%	SS	2-3 4-5 N=7				12.4–14.5	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.			
							14.5–14.8	Dark gray (10YR4/1), moist, stiff, lean CLAY, with some silt.			
8A	20/24 83%	SS	1-2 3-4 N=5				14.8–16.5	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.			
9A	21/24 88%	SS	1-2 2-3 N=4				16.5–18.8	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.			
10A											
10B	24/24 100%	SS	0-1 1-0 N=2				18.8–20	Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, wet, very loose, SILT, with some very fine- to fine-grained sand, few small gravel, trace clay.			

NOTE(S): G282D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/25/2021
Finish: 1/25/2021
WEATHER: Rain, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G282D
Well ID: 282D
Surface Elev: ft. MSL
Completion: 60.00 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 18.80 - During Drilling
= 55.90 - During Drilling
=

Sample Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 100%	SS	3-7 11-16 N=18					Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/6) and 5% yellowish red (5YR4/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel.			
							22	Yellowish brown (10YR5/4), wet, fine- to medium-grained SAND.			
12A	24/24 100%	SS	7-12 17-24 N=29					Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/6) and 5% yellowish red (5YR4/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel, trace medium gravel.			
13A	24/24 100%	SS	9-15 22-22 N=37				24				
14A	22/24 92%	SS	8-17 16-22 N=33				26	Dark gray (10YR4/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel, trace medium gravel.			
15A	21/24 88%	SS	5-11 15-19 N=26				28				
16A	22/22 100%	SS	5-25 33-50/4" N=58				30	Dark gray (10YR4/1), moist, SAND, little silt and clay.			
								Dark gray (10YR4/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel, trace medium gravel.			
17A	22/24 92%	SS	7-10 15-20 N=25				32				
18A	24/24 100%	SS	4-8 10-16 N=18				34				
19A	24/24 100%	SS	5-8 13-15 N=21				36	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, little small gravel.			
20A	21/24 88%	SS	2-4 8-11 N=12				38				
							40				

NOTE(S): G282D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/25/2021
Finish: 1/25/2021
WEATHER: Rain, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G282D
Well ID: 282D
Surface Elev: ft. MSL
Completion: 60.00 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 18.80 - During Drilling
▼ = 55.90 - During Drilling
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	24/24 *100%*	SS	*4-8 11-14* N=19					Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, little small gravel. *[Continued from previous page]*			
22A	22/24 *92%*	SS	*3-7 8-12* N=15				42				
23A	24/24 *100%*	SS	*3-6 9-13* N=15				44				
24A	24/24 *100%*	SS	*4-6 9-12* N=15				46				Trace wood fragments below 45.7 ft.
25A	24/24 *100%*	SS	*4-6 12-13* N=18				48				0.5" gravel seam at 48.5 ft.
26A	24/24 *100%*	SS	*2-7 9-13* N=16				50				
27A	24/24 *100%*	SS	*4-7 11-14* N=18				52				
28A / 28B	24/24 *100%*	SS	*6-12 9-18* N=21				54	Light yellowish brown (10YR6/5), moist, very fine- to medium-grained SAND, with some silt, little small to medium gravel. Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, little small gravel, trace wood fragments.			
29A	24/24 *100%*	SS	*6-10 11-11* N=21				▼ 56	Light yellowish brown (10YR6/5), wet, medium dense, very fine- to coarse-grained SAND, little small gravel, few silt.			
30A	24/24 *100%*	SS	*4-5 8-9* N=13				58	Dark gray (10YR4/1) with 5% dark yellowish brown (10YR3/6) mottles, moist, stiff, lean CLAY, with some silt.			
							60				

NOTE(S): G282D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/25/2021
Finish: 1/25/2021
WEATHER: Rain, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G282D
Well ID: 282D
Surface Elev: ft. MSL
Completion: 60.00 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 18.80 - During Drilling
= 55.90 - During Drilling
=

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								End of boring = 60.0 feet			

NOTE(S): G282D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/18/2021
Finish: 1/18/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G283
Well ID: G283
Surface Elev: 608.30 ft. MSL
Completion: 18.00 ft. BGS
Station: 874,113.00N
2,516,503.00E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 14.00 - During Drilling
▽ =
▼ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A / 1B	19/24 *79%*	SS	*1-2 4-3* N=6				0–0.9	Very dark grayish brown (10YR3/2), moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace roots.	608	
							0.9–2	Yellowish brown (10YR5/4), moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, few small gravel.		
2A	23/24 *96%*	SS	*8-15 24-31* N=39				2–4	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, little small gravel, trace clay.	606	
3A	20/23 *87%*	SS	*5-27 35-50/5"* N=62				4–6.3	Yellowish brown (10YR5/6) with 30% gray (10YR6/1) mottles and frequent yellowish red (5YR4/6) oxidation along fracture faces, moist, hard SILT, with some very fine- to fine-grained sand, little small gravel, trace clay.	604	
4A	18/18 *100%*	SS	*15-31 50/5.5"*				6.3–8	Gray (10YR5/1), moist, hard, SILT, with some very fine- to fine-grained sand, little small gravel, trace clay.	602	
5A	19/22 *86%*	SS	*9-29 38-50/4"* N=67				8–10	Gray (10YR5/1), moist, hard, SILT, with some to little very fine- to fine-grained sand, little small gravel, trace clay.	600	
6A	21/24 *88%*	SS	*12-24 25-30* N=49				10–14	Gray (10YR5/1), moist, hard, SILT, with some to little very fine- to fine-grained sand, little to few small gravel, trace clay.	598	
7A	24/24 *100%*	SS	*14-22 32-38* N=54						596	0.5" very fine-grained SAND seam at 13.6 ft.
8A	22/24 *92%*	SS	*6-17 12-12* N=29				14–16.8 (▽ 14)	Dark gray (10YR4/1), wet, medium dense, very fine- to medium-grained SAND, with some silt, few small gravel, occasional thin clayey seams.	594	
9A / 9B	24/24 *100%*	SS	*0-8 16-19* N=24				16.8–18	Gray (10YR5/1), moist, very stiff, SILT, with some to ltitle very fine-grained sand.	592	

End of boring = 18.0 feet

NOTE(S): G283 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/20/2021
Finish: 1/20/2021
WEATHER: Clear, cool (40s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G284
Well ID: G284
Surface Elev: 615.33 ft. MSL
Completion: 14.00 ft. BGS
Station: 874,423.60N
2,516,922.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 11.60 - During Drilling
▼ =
▼ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 *75%*	SS	*0-2 2-5* N=4				0–1.2	Very dark gray (10YR3/1), moist, very stiff, lean CLAY, some silt, few roots.		614	
							1.2–2.2	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand.			
2A	22/24 *92%*	SS	*1-2 3-4* N=5				2.2–4.6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.		612	
3A	20/24 *83%*	SS	*0-3 4-4* N=7				4.6–6	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) moist, very stiff, lean CLAY, with some very fine-grained sand and silt, few small gravel.		610	
4A	22/24 *92%*	SS	*2-3 4-6* N=7				6–8.9	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) moist, very stiff, lean CLAY, with some very fine-grained sand and silt, few small gravel.		608	
5A / 5B	24/24 *100%*	SS	*2-3 4-4* N=7				8.9–10	Yellowish brown (10YR5/4), moist, loose, SILT, with some very fine- to fine-grained sand, few clay and small gravel.		606	
6A	20/24 *83%*	SS	*1-2 3-3* N=5				10–11.6	Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/6) mottles, moist, loose, SILT, with some very fine- to fine-grained sand, few clay and small gravel.		604	
							11.6–11.8	Yellowish brown (10YR5/4), wet, SAND, with some silt.			
7A	23/24 *96%*	SS	*7-22 27-48* N=49				11.8–12.7	Yellowish brown (10YR5/4) with 20% yellowish brown (10YR5/6) mottles, wet, loose, SILT, with few very fine- to medium-grained sand, little clay, few small gravel.			
							12.7–14	Light yellowish brown (10YR6/4) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, trace very fine-grained sand.		602	

End of boring = 14.0 feet

NOTE(S): G284 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.	**CONTRACTOR:** Roberts		
Site: Coffeen Part 845 Groundwater	**Rig mfg/model:** GeoProbe 8040DT	**BOREHOLE ID:**	G285
Location: Coffeen, Illinois	**Drilling Method:** 4.25" HSA w/SS sampler	**Well ID:**	G285
Project: 20E0111A		**Surface Elev:**	610.54 ft. MSL
DATES: Start: 1/19/2021	**FIELD STAFF: Driller:** Matt	**Completion:**	26.00 ft. BGS
Finish: 1/19/2021	**Helper:** Corey	**Station:**	874,795.00N
WEATHER: Clear, cold (20s)	**Eng/Geo:** C. Colin Winter		2,516,680.40E

TOPOGRAPHIC MAP INFORMATION:
- **Quadrangle:** Coffeen, IL
- **Township:** East Fork Township
- **Section** 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
- ▽ = Dry During Drilling
- ▼ =
- ▼ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
1A	20/24 *83%*	SS	*0-2 3-3* N=5			
2A	18/24 *75%*	SS	*1-3 4-6* N=7			
3A	22/24 *92%*	SS	*2-5 8-9* N=13			
4A	22/24 *92%*	SS	*3-8 12-15* N=20			
5A	21/24 *88%*	SS	*4-11 16-18* N=27			
6A	23/24 *96%*	SS	*3-8 13-17* N=21			
7A	23/24 *96%*	SS	*4-9 12-17* N=21			
8A	23/24 *96%*	SS	*5-14 21-33* N=35			
9A	23/24 *96%*	SS	*5-7 10-15* N=17			
10A	4/24 *17%*	SS	*4-6 12-14* N=18			

Depth ft. BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Elevation ft. MSL: 610, 608, 606, 604, 602, 600, 598, 596, 594, 592

Lithologic Description

Yellowish brown (10YR5/4), moist, stiff, lean CLAY, with some silt, few fine-grained sand.

Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, few very fine-grained sand, trace small gravel.

Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, very stiff, lean CLAY, with some silt, few very fine-grained sand, trace small gravel.

Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.

Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.

Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.

Grayish brown (10YR5/2) with 15% yellowish brown (10YR5/6) mottles and 15% dark reddish brown (5YR3/4) oxidation along vertical fracture, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.

Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel.

Remarks: Sampler pushing gravel in Run 10.

NOTE(S): G285 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT:	Illinois Power Generating Co.	**CONTRACTOR:**	Roberts		
Site:	Coffeen Part 845 Groundwater	**Rig mfg/model:**	GeoProbe 8040DT	**BOREHOLE ID:**	G285
Location:	Coffeen, Illinois	**Drilling Method:**	4.25" HSA w/SS sampler	**Well ID:**	G285
Project:	20E0111A			**Surface Elev:**	610.54 ft. MSL
DATES: Start:	1/19/2021	**FIELD STAFF: Driller:**	Matt	**Completion:**	26.00 ft. BGS
Finish:	1/19/2021	**Helper:**	Corey	**Station:**	874,795.00N
WEATHER:	Clear, cold (20s)	**Eng/Geo:**	C. Colin Winter		2,516,680.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
∇ = Dry During Drilling
∇ =
∇ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
11A	24/24 *100%*	SS	*4-7 9-11* N=16					Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine-grained sand and small gravel. *[Continued from previous page]*		590	
12A	3/24 *13%*	SS	*4-7 8-13* N=15				22			588	Sampler pushing gravel in Run 12.
13A	23/24 *96%*	SS	*3-5 7-11* N=12				24			586	
							26	**End of boring = 26.0 feet**			

NOTE(S): G285 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/19/2021
Finish: 1/19/2021
WEATHER: Clear, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G286
Well ID: G286
Surface Elev: 609.97 ft. MSL
Completion: 10.00 ft. BGS
Station: 875,072.20N
2,516,561.80E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 6.40 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	24/24 *100%*	SS	*0-0* *2-2* N=2				0–2	Dark grayish brown (10YR4/2), moist, medium stiff, SILT, with some clay, trace very fine-grained sand and small gravel.	608 (at 2)	
2A							2–3	Brown (10YR5/3), moist, stiff, SILT, with some clay, few very fine- to fine-grained sand, trace small gravel.		
2B	19/24 *79%*	SS	*0-2* *5-7* N=7				3–4.3	Grayish brown (10YR5/2), moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	606 (at 4)	
3A	19/24 *79%*	SS	*4-7* *5-4* N=12				4.3–6.4	Dark grayish brown (10YR4/2) with 20% grayish brown (10YR5/2) mottles, moist, very stiff, lean CLAY, with some very fine- to medium-grained sand, little silt, few small gravel.	604 (at 6)	
4A	20/24 *83%*	SS	*2-3* *3-4* N=6				6.4–7.4	Gray (10YR5/1) with 10% dark yellowish brown (10YR3/6) mottles, wet, loose, SAND, with some silt and small to medium gravel, trace clay.		
4B							7.4–10	Gray (10YR5/1), moist, hard, SILT, with some very fine- to fine-grained sand, few small gravel.	602 (at 8)	
5A	20/24 *83%*	SS	*2-5* *7-15* N=12				10		600 (at 10)	

End of boring = 10.0 feet

NOTE(S): G286 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/18/2021
Finish: 1/18/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

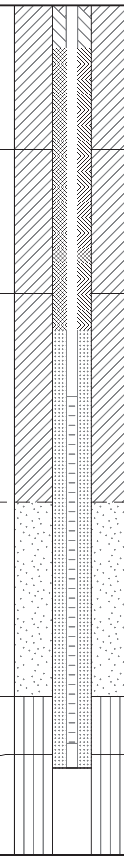
BOREHOLE ID: G287
Well ID: G287
Surface Elev: 614.34 ft. MSL
Completion: 11.80 ft. BGS
Station: 875,442.80N
2,516,415.50E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 6.90 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	12/24 *50%*	SS	*0-1 2-3* N=3				0–2	Gray (10YR5/1), moist, stiff, lean CLAY, with some silt, trace roots.	614	
2A	20/24 *83%*	SS	*1-2 4-6* N=6				2–4	Gray (10YR6/1), moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.	612	
3A	20/24 *83%*	SS	*3-4 5-9* N=9				4–6.9	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small to medium gravel.	610, 608	
4A / 4B	23/24 *96%*	SS	*2-3 3-4* N=6				6.9 ▽			
5A / 5B	20/24 *83%*	SS	*2-3 7-8* N=10				6.9–9.6	Yellowish brown (10YR5/6) with 20% gray (10YR5/1), wet, loose, SAND, with some silt, few small gravel, trace clay.	606	
							9.6–10.4	Gray (10YR6/1) with 30% yellowish brown (10YR5/6), moist, stiff, SILT, with little very fine- to fine-grained sand, few clay and small gravel.	604	
6A	17/22 *77%*	SS	*3-7 15-50/4"* N=22				10.4–11.8	Gray (10YR6/1) with 40% yellowish brown (10YR5/6), moist, stiff, SILT, with some very fine- to fine-grained sand, few clay and little small gravel.		

Borehole Detail



End of boring = 11.8 feet

NOTE(S): G287 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/21/2021
Finish: 1/21/2021
WEATHER: Clear, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G288
Well ID: G288
Surface Elev: 617.08 ft. MSL
Completion: 14.00 ft. BGS
Station: 875,279.60N
2,517,071.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 11.20 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	18/24 *75%*	SS	*1-2 2-3* N=4				0–3.3	Brown (10YR4/3), moist, medium stiff, SILT, with some clay, trace roots.		616	
2A / 2B	20/24 *83%*	SS	*1-1 2-3* N=3							614	
							3.3–5.0	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.			
3A	20/24 *83%*	SS	*2-3 4-4* N=7				5.0–6.6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.		612	
4A	24/24 *100%*	SS	*1-2 4-4* N=6				6.6–10.2	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.		610	
5A	24/24 *100%*	SS	*0-2 2-3* N=4							608	
6A	21/24 *88%*	SS	*1-2 3-5* N=5				10.2–11.2	Light yellowish brown (10YR6/4), moist, stiff, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.		606	
6B							11.2–12.5	Gray (10YR6/1), wet, medium stiff, SILT, with some very fine- to fine-grained sand, few small to medium gravel, occasional thin sand seams.			
7A	22/24 *92%*	SS	*5-12 19-19* N=31				12.5–14.0	Gray (10YR6/1) with 25% dark yellowish brown (10YR4/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay, trace small gravel.		604	

End of boring = 14.0 feet

NOTE(S): G288 installed in borehole.

Identified as SB289

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G289
Well ID: n/a
Surface Elev: ft. MSL
Completion: 60.0 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 18.60 - During Drilling
▼ = 8.00 - 1/27/2021 8am
▼ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	17/24 *71%*	SS	*2-2 4-4* N=6				0–2.3	Brown (10YR4/3) with 10% gray (10YR6/1) and 10% yellowish brown (10YR5/6) mottles, moist, stiff, SILT, with some clay, trace very fine- to fine-grained sand.			
2A	19/24 *79%*	SS	*3-5 6-8* N=11				2.3–5.5	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.			
3A	19/24 *79%*	SS	*3-4 4-10* N=8				5.5–7.0	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.			
4A	21/24 *88%*	SS	*2-2 4-6* N=6				7.0–7.3	Dark gray (10YR4/1), SILT, with some clay.			
5A	18/24 *75%*	SH					7.3–10	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/6) and 5% very pale brown (10YR7/3) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.			
6A	22/24 *92%*	SS	*3-4 4-6* N=8				10–11.2	Dark grayish brown (10YR4/3), moist, stiff, lean CLAY, with some silt.			
6B							11.2–12.3	Gray (10YR6/1) with 20% dark grayish brown (10YR4/2) and 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.			
7A	19/24 *79%*	SS	*3-4 6-6* N=10				12.3–14	Gray (10YR6/1) with 30% dark yellowish brown (10YR4/6) and 20% dark grayish brown (10YR4/2) mottles, moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.			
8A	22/24 *92%*	SS	*3-4 5-6* N=9				14–16	Very dark gray (10YR3/1), moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.			
9A	24/24 *100%*	SS	*2-3 4-4* N=7				16–18.6	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, medium stiff, lean CLAY, with some silt and very fine- to fine-grained sand, few small gravel.			
10A	24/24 *100%*	SS	*2-2 1-2* N=3				18.6–19.3	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist to wet, SILT, with some very fine- to fine-grained sand and clay, few small gravel.			
10B							19.3–20	Strong brown (7.5YR5/8), moist to wet, SILT, with some very			

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G289
Well ID: n/a
Surface Elev: ft. MSL
Completion: 60.0 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 18.60 - During Drilling
▼ = 8.00 - 1/27/2021 8am
▼ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								fine- to fine-grained sand and clay, few small gravel.			
11A	22/24 92%	SS	2-2 4-7 N=6					Strong brown (7.5YR5/8) with 20% gray (10YR6/1) mottles, moist to wet, SILT, with some very fine- to fine-grained sand and clay, few small gravel.			1" wet, fine- to coarse-grained SAND, with little small gravel.
							22	Gray (10YR6/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel.			
12A	21/24 88%	SS	6-20 17-26 N=37					Gray (10YR6/1), wet, SILT, with some sand, little small to medium gravel.			
								Gray (10YR6/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel.			
13A							24	Gray (10YR6/1), wet, loose, very fine- to medium-grained SAND, with some silt, little small to medium gravel.			
13B	23/24 96%	SS	4-23 32-41 N=55								
14A	22/24 92%	SS	23-25 24-27 N=49				26				Trace large gravel from 27 to 28 ft.
15A	23/23 100%	SS	14-22 32-50/5" N=54				28	Gray (10YR6/1), moist, hard, SILT, with some very fine- to fine-grained sand, little clay, few small gravel.			
16A	14/17 82%	SS	4-6 50/5"				30				Trace large gravel from 31 to 31.5 ft.
17A	11/11 100%	SS	27-50/5"				32				
18A	19/24 79%	SS	20-17 15-19 N=32				34				
19A	24/24 100%	SS	7-14 16-16 N=30				36	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine- grained sand, few small gravel.			
20A	24/24 100%	SS	7-12 15-18 N=27				38				
							40				

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G289
Well ID: n/a
Surface Elev: ft. MSL
Completion: 60.0 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 18.60 - During Drilling
= 8.00 - 1/27/2021 8am
=

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
21A	24/24 *100%*	SH						Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, few very fine- to fine- grained sand, few small gravel. *[Continued from previous page]*			
22A	24/24 *100%*	SS	*5-13* *20-22* N=33				42				Trace wood fragments below 42 ft.
23A	22/24 *92%*	SS	*3-7* *11-14* N=18				44				
24A	24/24 *100%*	SS	*4-9* *10-14* N=19				46				
25A	23/24 *96%*	SS	*2-5* *7-10* N=12				48				
26A	24/24 *100%*	SS	*4-10* *12-18* N=22				50				
27A	24/24 *100%*	SS	*5-9* *11-15* N=20				52				
28A	24/24 *100%*	SS	*3-5* *7-8* N=12				54	Gray (10YR5/1) with 15% dark brown (10YR3/6) mottles, moist, stiff, lean CLAY, with some silt.			
29A	24/24 *100%*	SS	*3-5* *9-9* N=14				56	Gray (10YR5/1) with 20% dark brown (10YR3/6) and 10% dark gray (10YR4/1) mottles, moist, stiff, lean CLAY, with some silt.			
30A	24/24 *100%*	SS	*0-4* *8-9* N=12				58				Few fine- to medium-grained sand below 59 ft.
							60				

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/26/2021
Finish: 1/27/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G289
Well ID: n/a
Surface Elev: ft. MSL
Completion: 60.0 ft. BGS
Station: N
E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 18.60 - During Drilling
▼ = 8.00 - 1/27/2021 8am
▼ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								End of boring = 60.0 feet			

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
Finish: 2/9/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G307D
Well ID: G307D
Surface Elev: 622.51 ft. MSL
Completion: 60.00 ft. BGS
Station: 871,397.20N
2,515,560.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 12.80 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) / Qp (tsf) / Failure Type
1A	18/24 75%	SS	3-2 1-2 N=3			
2A	16/24 67%	SS	2-3 5-6 N=8			
3A	24/24 100%	SS	2-3 4-5 N=7			
4A	24/24 100%	SS	3-4 6-7 N=10			
5A	24/24 100%	SH				
6A	24/24 100%	SS	1-2 4-4 N=6			
7A, 7B	20/24 83%	SS	4-7 3-8 N=10			
8A	21/24 88%	SS	0-6 10-13 N=16			
9A	11/11 100%	SS	29-50/5"			
10A	7/9 78%	SS	45-50/3"			

Depth ft. BGS / Lithologic Description / Borehole Detail / Elevation ft. MSL / Remarks

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. Elevation scale: 622, 620, 618, 616, 614, 612, 610, 608, 606, 604.

Greenish gray (GLEY15/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace roots and very fine-grained sand.

Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.

Gray (10YR5/1) with 30% yellowish brown (10YR5/6) and 10% very dark grayish brown (10YR3/2) mottles, moist, stiff, lean CLAY, with some silt, few very fine-grained sand.

Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.

Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.

Gray (10YR5/1), wet, medium stiff, SILT, with some very fine- to fine-grained sand, little clay, trace small gravel.

Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.

Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND, with some silt, few small to medium gravel.

Yellowish brown (10YR4/6), moist, hard, SILT, with some very fine- to medium-grained sand, few clay and small gravel.

Yellowish brown (10YR5/6), wet, loose, very fine- to medium-grained SAND, with some silt, few small to medium gravel.

Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel, trace medium gravel.

NOTE(S): G307D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
Finish: 2/9/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G307D
Well ID: G307D
Surface Elev: 622.51 ft. MSL
Completion: 60.00 ft. BGS
Station: 871,397.20N
2,515,560.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 12.80 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / RQD	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) / Qp (tsf) / Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
11A	8/8 100%	SS	35-50/2"					Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel, trace medium gravel. *[Continued from previous page]*	602	Little sand below 20 ft.
12A	8/9 89%	SS	30-50/3"				22		600	
13A	17/17 100%	SS	23-39 50/5"				24		598	
14A	9/9 100%	SS	38-50/3"				26		596	
15A	23/23 100%	SS	31-44 34-50/5" N=78				28		594	1" dark gray (10YR4/1), fine- to medium-grained sand, with some silt, little small gravel.
16A	15/15 100%	SS	3-44 50/3"				30		592	
17A	10/10 100%	SS	34-50/4"				32		590	
18A	11/11 100%	SS	31-50/5"				34		588	
19A	17/17 100%	SS	28-44 50/5"				36		586	
20A	24/24 100%	SS	14-19 13-24 N=32				38	Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, little to few very fine- to fine-grained sand, few small gravel.	584	
							40			

NOTE(S): G307D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/9/2021
Finish: 2/9/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G307D
Well ID: G307D
Surface Elev: 622.51 ft. MSL
Completion: 60.00 ft. BGS
Station: 871,397.20N
2,515,560.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
∇ = 12.80 - During Drilling
∇ =
▼ =

Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
										Trace medium gravel below 40 ft.
21A	24/24 100%	SS	7-8 12-15 N=20					Dark gray (10YR4/1), moist, hard, lean CLAY, with some silt, little to few very fine- to fine-grained sand, few small gravel. *[Continued from previous page]*	582	
22A	20/24 83%	SH					42		580	
23A	24/24 100%	SS	6-8 10-12 N=18				44		578	
24A	24/24 100%	SS	5-6 10-12 N=16				46		576	
25A	24/24 100%	SS	3-6 11-11 N=17				48		574	Trace wood fragments below 48.5 ft.
26A	24/24 100%	SS	3-7 9-10 N=16				50		572	
27A	16/24 67%	SS	4-7 11-9 N=18				52		570	Gravel plugged shoe in Run 27. Large lignite fragment at 52.4 ft.
28A	24/24 100%	SS	3-6 10-9 N=16				54	Greenish gray (GLEY15/1) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.	568	
29A	24/24 100%	SS	4-6 8-12 N=14				56	Yellowish brown (10YR5/6) with 30% greenish gray (GLEY15/1) and 5% very dark grayish brown (10YR3/2) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.	566	
30A	24/24 100%	SS	2-5 8-10 N=13				58	Yellowish brown (10YR5/6) with 20% greenish gray (GLEY15/1) and 5% very dark grayish brown (10YR3/2) mottles, moist, stiff, lean CLAY, with some silt, trace small gravel.	564	Large wood fragment
							60			

NOTE(S): G307D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT:	Illinois Power Generating Co.	**CONTRACTOR:**	Roberts		
Site:	Coffeen Part 845 Groundwater	**Rig mfg/model:**	CME-75 Track Rig	**BOREHOLE ID:**	G307D
Location:	Coffeen, Illinois	**Drilling Method:**	4.25" HSA w/SS sampler	**Well ID:**	G307D
Project:	20E0111A			**Surface Elev:**	622.51 ft. MSL
DATES:	**Start:** 2/9/2021	**FIELD STAFF:**	**Driller:** Matt	**Completion:**	60.00 ft. BGS
	Finish: 2/9/2021		**Helper:** Corey	**Station:**	871,397.20N
WEATHER:	Overcast, very cold (10s)		**Eng/Geo:** C. Colin Winter		2,515,560.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 12.80 - During Drilling
▽ =
▼ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								End of boring = 60.0 feet			at 59.8 ft.

NOTE(S): G307D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
Finish: 1/13/2021
WEATHER: Clear, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G308
Well ID: G308
Surface Elev: 621.59 ft. MSL
Completion: 15.80 ft. BGS
Station: 871,454.70N
2,515,101.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 13.00 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
1A	16/24 *67%*	SS	*2-2 2-3* N=4			
2A	19/24 *79%*	SS	*0-2 3-5* N=5			
3A	17/24 *71%*	SS	*2-4 5-6* N=9			
4A	23/24 *96%*	SS	*1-4 5-6* N=9			
5A	22/24 *92%*	SS	*2-4 6-7* N=10			
6A	21/24 *88%*	SS	*2-3 4-5* N=7			
7A	24/24 *100%*	SS	*2-3 4-6* N=7			
8A	19/22 *86%*	SS	*4-12 33-50/4"* N=45			

Depth ft. BGS	Lithologic Description	Elevation ft. MSL
0–2	Grayish brown (10YR5/2), moist, stiff, lean CLAY, with some silt, trace roots.	620
2–4.5	Brown (10YR5/3) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace roots.	618
4.5–7.8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	616, 614
7.8–10	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small to medium gravel.	612
10–13	Gray (10YR5/1) with 40% yellowish brown (10YR5/6) mottles, moist, stiff to very stiff, lean CLAY, with some silt, little to trace very fine-grained sand, trace small to medium gravel.	610
13–14.7	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, wet, stiff, lean CLAY, with some very fine- to fine-grained sand, little silt, trace small gravel.	608
14.7–15.8	Light yellowish brown (10YR6/4) wet, hard, SILT, with some very fine-grained sand, few clay and small to medium gravel.	606

End of boring = 15.8 feet

NOTE(S): G308 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/12/2021
Finish: 1/12/2021
WEATHER: Clear, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G309
Well ID: G309
Surface Elev: 622.77 ft. MSL
Completion: 18.00 ft. BGS
Station: 871,865.80N
2,515,067.10E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 16.00 - During Drilling
▼ =
▼ =

Sample Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / RQD	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	13/24 54%	SS	2-4 3-3 N=7				0–2.3	Brown (10YR4/3), moist, very stiff, lean CLAY, with some silt, few to little sand, trace gravel and ash. [FILL]	622	
2A	8/24 33%	SS	3-2 2-1 N=4				2.3–4.2	Black (10YR2/1), moist, very loose, ASH. [FILL]	620	
3A	17/24 71%	SS	3-2 2-4 N=4				4.2–6	Yellowish brown (10YR5/6) with 30% gray (10YR5/1) mottles, moist, stiff, lean CLAY, with some silt.	618	
4A	23/24 96%	SS	2-3 3-3 N=6				6–10.8	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	616, 614	
5A	23/24 96%	SS	2-3 4-5 N=7							
6A	22/24 92%	SS	1-2 3-5 N=5				10.8–12	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	612	
7A	21/24 88%	SS	2-3 6-5 N=9				12–14.3	Yellowish brown (10YR5/6) with 20% gray (10YR5/1) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	610	
8A	13/24 54%	SS	2-2 3-4 N=5				14.3–16	Light yellowish brown (10YR6/4) with 10% yellowish brown (10YR5/6) mottles, moist, medium stiff, lean CLAY, with some fine-grained sand, little small gravel, trace medium to large gravel.	608	Gravel plugged shoe in Run 8.
9A	8/24 33%	SS	5-12 24-22 N=36				16–16.7 (▽ 16)	Pale brown (10YR6/3), wet, hard, SILT, little very fine-grained sand, few clay and small to medium gravel.		
							16.7–17.4	Brownish yellow (10YR6/6), wet, loose, very fine- to fine-grained SAND, trace clay and small to medium gravel.	606	
							17.4–18	Pale brown (10YR6/3), wet, hard, SILT, little very fine-grained sand, few clay and small to medium gravel.		Sampler shoe lost in hole at 18 ft.

End of boring = 18.0 feet

NOTE(S): G309 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/15/2021
Finish: 1/15/2021
WEATHER: Clear, light snow, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G310
Well ID: G310
Surface Elev: 619.89 ft. MSL
Completion: 15.90 ft. BGS
Station: 872,239.40N
2,515,159.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 14.20 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A / 1B	21/24 88%	SS	2-7 4-6 N=11					Dark gray (10YR4/1), moist, very stiff, lean CLAY, with some silt, trace roots.			
								Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT, few clay, trace roots.			
2A	18/24 75%	SS	2-4 4-6 N=8				2	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt.		618	
3A	23/24 96%	SS	2-3 4-5 N=7				4	Gray (10YR6/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt.		616	
4A	24/24 100%	SS	2-3 5-6 N=8				6	Dark gray (10YR4/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand and small gravel.		614	
5A	24/24 100%	SS	2-3 4-5 N=7				8	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few small gravel, trace very fine- to fine-grained sand.		612	
6A	24/24 100%	SS	2-3 4-4 N=7				10			610	
7A	24/24 100%	SS	0-1 2-2 N=3				12	Gray (10YR5/1), moist, medium stiff, SILT, with some clay, little very fine- to fine-grained sand, few small gravel.		608	
8A	17/23 74%	SS	8-16 26-50/5" N=42				14 ▽	Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, wet, hard, SILT, with some very fine-grained sand, few small gravel, trace clay.		606	
								Yellowish brown (10YR5/6), wet, SAND, some silt, few gravel.			
								Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, wet, hard, SILT, with some very fine-grained sand, few small gravel, trace clay.		604	
								Yellowish brown (10YR5/6), wet, SAND, some silt, few gravel seam from 15.3 to 15.5 ft.			
								Yellowish brown (10YR5/6) with 10% gray (10YR5/1) mottles, wet, hard, SILT, with some very fine-grained sand, few small gravel, trace clay.			

End of boring = 15.9 feet

NOTE(S): G310 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/5/2021
Finish: 2/5/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model:
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G311
Well ID: G311
Surface Elev: 618.32 ft. MSL
Completion: 14.40 ft. BGS
Station: 872,238.70N
2,515,881.80E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork
Section 11, **Tier** 7N; **Range** 3W

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							2			618	
							4			616	
							6			614	
							8			612	
							10			610	
							12			608	
							14			606	
										604	

NOTE(S): G311 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/5/2021
Finish: 2/5/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 3.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G311D
Well ID: G311D
Surface Elev: 618.39 ft. MSL
Completion: 60.00 ft. BGS
Station: 872,238.70N
2,515,881.80E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 11.20 - During Drilling
=
=

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	13/24 54%	SS	0-4 4-4 N=8				0–2	Yellowish brown (10YR5/6), moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	618	
2A	24/24 100%	SS	3-4 5-6 N=9				2–3.6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) and 5% very dark grayish brown (10YR3/2) mottles, moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand, and small gravel.	616	
3A	24/24 100%	SS	2-4 5-7 N=9				3.6–6.5	Very dark grayish brown (10YR3/2) with 10% gray (10YR5/1) mottles, moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand, and small gravel.	614	
4A	24/24 100%	SH					6.5–11.2	Gray (10YR5/1) with 15% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, few small gravel.	612	
5A	18/24 75%	SS	1-2 4-5 N=6						610	
6A	24/24 100%	SS	1-3 3-4 N=6				11.2–12	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist to wet, medium stiff, lean CLAY, with some very fine- to fine-grained sand, little silt, few small gravel.	608	
							12–12.4	Yellowish brown (10YR5/6), moist to wet, medium stiff, lean CLAY, with some very fine- to fine-grained sand, little silt, few small gravel.		
7A	24/24 100%	SS	2-6 12-13 N=18				12.4–14	Gray (10YR5/1), moist to wet, medium stiff, SILT, with some very fine- to fine-grained sand, few clay, trace small gravel.	606	1" wet, SAND at 13.5 ft.
8A	24/24 100%	SS	2-6 12-13 N=18				14–18.4	Yellowish brown (10YR5/6), moist, hard, SILT, with some clay, some to little sand, few small gravel.	604	
9A	24/24 100%	SS	6-15 18-22 N=33						602	Vertical fracture with very fine- to fine-grained sand from 16.9 to 18 ft.
10A	24/24 100%	SS	6-13 16-22 N=29				18.4–20	Dark grayish brown (10YR4/2) with frequent yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	600	

NOTE(S): G311D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.	**CONTRACTOR:** Roberts		
Site: Coffeen Part 845 Groundwater	**Rig mfg/model:** CME-75 Track Rig	**BOREHOLE ID:** G311D	
Location: Coffeen, Illinois	**Drilling Method:** 3.25" HSA w/SS sampler	**Well ID:** G311D	
Project: 20E0111A		**Surface Elev:** 618.39 ft. MSL	
DATES: Start: 2/5/2021	**FIELD STAFF: Driller:** Matt	**Completion:** 60.00 ft. BGS	
Finish: 2/5/2021	**Helper:** Corey	**Station:** 872,238.70N	
WEATHER: Clear, cold (20s)	**Eng/Geo:** C. Colin Winter	2,515,881.80E	

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
= 11.20 - During Drilling
=
=

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
11A	24/24 *100%*	SS	*5-15 20-26* N=35			
12A	12/24 *50%*	SS	*2-3 14-17* N=17			
13A	24/24 *100%*	SS	*6-11 14-20* N=25			
14A	24/24 *100%*	SS	*4-8 11-16* N=19			
15A	24/24 *100%*	SH				
16A	24/24 *100%*	SS	*0-3 5-8* N=8			
17A	24/24 *100%*	SS	*2-4 6-8* N=10			
18A	24/24 *100%*	SS	*2-5 7-7* N=12			
19A	13/24 *54%*	SS	*2-7 8-11* N=15			
20A	24/24 *100%*	SS	*2-6 10-8* N=16			

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
20–40	Dark gray (10YR4/1) with frequent yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.		598–580	No oxidation below 22 ft.
				Trace medium gravel below 24 ft.
				Gravel plugged shoe in Run 18.
				Trace large gravel from 35 to 36 ft.
				Trace lignite and wood fragments below 36 ft.

Depth scale: 22, 24, 26, 28, 30, 32, 34, 36, 38, 40
Elevation scale: 598, 596, 594, 592, 590, 588, 586, 584, 582, 580

NOTE(S): G311D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/5/2021
Finish: 2/5/2021
WEATHER: Clear, cold (20s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 3.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G311D
Well ID: G311D
Surface Elev: 618.39 ft. MSL
Completion: 60.00 ft. BGS
Station: 872,238.70N
2,515,881.80E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 11.20 - During Drilling
▽ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	TESTING Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type
21A	16/24 67%	SS	3-3 6-8 N=9			
22A						
22B	24/24 100%	SS	3-4 7-8 N=11			
23A	24/24 100%	SS	1-3 5-7 N=8			
24A	20/24 83%	SS	3-4 10-8 N=14			
25A	24/24 100%	SS	3-5 8-13 N=13			
26A	24/24 100%	SS	2-5 10-12 N=15			
27A	24/24 100%	SS	2-6 10-14 N=16			
28A	24/24 100%	SS	4-7 7-11 N=14			
29A	24/24 100%	SS	2-5 9-11 N=14			
30A	24/24 100%	SS	3-7 10-13 N=17			

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
40–42	Dark gray (10YR4/1) with frequent yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel. *[Continued from previous page]*	578	
42–42.4	Greenish gray (GLEY15/1) with 20% dark reddish brown (10YR3/2) mottles, moist, medium stiff, lean CLAY, with some silt.	576	
42.4–53.4	Dark grayish brown (10YR4/1) with frequent yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small to large gravel.	574, 572, 570, 568, 566	
53.4–56	Dark gray (10YR4/1) with 20% greenish gray (GLEY15/1) and 5% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	564	Trace small gravel below 54.3 ft.
56–58	Greenish gray (GLEY16/1) with 40% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	562	0.5" small to medium GRAVEL.
58–60	Yellowish brown (10YR5/6) with 30% greenish gray (GLEY16/1) mottles, moist, very stiff, lean CLAY, with some silt, trace very fine-grained sand and small gravel.	560	

Depth scale: 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

Borehole Detail

NOTE(S): G311D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.	**CONTRACTOR:** Roberts		
Site: Coffeen Part 845 Groundwater	**Rig mfg/model:** CME-75 Track Rig	**BOREHOLE ID:** G311D	
Location: Coffeen, Illinois	**Drilling Method:** 3.25" HSA w/SS sampler	**Well ID:** G311D	
Project: 20E0111A		**Surface Elev:**	618.39 ft. MSL
DATES: Start: 2/5/2021	**FIELD STAFF: Driller:** Matt	**Completion:**	60.00 ft. BGS
Finish: 2/5/2021	**Helper:** Corey	**Station:**	872,238.70N
WEATHER: Clear, cold (20s)	**Eng/Geo:** C. Colin Winter		2,515,881.80E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 11.20 - During Drilling
▽ =
▼ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
								End of boring = 60.0 feet			

NOTE(S): G311D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/4/2021
Finish: 2/4/2021
WEATHER: Rain, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G312
Well ID: G312
Surface Elev: 616.92 ft. MSL
Completion: 15.25 ft. BGS
Station: 872,260.90N
2,516,557.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 12.70 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	14/24 58%	SS	0-2 3-2 N=5				0–1.8	Brown (10YR5/3) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.	616	
2A	17/24 71%	SS	2-1 2-2 N=3				2	Yellowish brown (10YR5/6), moist, stiff to very stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.	614	
3A	18/24 75%	SS	1-3 5-6 N=8				4	Yellowish brown (10YR5/6) with 10% very dark grayish brown (10YR3/2) mottles, moist, stiff to very stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, trace small gravel.	612	
4A	17/24 71%	SS	2-3 3-4 N=6				6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	610	
5A	20/24 83%	SS	2-4 5-7 N=9				8	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) and 5% very dark grayish brown (10YR3/2) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	608	
6A	20/24 83%	SS	1-3 4-4 N=7				10	Gray (10YR5/1), moist, soft SILT, some clay, trace roots.		
								Gray (10YR5/1) with 20% yellowish brown (10YR5/6) and 5% very dark grayish brown (10YR3/2) mottles, moist, very stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	606	
							12	Yellowish brown (10YR5/6) with 15% gray (10YR5/1) mottles, moist, very stiff, lean CLAY, with some silt and very fine- to fine-grained sand.		
7A	24/24 100%	SS	0-3 2-5 N=5				▽	Gray (10YR6/1) with 15% yellowish brown (10YR5/6), moist, very stiff, lean CLAY, with some silt and very fine- to fine-grained sand.	604	
7B								Gray (10YR5/1), wet, loose, SILT, with some very fine- to fine-grained sand, few clay, trace small gravel.		
8A	15/15 100%	SS	4-17 50/3"				14	Yellowish brown (10YR5/6) with 5% very dark grayish brown (10YR3/2), wet, loose, SILT, with some very fine- to fine-grained sand, few clay and small gravel.	602	
8B								Yellowish brown (10YR5/6) with 5% very dark grayish brown (10YR3/2) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel.		

End of boring = 15.25 feet

NOTE(S): G312 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/14/2021
Finish: 1/14/2021
WEATHER: Overcast, cool (40s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G313
Well ID: G313
Surface Elev: 611.51 ft. MSL
Completion: 12.00 ft. BGS
Station: 871,976.80N
2,516,803.70E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 9.80 - During Drilling
▼ =
▼ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A 1B	17/24 *71%*	SS	*0-2* *3-3* N=5					Dark yellowish brown (10YR4/4), wet, stiff, lean CLAY, with some silt, few roots, trace small gravel.			
							2	Gray (10YR6/1) with 15% yellowish brown (10YR5/6) mottles, moist, very stiff, SILT, with little clay, few roots.		610	
2A	13/24 *54%*	SS	*0-2* *2-3* N=4				4	Dark gray (10YR4/1) with 5% black (10YR2/1) mottles, moist, stiff, lean CLAY, with some silt.		608	
3A	19/24 *79%*	SS	*2-3* *5-5* N=8				6	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine- to fine-grained sand and small gravel.		606	
4A	22/24 *92%*	SS	*2-3* *4-5* N=7				8	Very dark gray (10YR3/1), moist, stiff, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.		604	
5A	22/24 *92%*	SS	*2-5* *9-12* N=14				▽ 10	Yellowish brown (10YR5/6) with 10% very dark gray (10YR3/1) mottles, moist, stiff SILT, with some very fine- to fine-grained sand and clay, few small gravel.		602	
6A 6B	21/24 *88%*	SS	*9-12* *21-22* N=33					Yellowish brown (10YR5/4), wet, medium dense, very fine- to medium-grained SAND, with some silt, few small gravel.			
							12	Dark grayish brown (10YR4/2) with 10% yellowish brown (10YR5/6) mottles, moist, hard, SILT, with some very fine- to fine-grained sand, few clay and small gravel, trace medium gravel.		600	

End of boring = 12.0 feet

NOTE(S): G313 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/26/2021
Finish: 2/26/2021
WEATHER: Clear, mild (40s)

CONTRACTOR: Holcomb Foundation Engineering Co.
Rig mfg/model:
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Steve
Helper: Jeff
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314
Well ID: G314
Surface Elev: 611.11 ft. MSL
Completion: 20.05 ft. BGS
Station: 871,630.20N
2,516,852.10E

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							2			610	
							4			608	
							6			606	
							8			604	
							10			602	
							12			600	
							14			598	
							16			596	
							18			594	
							20			592	

NOTE(S): G314 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.	**CONTRACTOR:** Holcomb Foundation Engineering Co.		
Site: Coffeen Part 845 Groundwater	**Rig mfg/model:**	**BOREHOLE ID:**	G314
Location: Coffeen, Illinois	**Drilling Method:** 4.25" HSA w/SS sampler	**Well ID:**	G314
Project: 20E0111A		**Surface Elev:**	611.11 ft. MSL
DATES: Start: 2/26/2021	**FIELD STAFF: Driller:** Steve	**Completion:**	20.05 ft. BGS
Finish: 2/26/2021	**Helper:** Jeff	**Station:**	871,630.20N
WEATHER: Clear, mild (40s)	**Eng/Geo:** C. Colin Winter		2,516,852.10E

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp* (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks

NOTE(S): G314 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314D
Well ID: G314D
Surface Elev: 610.87 ft. MSL
Completion: 100.30 ft. BGS
Station: 871,642.00N
2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▼ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	4/24 *17%*	SS	*13-7 4-5* N=11				0–1	Moist, dense, small to large GRAVEL. [FILL]	610	
	1/24 *4%*	SS	*3-4 5-5* N=9				1–6.8	Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few very fine- to fine-grained sand, trace small gravel.	608	
3A	24/24 *100%*	SS	*1-3 4-5* N=7						606	
4A	24/24 *100%*	SS	*2-5 15-17* N=20				6.8–9.4	Yellowish brown (10YR5/6) with occasional yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.	604	
5A	24/24 *100%*	SS	*4-10 12-16* N=22				9.4–17	Yellowish brown (10YR5/6) with 10% very dark grayish brown (10YR3/2) mottles and occasional yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.	602	
6A	24/24 *100%*	SS	*4-5 14-18* N=19						600	1" wet, SAND, with some silt at 11.6 ft.
7A	24/24 *100%*	SS	*3-11 14-18* N=25						598	
8A	24/24 *100%*	SS	*3-9 13-18* N=22						596	
							17–18	Yellowish brown (10YR5/6) with 10% very dark grayish brown (10YR3/2) and 10% dark yellowish brown (10YR4/6) mottles and occasional yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.	594	
9A	24/24 *100%*	SS	*1-7 9-13* N=16				18–20	Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/6) mottles and occasional yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.	592	

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314D
Well ID: G314D
Surface Elev: 610.87 ft. MSL
Completion: 100.30 ft. BGS
Station: 871,642.00N
2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▼ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
10A	24/24 *100%*	SS	*1-5 10-13* N=15						590	1" wet, SAND, with some silt at 20 ft.
11A	24/24 *100%*	SS	*1-6 9-12* N=15				22	Dark grayish brown (10YR4/2) with 15% yellowish brown (10YR5/6) and 5% dark yellowish brown (10YR4/6) mottles and occasional yellowish red (5YR4/6) oxidation along fractures, moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel. *[Continued from previous page]*	588	Frequent oxidation below 21.7 ft.
12A	24/24 *100%*	SS	*4-7 10-13* N=17				24		586	
13A	24/24 *100%*	SS	*3-7 10-13* N=17				26		584	
14A	24/24 *100%*	SS	*4-6 10-10* N=16				28	Dark grayish brown (10YR4/2), moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel.	582	1 ft vertical fracture with yellowish red (5YR4/6) oxidation at 28.3 ft.
15A	24/24 *100%*	SS	*3-9 10-12* N=19				30, 32		580	
16A	24/24 *100%*	SS	*2-3 7-8* N=10				34		578	Trace roots below 34 ft.
17A	24/24 *100%*	SS	*2-4 7-9* N=11				36	Gray (GLEY15/), moist, stiff, lean CLAY, with some silt.	576	
18A	21/24 *88%*	SH					38	Dark grayish brown (10YR4/2), moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel and roots.	574, 572	
			2-5				40			

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314D
Well ID: G314D
Surface Elev: 610.87 ft. MSL
Completion: 100.30 ft. BGS
Station: 871,642.00N
2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▽ =
▼ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
19A	24/24 *100%*	SS	*7-12* N=12			
20A	24/24 *100%*	SS	*4-8 10-14* N=18			
21A	24/24 *100%*	SS	*3-9 13-16* N=22			
22A / 22B	24/24 *100%*	SS	*12-31 14-11* N=45			
23A	24/24 *100%*	SS	*3-4 6-9* N=10			
24A	24/24 *100%*	SS	*5-11 14-17* N=25			
25A	24/24 *100%*	SS	*4-6 11-15* N=17			
26A	20/24 *83%*	SS	*4-5 18-30* N=23			
27A	20/24 *83%*	SS	*9-22 33-33* N=55			
28A	24/24 *100%*	SS	*7-19 29-43*			

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
40–46	Dark grayish brown (10YR4/2), moist, hard, lean CLAY, with some silt and very fine- to fine-grained sand, trace small gravel and roots. *[Continued from previous page]*	570, 568, 566	Trace medium gravel below 41.3 ft.
46–47	Gray (10YR5/1), wet, dense, SAND, with some silt, few small gravel.	564	
47–51	Gray (GLEY15/) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.	562, 560	1" SILT, with some sand at 48.2 ft.
51–55.4	Yellowish brown (10YR5/6) with 20% gray (GLEY15/) mottles, moist, stiff, lean CLAY, with some silt, trace very fine-grained sand.	558, 556	
55.4–57.8	Yellowish brown (10YR5/6), moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.	554	
57.8–58.8	Yellowish brown (10YR5/6) with 20% gray (GLEY15/) mottles, moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.		
58.8–60	Yellowish brown (10YR5/6) with 10% gray (GLEY15/) and 5% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.	552	

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314D
Well ID: G314D
Surface Elev: 610.87 ft. MSL
Completion: 100.30 ft. BGS
Station: 871,642.00N
2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
			N=48						550	
29A	20/24 83%	SS	13-20 30-38 N=50				62		548	
30A	24/24 100%	SS	8-15 30-34 N=45				64	Yellowish brown (10YR5/6) with 10% gray (GLEY15/) and 5% dark yellowish brown (10YR4/6) mottles, moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel. *[Continued from previous page]*	546	
31A	24/24 100%	SS	5-17 28-29 N=45				66		544	
32A	24/24 100%	SS	7-18 29-43 N=47				68	Yellowish brown (10YR5/6) with 10% gray (GLEY15/), 5% dark yellowish brown (10YR4/6) and 5% very dark grayish brown (10YR3/2) mottles, moist, hard, lean CLAY, with some silt, little very fine- to fine-grained sand and small gravel.	542	
33A	24/24 100%	SS	5-14 32-26 N=46				70	Dark grayish brown (10YR4/2) with 5% gray (GLEY15/), 5% yellowish brown (10YR5/6), and 5% light gray (10YR7/1) mottles, moist, hard, lean CLAY, with some silt, little sand and gravel.	540	
34A	24/24 100%	SS	8-17 26-38 N=43				72	Yellowish brown (10YR5/6) with 5% gray (GLEY15/), 5% dark grayish brown (10YR4/2), and 5% light gray (10YR7/1) mottles.	538	
35A	24/24 100%	SS	5-12 24-24 N=36				74 / 76	Dark grayish brown (10YR4/2) with 5% gray (GLEY15/), 5% yellowish brown (10YR5/6), and 5% light gray (10YR7/1) mottles.	536	
36A	24/24 100%	SS	14-24 20-33 N=44				78	Dark grayish brown (10YR5/2) with 20% reddish brown (5YR4/4) and 5% light gray (10YR7/1) mottles, moist, hard, lean CLAY, with some silt, trace very fine- to fine-grained sand and small gravel.	534	
37A	24/24 100%	SS	6-14 17-31 N=31				80	Dark gray (10YR4/1) with 5% light gray (10YR7/1) mottles, moist, hard, lean CLAY, with some silt, trace very fine- to fine-grained sand and small gravel.	532	

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/10/2021
Finish: 2/12/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G314D
Well ID: G314D
Surface Elev: 610.87 ft. MSL
Completion: 100.30 ft. BGS
Station: 871,642.00N
2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▼ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
38A	24/24 *100%*	SS	*7-17 21-29* N=38				82	Dark gray (10YR4/1) with 5% light gray (10YR7/1) mottles, moist, hard, lean CLAY, with some silt, trace very fine- to fine-grained sand and small gravel. *[Continued from previous page]*	530, 528	Trace roots at 82 ft.
39A	24/24 *100%*	SS	*8-24 26-27* N=50				84	Very dark gray (10YR3/1), moist, hard, lean CLAY, with some silt.	526	
40A	24/24 *100%*	SS	*5-9 10-13* N=19				86	Dark gray (10YR4/1) with 5% black (10YR2/1) mottles, moist, hard, lean CLAY, with some silt.	524	
41A	24/24 *100%*	SS	*6-10 25-33* N=35				88	Dark greenish gray (GLEY14/1) with 5% yellowish brown (10YR5/6) mottles, moist, hard, lean CLAY, with some silt.	522	Few very fine- to fine-grained sand below 88 ft.
42A	11/11 *100%*	SS	*3-50/5"*				90	Light reddish brown (2.5YR6/3) with 10% gray (GLEY15/), dry, hard, SILT, with few clay and very fine-grained sand.	520	
43A	5/5 *100%*	SS	*50/5"*				92		518	
44A	5/5 *100%*	SS	*50/5"*				94		516	
45A	8/8 *100%*	SS	*49-50/2"*				96	Light reddish brown (2.5YR6/3) with 10% gray (GLEY15/) and 5% dark yellowish brown (10YR4/6) mottles, dry, hard, SILT, with few clay and very fine-grained sand.	514	
46A	11/11 *100%*	SS	*25-50/5"*				98, 100		512	

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.	**CONTRACTOR:** Roberts		
Site: Coffeen Part 845 Groundwater	**Rig mfg/model:** CME-75 Track Rig	**BOREHOLE ID:** G314D	
Location: Coffeen, Illinois	**Drilling Method:** 4.25" HSA w/SS sampler	**Well ID:** G314D	
Project: 20E0111A		**Surface Elev:**	610.87 ft. MSL
DATES: Start: 2/10/2021	**FIELD STAFF: Driller:** Matt	**Completion:**	100.30 ft. BGS
Finish: 2/12/2021	**Helper:** Corey	**Station:**	871,642.00N
WEATHER: Overcast, very cold (10s)	**Eng/Geo:** C. Colin Winter		2,516,853.90E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = During Drilling
▼ =
▼ =

SAMPLE			TESTING								
Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
47A	3/3 *100%*	SS	*50/3"*								
								End of boring = 100.3 feet			

NOTE(S): G314D installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
Finish: 1/13/2021
WEATHER: Overcast, cool (40s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G315
Well ID: G315
Surface Elev: 620.94 ft. MSL
Completion: 15.90 ft. BGS
Station: 871,385.00N
2,516,086.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 13.00 - During Drilling
▼ =
▼ =

Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) / Qp (tsf) / Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	15/24 *63%*	SS	*0-2* *3-2* N=5				0–2	Light gray (10YR7/1) with 20% brown (10YR4/3) mottles, moist, stiff, lean CLAY, with some silt, few roots.		620	
2A	9/24 *38%*	SS	*1-1* *2-2* N=3				2–6	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, with some silt.		618	
3A	22/24 *92%*	SS	*2-3* *3-5* N=6							616	
4A	24/24 *100%*	SS	*1-2* *2-4* N=4				6–10	Gray (10YR5/1) with 20% yellowish brown (10YR5/6) mottles, lean CLAY, with some silt, few to trace small gravel.		614	
5A	23/24 *96%*	SS	*2-2* *3-4* N=5							612	
	19/24 *79%*	SS	*0-2* *4-5* N=6				10	Gray (10YR5/1) with 30% yellowish brown (10YR5/6) mottles, lean CLAY, with some silt, few to trace small gravel.			Gray (10YR6/1), SILT seam.
6A								Gray (10YR5/1) with 30% yellowish brown (10YR6/1) mottles, lean CLAY, with some silt, few to trace small gravel.		610	
7A	24/24 *100%*	SS	*1-2* *3-3* N=5				12 ▽			608	
7B							14	Gray (10YR6/1) with 40% yellowish brown (10YR5/6) mottles, wet, medium stiff, lean CLAY, with some very fine- to fine-grained sand, little silt, few small to medium gravel.			Gravel plugged shoe in Run 8.
8A	21/23 *91%*	SS	*8-16* *32-50/5"* N=48					Yellowish brown (10YR5/6), wet, very stiff, SILT, with some very fine- to fine-grained sand, little small to medium gravel, few clay.		606	

End of boring = 15.9 feet

NOTE(S): G315 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/14/2021
Finish: 1/14/2021
WEATHER: Overcast, cold (30s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G316
Well ID: G316
Surface Elev: 599.64 ft. MSL
Completion: 15.75 ft. BGS
Station: 871,643.10N
2,517,211.60E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 8.60 - During Drilling
▼ = 13.80 - During Drilling
▼ =

SAMPLE: Number	Recov / Total (in) / % Recovery	Type	Blows / 6 in / N - Value / **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) Qp (tsf) / Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	15/24 63%	SS	10-9 5-4 N=14					Brown (10YR5/3), moist, medium dense, small to large GRAVEL, with some clay and fine to coarse grained sand. [FILL]	598	
2A	10/24 42%	SS	1-3 4-6 N=7				2	Gray (10YR5/1), moist, hard, lean CLAY, with some silt, few small gravel and very fine- to fine-grained sand.	596	
3A	14/24 58%	SS	2-2 3-3 N=5				4	Gray (10YR5/1) with 10% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few small gravel and very fine- to fine-grained sand.	594	
4A	10/24 42%	SS	0-1 1-2 N=2				6	Gray (10YR5/1) with 30% black (10YR2/1) mottles, moist, stiff, lean CLAY, with some silt, few very fine-grained sand, organics and wood fragments.	592	
5A							8			
5B	22/24 92%	SS	1-1 1-2 N=2				▽	Very dark gray (10YR3/1), wet, medium stiff to stiff, SILT, with some clay and very fine- to fine-grained sand.	590	
6A	20/24 83%	SS	1-2 4-7 N=6				10	Brown (10YR4/3), moist, very stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, few small gravel.	588	
7A	22/24 92%	SS	0-2 3-3 N=5				12	Dark gray (10YR4/1) with 20% yellowish brown (10YR5/6) mottles, moist, medium stiff to stiff, lean CLAY, with some silt, little very fine- to fine-grained sand, few small gravel.	586	
8A	21/17 124%	SS	2-2 26-50/3" N=28				▼ 14	Brown (10YR4/3), wet, loose, very fine- to fine-grained SAND, with some silt, trace clay.		
8B								Yellowish brown (10YR5/6), moist, hard, SILT, with some very fine- to fine-grained sand, trace small gravel.	584	

End of boring = 15.75 feet

NOTE(S): G316 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
Finish: 1/14/2021
WEATHER: Overcast, cold (30s to 40s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G317
Well ID: G317
Surface Elev: 638.85 ft. MSL
Completion: 36.00 ft. BGS
Station: 871,234.20N
2,517,087.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 34.00 - During Drilling
▽ =
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
1A	17/24 *71%*	SS	*2-2 5-3* N=7			
2A	12/24 *50%*	SS	*3-5 4-4* N=9			
3A	15/24 *63%*	SS	*1-2 3-4* N=5			
4A	11/24 *46%*	SS	*3-5 5-4* N=10			
5A	12/24 *50%*	SS	*3-4 4-4* N=8			
6A	4/24 *17%*	SS	*2-2 3-4* N=5			
7A, 7B	14/24 *58%*	SS	*1-3 4-3* N=7			
8A	20/24 *83%*	SS	*2-2 3-4* N=5			
9A	17/24 *71%*	SS	*1-2 3-4* N=5			
10A	16/24 *67%*	SS	*0-2 5-5* N=7			

Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
0–5.2	Light yellowish brown (10YR6/4) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, little fine-grained sand and small to medium gravel, trace to no roots.		638, 636, 634	
5.2–7.5	Gray (10YR6/1) with 20% yellowish brown (10YR5/6) mottles, moist, stiff, lean CLAY, with some silt, few fine-grained sand and small gravel.		632	
7.5–9	Brownish yellow (10YR6/8) with 20% gray (10YR6/1) mottles, moist, stiff, SILT, with little fine-grained sand and small gravel.		630	
9–13.4	Gray (10YR5/1) with 30% very dark gray (20YR3/1) mottles, moist, very stiff, lean CLAY, with some silt, trace lignite fragments and organics.		628, 626	Wood fragment plugged shoe in Run 6. Gravel plugged shoe in Run 7.
13.4–14.2	Gray (10YR5/1) with 10% yellowish brown (10YR5/4) mottles, moist, stiff, SILT, with some fine-grained sand, little small gravel.			
14.2–16.5	Gray (10YR5/1) with 10% yellowish brown (10YR5/4) and 10% very dark gray (10YR3/1) mottles, moist, very stiff, lean CLAY, with some silt, few fine-grained sand and small gravel.		624	
16.5–20	Gray (10YR5/1) with 10% very dark gray (10YR3/1) mottles, moist, medium stiff, lean CLAY, with some silt, little small gravel, trace lignite fragments and organics.		622, 620	Thin wood fragment seam at 19.4 ft.

NOTE(S): G317 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 1/13/2021
Finish: 1/14/2021
WEATHER: Overcast, cold (30s to 40s)

CONTRACTOR: Roberts
Rig mfg/model: GeoProbe 8040DT
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: G317
Well ID: G317
Surface Elev: 638.85 ft. MSL
Completion: 36.00 ft. BGS
Station: 871,234.20N
2,517,087.40E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 34.00 - During Drilling
▽ =
▼ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
11A	16/24 *67%*	SS	*3-5 6-11* N=11			
12A	21/24 *88%*	SS	*4-4 7-9* N=11			
13A	18/24 *75%*	SS	*3-5 7-11* N=12			
14A	20/24 *83%*	SS	*2-5 7-9* N=12			
15A	19/24 *79%*	SS	*2-4 6-8* N=10			
16A	24/24 *100%*	SS	*1-5 7-9* N=12			
17A	24/24 *100%*	SS	*2-4 6-7* N=10			
18A 18B	24/24 *100%*	SS	*0-1 14-34* N=15			

Depth ft. BGS | Lithologic Description | Borehole Detail | Elevation ft. MSL | Remarks

Depth marks: 22, 24, 26, 28, 30, 32, 34, 36. Elevation marks: 618, 616, 614, 612, 610, 608, 606, 604.

- Gray (10YR5/1) with 10% very dark gray (10YR3/1) mottles, moist, medium stiff, lean CLAY, with some silt, little small gravel, trace lignite fragments and organics. *[Continued from previous page]*
- Gray (10YR5/1) moist, SILT, with some clay.
- Gray (10YR5/1) with 10% very dark gray (10YR3/1) mottles, moist, medium stiff to very stiff, lean CLAY, with some silt, little small gravel, few wood fragments and organics.
- Yellowish brown (10YR5/6) with 20% gray (10YR6/1) mottles, moist, very stiff, lean CLAY, with some silt, few to no fine-grained sand, trace to no small gravel.
- Gray (10YR6/1) with 30% yellowish brown (10YR5/6) mottles, moist, very stiff, lean CLAY, with some silt, few to no fine-grained sand, trace to no small gravel.
- Gray (10YR6/1) with 30% yellowish brown (10YR5/6) and 10% black (10YR2/1) mottles, moist, very stiff, lean CLAY, with some silt, few to no fine-grained sand, trace to no small gravel.
- ▽ 34: Yellowish brown (10YR5/4) with 10% gray (10YR6/1) mottles, wet, loose, very fine- to fine-grained SAND, with some clay, little silt, few small gravel. — Remarks: Sampler full in Run 18.
- Yellowish brown (10YR5/6) with 10% gray (10YR6/1) mottles, moist, very stiff, SILT, with some very fine- to fine-grained sand, little small to medium gravel, trace clay.

End of boring = 36.0 feet

NOTE(S): G317 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/8/2021
Finish: 2/8/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler
FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: XPW01
Well ID: XPW01
Surface Elev: 631.85 ft. MSL
Completion: 14.00 ft. BGS
Station: 871,638.70N
2,515,366.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 5.00 - Approx. During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
1A	19/24 *79%*	SS	*11-20 21-13* N=41				0–2	Black (10YR2/1), moist, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]			
2A	24/24 *100%*	SS	*3-6 8-6* N=14				2–6	Black (10YR2/1), moist, BOTTOM ASH, very fine- to fine-grained, cohesive. [FILL]			
3A	0/24 *0%*	SH									
4A	24/24 *100%*	SS	*1-5 7-8* N=12				6–12.8	Black (10YR2/1), wet, BOTTOM ASH, fine- to coarse-grained. [FILL]			
5A	19/24 *79%*	SS	*1-1 1-6* N=2								
6A	15/24 *63%*	SS	*4-5 4-4* N=9								
7A	18/24 *75%*	SS	*1-3 5-6* N=8								
7B							12.8–14	Gray (10YR5/1) with 20% yellowish brown (10YR5/6), moist, stiff, lean CLAY, some silt, trace very fine grained sand.			

Depth scale: 2, 4, 6, 8, 10, 12, 14. Elevation scale: 630, 628, 626, 624, 622, 620, 618.

End of boring = 14.0 feet

NOTE(S): XPW01 installed in borehole.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Co.
Site: Coffeen Part 845 Groundwater
Location: Coffeen, Illinois
Project: 20E0111A
DATES: Start: 2/8/2021
Finish: 2/8/2021
WEATHER: Overcast, very cold (10s)

CONTRACTOR: Roberts
Rig mfg/model: CME-75 Track Rig
Drilling Method: 4.25" HSA w/SS sampler

FIELD STAFF: Driller: Matt
Helper: Corey
Eng/Geo: C. Colin Winter

BOREHOLE ID: XPW02
Well ID: XPW02
Surface Elev: 636.64 ft. MSL
Completion: 18.00 ft. BGS
Station: 871,987.10N
2,515,627.30E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Coffeen, IL
Township: East Fork Township
Section 11, **Tier** 7N; **Range** 3W

WATER LEVEL INFORMATION:
▽ = 6.00 - During Drilling
▼ =
▼ =

SAMPLE Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Water Content (%)	Dry Density (lb/ft³)	Qu (tsf) *Qp (tsf)* Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
1A	19/24 *79%*	SS	*5-5 10-15* N=15				0–2	Black (10YR2/1), moist, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]	636	
2A	21/24 *88%*	SS	*5-14 17-18* N=31				2–4		634	
3A	24/24 *100%*	SS	*4-13 15-14* N=28				4–6		632	
	24/24 *100%*	SS	*4-9 13-15* N=22				6–8	Black (10YR2/1), wet, BOTTOM ASH, fine- to coarse-grained, cohesionless. [FILL]	630	
5A	22/24 *92%*	SS	*3-4 7-12* N=11				8–10		628	
6A	23/24 *96%*	SS	*1-9 14-14* N=23				10–12		626	
7A	24/24 *100%*	SS	*5-7 7-7* N=14				12–14		624	
8A	21/24 *88%*	SS	*4-4 5-4* N=9				14–16		622	
9A 9B	24/24 *100%*	SS	*0-1 1-2* N=2				16–18	Dark gray (10YR4/1), moist, very soft, SILT, some clay.	620	

End of boring = 18.0 feet

NOTE(S): XPW02 installed in borehole.

WELL CONSTRUCTION LOGS

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G45D

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G405D

State Plane Coordinate: X 2,515,322.2 Y 873,998.0 (or) Latitude: 39° 3' 51.657" Longitude: -89° 23' 46.612"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/16/2016 Date Finished: 8/17/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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: 38 minutes

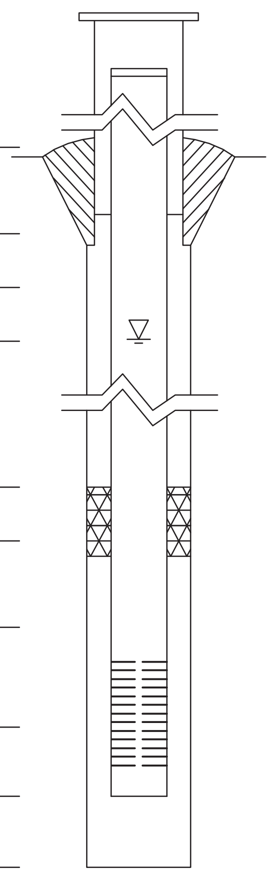
Type of Sand Pack: Quartz Sand

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.)
624.16	-3.22	Top of Protective Casing
623.81	-2.87	Top of Riser Pipe
620.94	0.00	Ground Surface
618.94	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
590.59	30.35	Top of Seal
589.62	31.32	Top of Sand Pack
589.06	31.88	Top of Screen
579.42	41.52	Bottom of Screen
579.02	41.92	Bottom of Well
578.94	42.00	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)	34.75
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	9.64
Total Length of Casing	(feet)	44.79
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: Montgomery Well #: G46D

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G406D

State Plane Coordinate: X 2,514,697.8 Y 872,519.7 (or) Latitude: 39° 3' 37.098" Longitude: -89° 23' 54.687"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/19/2016 Date Finished: 8/19/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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 (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >12 hours

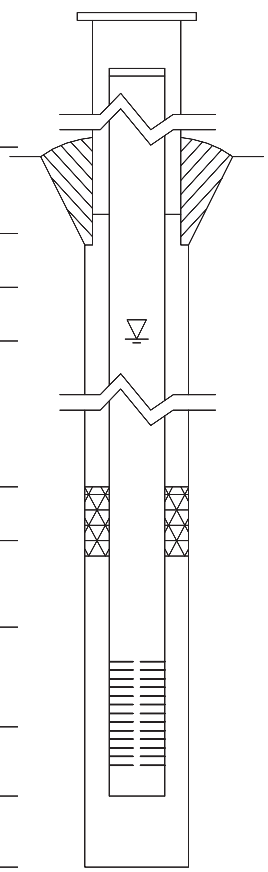
Type of Sand Pack: Quartz Sand

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.)
625.53	-3.62	Top of Protective Casing
625.24	-3.33	Top of Riser Pipe
621.91	0.00	Ground Surface
619.91	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
582.34	39.57	Top of Seal
581.21	40.70	Top of Sand Pack
580.30	41.61	Top of Screen
570.65	51.26	Bottom of Screen
570.26	51.65	Bottom of Well
569.91	52.00	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)	44.94
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	9.65
Total Length of Casing	(feet)	54.98
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: Montgomery Well #: G101

Site Name: CCB Management Facility Borehole #: G101

State Plane Coordinate: X 2,514,214.3 Y 876,551.8 (or) Latitude: 39° 4' 17.000" Longitude: -89° 24' 0.400"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 2/2/2010 Date Finished: 2/2/2010

Report Form Completed By: Suzanna Simpson Date: 2/4/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular circled]

Installation Method: Gravity

Setting Time: 20 min

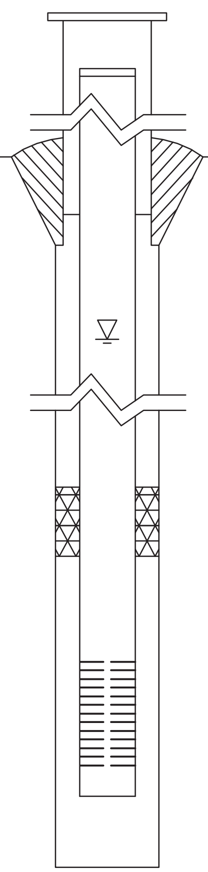
Type of Sand Pack: Quartz sand

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.)
627.89	-2.62	Top of Protective Casing
627.60	-2.33	Top of Riser Pipe
625.27	0.00	Ground Surface
622.27	3.00	Top of Annular Sealant
617.96	7.31	Static Water Level (After Completion) 3/1/2010
614.27	11.00	Top of Seal
612.14	13.13	Top of Sand Pack
609.59	15.68	Top of Screen
604.95	20.32	Bottom of Screen
604.38	20.89	Bottom of Well
603.35	21.92	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)	18.01
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.64
Total Length of Casing	(feet)	23.22
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:
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: Montgomery Well #: G102 (MW3S)

Site Name: CCB Management Facility Borehole #: SB-03a

State Plane Coordinate: X 2,514,531.5 Y 876,554.8 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 4/28/2006 Date Finished: 4/28/2006

Report Form Completed By: Rhonald W. Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

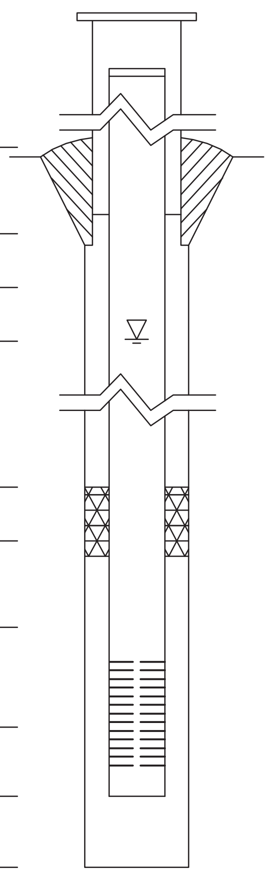
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
629.45	-3.75	Top of Protective Casing
628.96	-3.26	Top of Riser Pipe
625.70	0.00	Ground Surface
623.70	2.00	Top of Annular Sealant
618.67	7.03	Static Water Level (After Completion) 6/1/2006
623.70	2.00	Top of Seal
616.20	9.50	Top of Sand Pack
613.68	12.02	Top of Screen
608.92	16.78	Bottom of Screen
608.55	17.15	Bottom of Well
608.55	17.15	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)	15.28
Bottom of Screen to End Cap	(feet)	0.37
Screen Length (1st slot to last slot)	(feet)	4.76
Total Length of Casing	(feet)	20.41
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:
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: Montgomery Well #: G103

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G103

~~State~~ Plant ~~Plane~~ Coordinate: X 2,514,501.2 Y 876,199.5 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/15/2010 Date Finished: 2/15/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- **Granular** Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 8 min

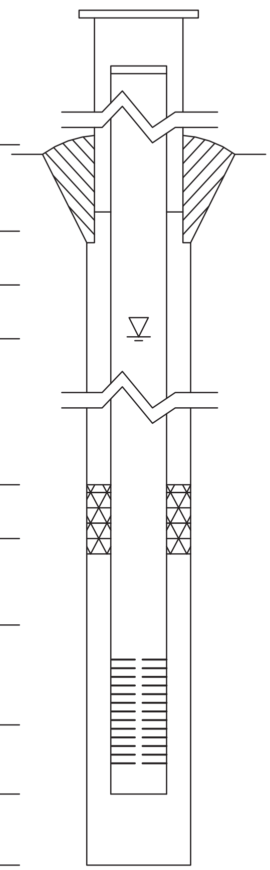
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
634.07	-3.08	Top of Protective Casing
633.80	-2.81	Top of Riser Pipe
630.99	0.00	Ground Surface
624.93	6.06	Top of Annular Sealant
614.00	16.99	Static Water Level (After Completion) 3/1/2010
618.51	12.48	Top of Seal
617.35	13.64	Top of Sand Pack
615.11	15.88	Top of Screen
610.32	20.67	Bottom of Screen
609.90	21.09	Bottom of Well
609.90	21.09	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)	18.69
Bottom of Screen to End Cap	(feet)	0.42
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	23.90
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: Montgomery Well #: G104

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G104

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,514,505.0 Y 875,849.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/15/2010 Date Finished: 2/15/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

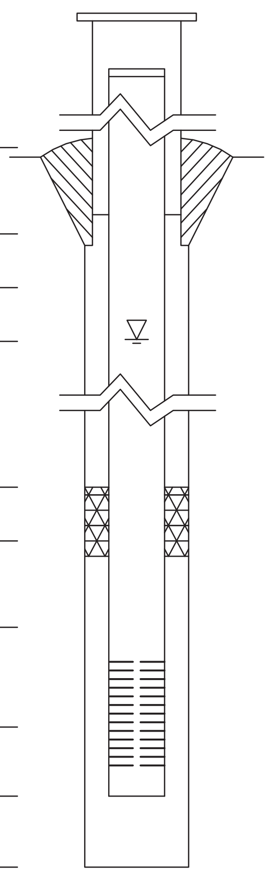
Type of Sand Pack: Quartz sand

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.)
633.29	-3.17	Top of Protective Casing
632.94	-2.82	Top of Riser Pipe
630.12	0.00	Ground Surface
624.92	5.20	Top of Annular Sealant
614.72	15.40	Static Water Level (After Completion) 3/1/2010
619.17	10.95	Top of Seal
617.42	12.70	Top of Sand Pack
615.21	14.91	Top of Screen
610.51	19.61	Bottom of Screen
610.04	20.08	Bottom of Well
607.92	22.20	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)	17.73
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	4.70
Total Length of Casing	(feet)	22.90
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. **Ownership (Name of Controlling Party)** AEG Coffeen Power Station (G104)

2. **Well Location** 134 CIPS Trail — Coffeen — Montgomery
   Address - Lot Number — **City** — **County**

   General Description **Township** 7 **(N)(~~S~~)** **Range** 3 **(~~E~~)(W)** **Section** 10

   SE **Quarter of the** NE **Quarter of the** NE **Quarter**

3. **Year Drilled** 2010

4. **Drilling Permit Number (and date, if known)** n/a

5. **Type of Well** **Bored** ____ **Drilled** ✓ **Other** ____

6. **Total Depth** 20.0 ft. **Diameter (inches)** 2

7. **Formation clear of obstruction** ✓ **Yes** ____ **No**

8. **DETAILS OF PLUGGING**

   Filled with Bentonite grout **from** 0.5 **to** 20.0 **ft.**
   (cement or other materials)

   Kind of plug Random soil **from** 0 **to** 0.5 **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

9. **CASING RECORD** **Upper 2 feet of casing removed** ✓ **Yes** ____ **No**

10. **Date well was sealed** **Month** October **Day** 8 **Year** 2010.

11. **Licensed water well driller or other person approved by the Department performing well sealing.**

    Rhonald W. Hasenyager, L.P.G. — 196-000246
    Name — **Complete License Number**

    Hanson Professional Services Inc., 1525 S. 6th St. — Springfield — IL 62703
    Address — **City** — **State/ZIP**

Illinois Environmental Protection Agency — Well Completion Report

Site #:
County: Montgomery
Well #: G105

Site Name: AEG Coffeen Power Station CCB Management Facility
Borehole #: G105

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,514,509.2 Y 875,499.7 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick
IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co
Driller: T. List

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson
Date Started: 2/16/2010
Date Finished: 2/16/2010

Report Form Completed By: Suzanna L. Simpson
Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

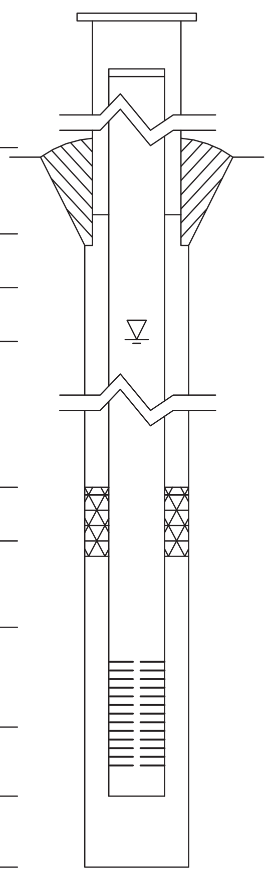
Type of Sand Pack: Quartz sand

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.)
632.40	-3.14	Top of Protective Casing
632.08	-2.82	Top of Riser Pipe
629.26	0.00	Ground Surface
623.80	5.46	Top of Annular Sealant
613.18	16.08	Static Water Level (After Completion) 3/1/2010
616.55	12.71	Top of Seal
615.50	13.76	Top of Sand Pack
613.15	16.11	Top of Screen
608.36	20.90	Bottom of Screen
607.89	21.37	Bottom of Well
606.80	22.46	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)	18.93
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	24.19
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: Montgomery Well #: G106

Site Name: CCB Management Facility Borehole #: G106

State Plane Coordinate: X 2,514,512.8 Y 875,149.8 (or) Latitude: 39° 4' 3.100" Longitude: -89° 23' 56.800"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 2/16/2010 Date Finished: 2/16/2010

Report Form Completed By: Suzanna Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 10 min

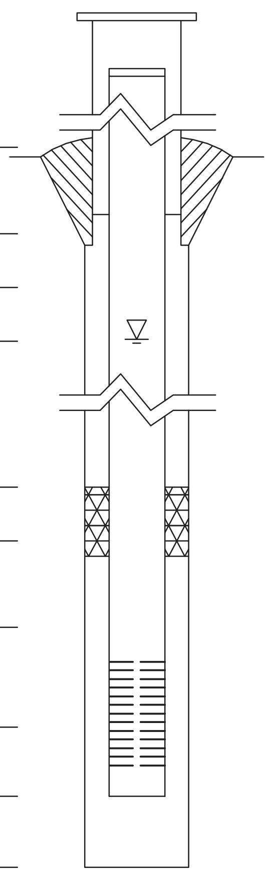
Type of Sand Pack: Quartz sand

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.)	
631.45	-3.06	Top of Protective Casing
631.15	-2.76	Top of Riser Pipe
628.39	0.00	Ground Surface
622.94	5.45	Top of Annular Sealant
615.77	12.62	Static Water Level (After Completion) 3/1/2010
617.44	10.95	Top of Seal
616.10	12.29	Top of Sand Pack
614.02	14.37	Top of Screen
609.43	18.96	Bottom of Screen
608.95	19.44	Bottom of Well
607.94	20.45	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)	17.13
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	4.69
Total Length of Casing	(feet)	22.30
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: (circled)
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G107

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G107

~~State~~ Plant ~~Plane~~ Coordinate: X 2,514,358.3 Y 874,994.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

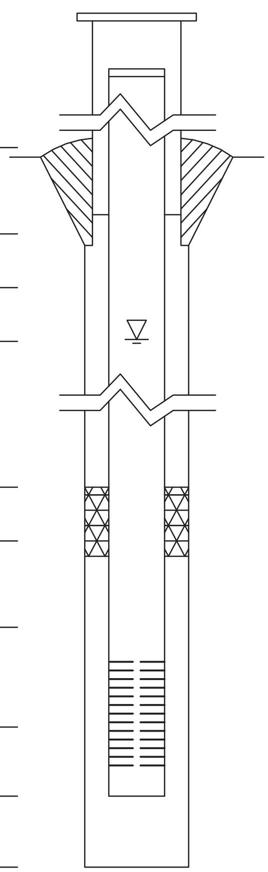
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/17/2010 Date Finished: 2/17/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 8 min

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.)
630.60	-2.81	Top of Protective Casing
630.23	-2.44	Top of Riser Pipe
627.79	0.00	Ground Surface
624.08	3.71	Top of Annular Sealant
617.39	10.40	Static Water Level (After Completion) 3/1/2010
617.41	10.38	Top of Seal
616.24	11.55	Top of Sand Pack
613.92	13.87	Top of Screen
609.29	18.50	Bottom of Screen
608.82	18.97	Bottom of Well
607.08	20.71	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)	16.31
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	4.63
Total Length of Casing	(feet)	21.41
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: Montgomery　　Well #: G108

Site Name: AEG Coffeen Power Station CCB Management Facility　　Borehole #: G108

~~State~~ Plant ~~Plane~~ Coordinate: X 2,514,248.3　Y 874,948.8　(or)　Latitude: ° ' "　Longitude: ° ' "

Surveyed By: Jeffrey D. Emrick　　IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co　　Driller: T. List

Consulting Firm: Hanson Professional Services Inc.　　Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger　　Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb　　Date Started: 2/12/2010　　Date Finished: 2/12/2010

Report Form Completed By: Diane M. Lamb　　Date: 2/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled)　Pellet　Slurry (choose one)

Installation Method: Granular

Setting Time: 10 min

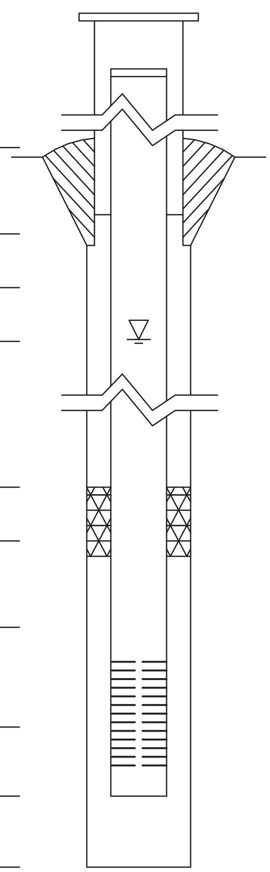
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
630.52	-3.02	Top of Protective Casing
630.22	-2.72	Top of Riser Pipe
627.50	0.00	Ground Surface
622.50	5.00	Top of Annular Sealant
618.57	8.93	Static Water Level (After Completion) 3/1/2010
614.00	13.50	Top of Seal
612.80	14.70	Top of Sand Pack
610.68	16.82	Top of Screen
606.00	21.50	Bottom of Screen
605.50	22.00	Bottom of Well
605.50	22.00	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)	19.54
Bottom of Screen to End Cap	(feet)	0.50
Screen Length (1st slot to last slot)	(feet)	4.68
Total Length of Casing	(feet)	24.72
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: Montgomery Well #: G109

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G109

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,514,137.8 Y 874,970.1 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb Date Started: 2/11/2010 Date Finished: 2/11/2010

Report Form Completed By: Diane M. Lamb Date: 2/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Granular

Setting Time: 10 min

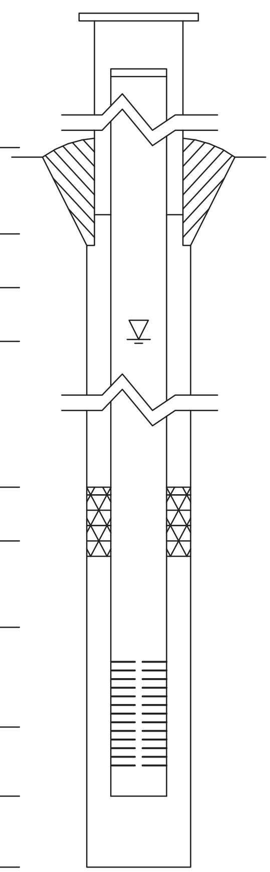
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
630.08	-2.88	Top of Protective Casing
629.76	-2.56	Top of Riser Pipe
627.20	0.00	Ground Surface
621.70	5.50	Top of Annular Sealant
618.35	8.85	Static Water Level (After Completion) 3/1/2010
614.90	12.30	Top of Seal
614.60	12.60	Top of Sand Pack
611.81	15.39	Top of Screen
607.27	19.93	Bottom of Screen
606.70	20.50	Bottom of Well
606.70	20.50	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)	17.95
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	23.06
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: Montgomery Well #: G110

Site Name: CCB Management Facility Borehole #: G110

State Plane Coordinate: X 2,514,057.7 Y 875,015.4 (or) Latitude: 39° 4' 1.800" Longitude: -89° 24' 2.500"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: ______ Date Started: 2/11/2010 Date Finished: 2/11/2010

Report Form Completed By: ______ Date: 2/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular circled]

Installation Method: Granular

Setting Time: 10 min

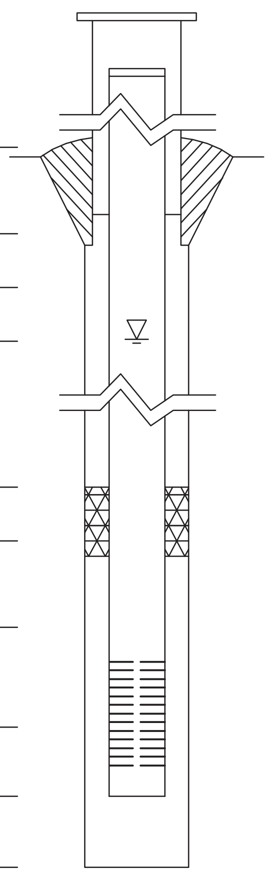
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
629.96	-2.94	Top of Protective Casing
629.65	-2.63	Top of Riser Pipe
627.02	0.00	Ground Surface
621.86	5.16	Top of Annular Sealant
617.52	9.50	Static Water Level (After Completion) 3/1/2010
615.46	11.56	Top of Seal
614.06	12.96	Top of Sand Pack
611.97	15.05	Top of Screen
607.43	19.59	Bottom of Screen
606.86	20.16	Bottom of Well
606.86	20.16	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)	17.68
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	22.79
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:
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: Montgomery Well #: G111

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G111

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,981.7 Y 875,058.7 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb Date Started: 2/10/2010 Date Finished: 2/11/2010

Report Form Completed By: Diane M. Lamb Date: 2/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Granular

Setting Time: 10 min

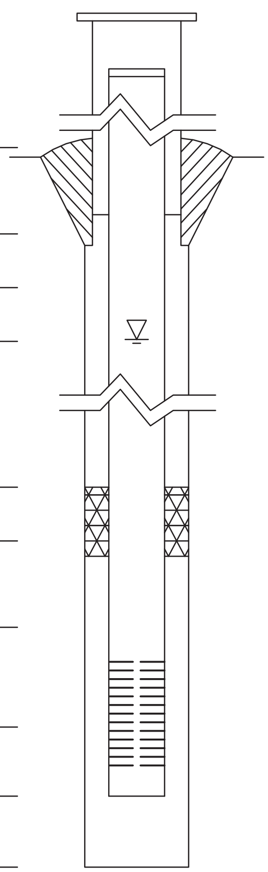
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
630.19	-2.95	Top of Protective Casing
629.90	-2.66	Top of Riser Pipe
627.24	0.00	Ground Surface
622.52	4.72	Top of Annular Sealant
616.74	10.50	Static Water Level (After Completion) 3/1/2010
616.41	10.83	Top of Seal
614.52	12.72	Top of Sand Pack
612.63	14.61	Top of Screen
608.09	19.15	Bottom of Screen
607.52	19.72	Bottom of Well
607.52	19.72	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)	17.27
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	22.38
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G119

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G119

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,907.7 Y 875,675.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/9/2010 Date Finished: 2/9/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

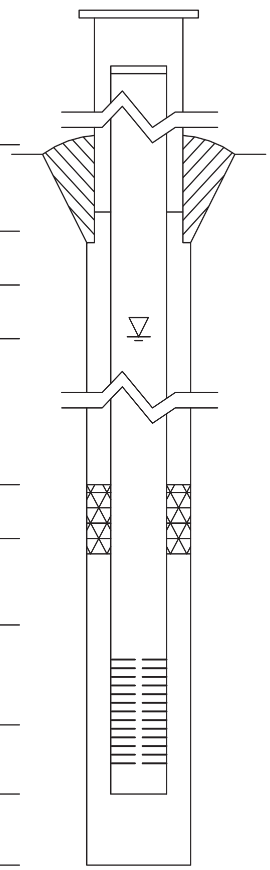
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
631.85	-3.00	Top of Protective Casing
631.55	-2.70	Top of Riser Pipe
628.85	0.00	Ground Surface
623.57	5.28	Top of Annular Sealant
617.59	11.26	Static Water Level (After Completion) 3/1/2010
614.87	13.98	Top of Seal
613.57	15.28	Top of Sand Pack
611.56	17.29	Top of Screen
607.02	21.83	Bottom of Screen
606.47	22.38	Bottom of Well
606.47	22.38	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)	19.99
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	25.08
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: Montgomery Well #: G120

Site Name: CCB Management Facility Borehole #: G120

State Plane Coordinate: X 2,513,905.8 Y 875,854.4 (or) Latitude: 39° 4' 10.100" Longitude: -89° 24' 4.400"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 2/8/2010 Date Finished: 2/8/2010

Report Form Completed By: Suzanna Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular selected]

Installation Method: Gravity

Setting Time: 8 min

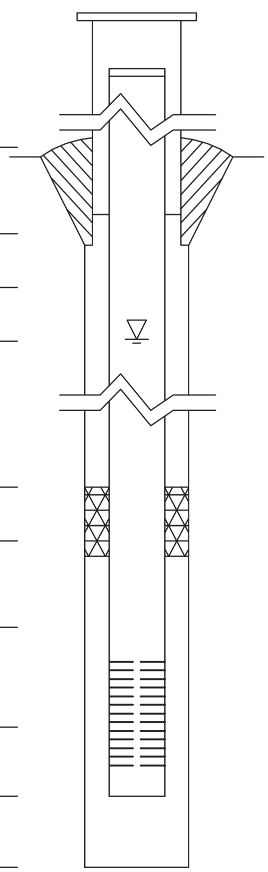
Type of Sand Pack: Quartz sand

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.)
632.18	-2.88	Top of Protective Casing
631.87	-2.57	Top of Riser Pipe
629.30	0.00	Ground Surface
624.22	5.08	Top of Annular Sealant
615.45	13.85	Static Water Level (After Completion) 3/1/2010
618.14	11.16	Top of Seal
616.22	13.08	Top of Sand Pack
614.20	15.10	Top of Screen
609.68	19.62	Bottom of Screen
609.09	20.21	Bottom of Well
607.22	22.08	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)	17.67
Bottom of Screen to End Cap	(feet)	0.59
Screen Length (1st slot to last slot)	(feet)	4.52
Total Length of Casing	(feet)	22.78
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:
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: Montgomery Well #: G121

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G121

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,904.4 Y 875,964.6 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/4/2010 Date Finished: 2/4/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 7 min

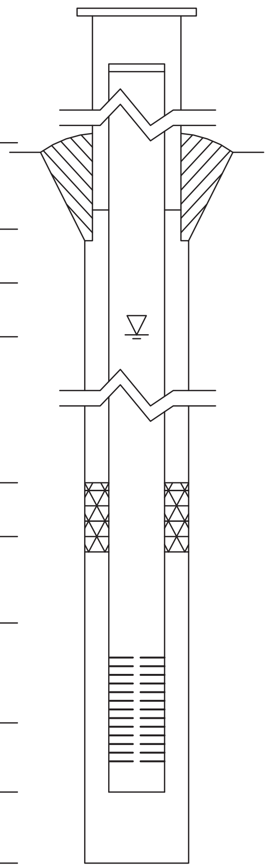
Type of Sand Pack: Quartz sand

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.)
633.14	-3.57	Top of Protective Casing
632.83	-3.26	Top of Riser Pipe
629.57	0.00	Ground Surface
624.41	5.16	Top of Annular Sealant
615.13	14.44	Static Water Level (After Completion) 3/1/2010
616.81	12.76	Top of Seal
615.49	14.08	Top of Sand Pack
612.78	16.79	Top of Screen
608.10	21.47	Bottom of Screen
607.62	21.95	Bottom of Well
605.41	24.16	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)	20.05
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	4.68
Total Length of Casing	(feet)	25.21
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: Montgomery Well #: G122

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G122

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,902.8 Y 876,080.1 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb Date Started: 2/4/2010 Date Finished: 2/4/2010

Report Form Completed By: Diane M. Lamb Date: 2/9/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

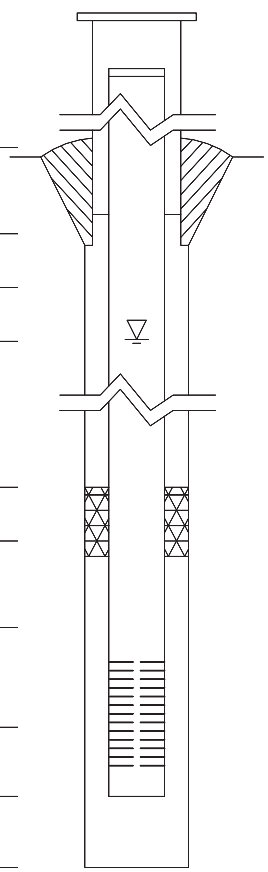
Type of Sand Pack: Quartz sand

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.)
632.98	-3.12	Top of Protective Casing
632.69	-2.83	Top of Riser Pipe
629.86	0.00	Ground Surface
625.01	4.85	Top of Annular Sealant
617.02	12.84	Static Water Level (After Completion) 3/1/2010
617.01	12.85	Top of Seal
615.41	14.45	Top of Sand Pack
613.35	16.51	Top of Screen
608.81	21.05	Bottom of Screen
608.20	21.66	Bottom of Well
608.01	21.85	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)	19.34
Bottom of Screen to End Cap	(feet)	0.61
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	24.49
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: Montgomery Well #: G123

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G123

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,901.5 Y 876,189.6 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb Date Started: 2/3/2010 Date Finished: 2/4/2010

Report Form Completed By: Diane M. Lamb Date: 2/9/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

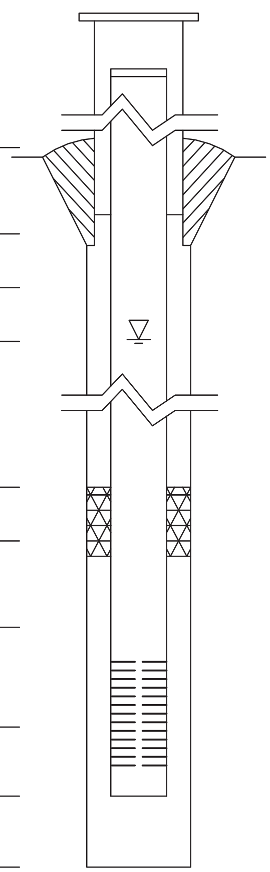
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.29	-3.16	Top of Protective Casing
632.96	-2.83	Top of Riser Pipe
630.13	0.00	Ground Surface
625.06	5.07	Top of Annular Sealant
614.15	15.98	Static Water Level (After Completion) 3/1/2010
612.31	17.82	Top of Seal
611.14	18.99	Top of Sand Pack
609.19	20.94	Top of Screen
604.67	25.46	Bottom of Screen
604.06	26.07	Bottom of Well
604.06	26.07	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)	23.77
Bottom of Screen to End Cap	(feet)	0.61
Screen Length (1st slot to last slot)	(feet)	4.52
Total Length of Casing	(feet)	28.90
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 (circled)
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G124

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G124

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,900.3 Y 876,304.9 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

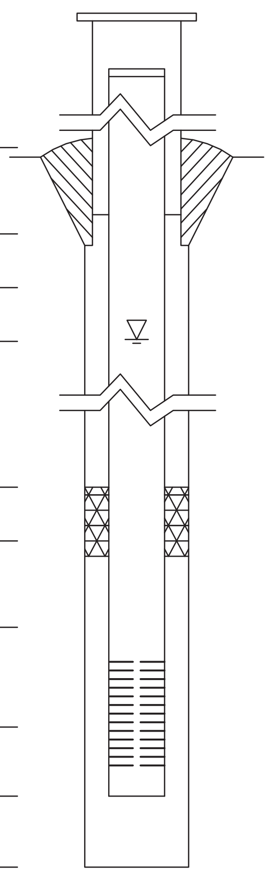
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/3/2010 Date Finished: 2/3/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/5/2010

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.70	-3.28	Top of Protective Casing
633.39	-2.97	Top of Riser Pipe
630.42	0.00	Ground Surface
625.45	4.97	Top of Annular Sealant
619.43	10.99	Static Water Level (After Completion) 3/1/2010
618.34	12.08	Top of Seal
616.50	13.92	Top of Sand Pack
614.44	15.98	Top of Screen
609.91	20.51	Bottom of Screen
609.36	21.06	Bottom of Well
608.45	21.97	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

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

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:

Well Completion Form (revised 02/06/02)

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)	18.95
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	24.03
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G125

Site Name: CCB Management Facility Borehole #: G125

State Plane Coordinate: X 2,513,899.1 Y 876,409.5 (or) Latitude: 39° 4' 15.600" Longitude: -89° 24' 4.400"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 2/2/2010 Date Finished: 2/3/2010

Report Form Completed By: Suzanna Simpson Date: 2/5/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

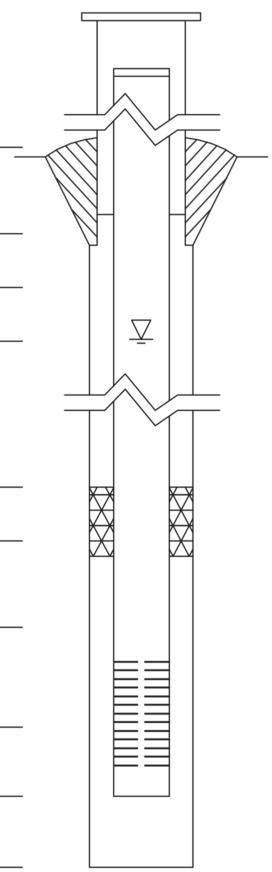
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.82	-3.14	Top of Protective Casing
633.51	-2.83	Top of Riser Pipe
630.68	0.00	Ground Surface
625.77	4.91	Top of Annular Sealant
622.10	8.58	Static Water Level (After Completion) 3/1/2010
617.15	13.53	Top of Seal
615.95	14.73	Top of Sand Pack
613.65	17.03	Top of Screen
609.12	21.56	Bottom of Screen
608.64	22.04	Bottom of Well
608.64	22.04	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)	19.86
Bottom of Screen to End Cap	(feet)	0.58
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	24.97
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:
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: Montgomery Well #: G126

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G126

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,895.4 Y 875,062.4 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Diane M. Lamb Date Started: 2/10/2010 Date Finished: 2/10/2010

Report Form Completed By: Diane M. Lamb Date: 2/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Granular

Setting Time: 10 min

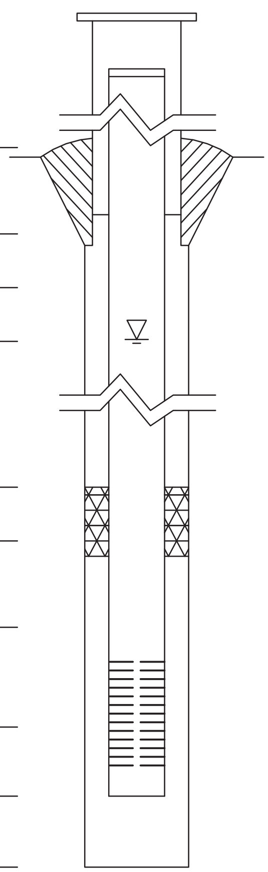
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.69	-2.73	Top of Protective Casing
625.39	-2.43	Top of Riser Pipe
622.96	0.00	Ground Surface
619.96	3.00	Top of Annular Sealant
614.14	8.82	Static Water Level (After Completion) 3/1/2010
613.96	9.00	Top of Seal
612.86	10.10	Top of Sand Pack
610.07	12.89	Top of Screen
605.53	17.43	Bottom of Screen
604.96	18.00	Bottom of Well
604.96	18.00	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)	15.32
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	20.43
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 (circled)
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G151

Site Name: CCB Management Facility Borehole #: G151

State Plane Coordinate: X 2,513,805.9 Y 875,023.7 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Ryne M. Fiorito Date Started: 12/19/2011 Date Finished: 12/19/2011

Report Form Completed By: Rhonald W. Hasenyager Date: 12/27/2011

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 24 min

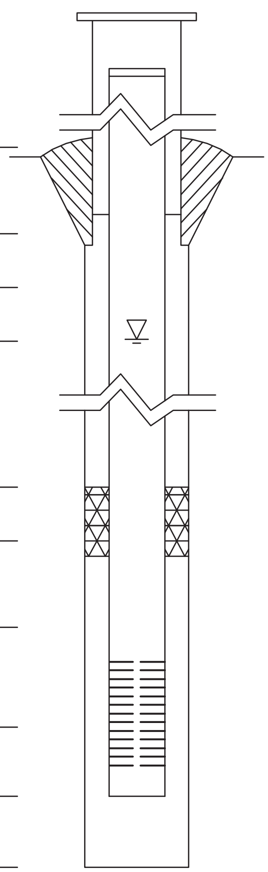
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.24	-3.42	Top of Protective Casing
625.93	-3.11	Top of Riser Pipe
622.82	0.00	Ground Surface
620.49	2.33	Top of Annular Sealant
615.03	7.79	Static Water Level (After Completion) 12/21/2011
611.82	11.00	Top of Seal
609.07	13.75	Top of Sand Pack
607.48	15.34	Top of Screen
602.98	19.84	Bottom of Screen
602.36	20.46	Bottom of Well
602.36	20.46	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)	18.45
Bottom of Screen to End Cap	(feet)	0.62
Screen Length (1st slot to last slot)	(feet)	4.50
Total Length of Casing	(feet)	23.57
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:
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: Montgomery
Well #: G152

Site Name: CCB Management Facility
Borehole #: G152

State Plane Coordinate: X 2,513,894.5 Y 874,687.5 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Jeffrey D. Emrick
IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp.
Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): n/a

Logged By: Ryne M. Fiorito
Date Started: 12/20/2011 Date Finished: 12/20/2011

Report Form Completed By: Rhonald W. Hasenyager
Date: 12/27/2011

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Seal extended to near surface

Installation Method:

Setting Time:

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

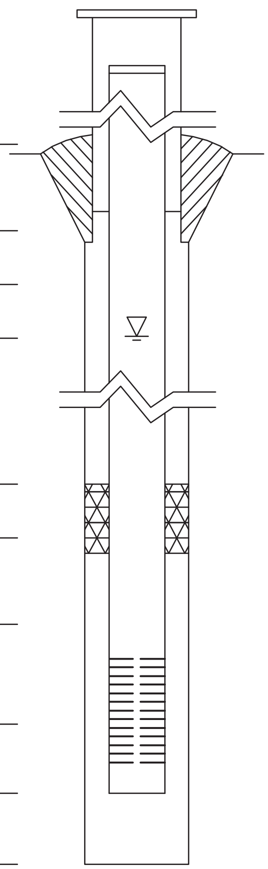
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.67	-3.61	Top of Protective Casing
626.52	-3.46	Top of Riser Pipe
623.06	0.00	Ground Surface
621.06	2.00	Top of Annular Sealant
606.06	17.00	Static Water Level (After Completion) 12/21/2011
621.06	2.00	Top of Seal
611.56	11.50	Top of Sand Pack
609.47	13.59	Top of Screen
604.97	18.09	Bottom of Screen
604.49	18.57	Bottom of Well
604.49	18.57	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)	17.05
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	4.50
Total Length of Casing	(feet)	22.03
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:
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: Montgomery Well #: G153

Site Name: CCB Management Facility Borehole #: G153

State Plane Coordinate: X 2,513,532.7 Y 874,532.7 (or) Latitude: ______ ______ ______ Longitude: ______ ______ ______

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Ryne M. Fiorito Date Started: 12/15/2011 Date Finished: 12/15/2011

Report Form Completed By: Rhonald W. Hasenyager Date: 12/27/2011

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

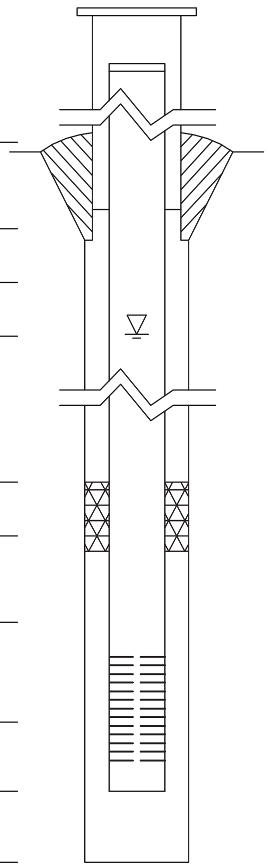
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.59	-3.29	Top of Protective Casing
626.35	-3.05	Top of Riser Pipe
623.30	0.00	Ground Surface
622.63	0.67	Top of Annular Sealant
605.75	17.55	Static Water Level (After Completion) 12/21/2011
610.30	13.00	Top of Seal
608.30	15.00	Top of Sand Pack
607.40	15.90	Top of Screen
602.96	20.34	Bottom of Screen
602.54	20.76	Bottom of Well
602.54	20.76	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)	18.95
Bottom of Screen to End Cap	(feet)	0.42
Screen Length (1st slot to last slot)	(feet)	4.44
Total Length of Casing	(feet)	23.81
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:
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: Montgomery Well #: G154

Site Name: CCB Management Facility Borehole #: G154

State Plane Coordinate: X 2,513,243.1 Y 874,978.4 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Ryne M. Fiorito Date Started: 12/16/2011 Date Finished: 12/16/2011

Report Form Completed By: Rhonald W. Hasenyager Date: 12/27/2011

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 24 min

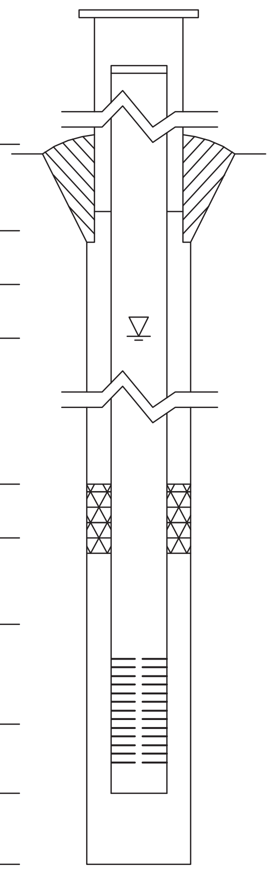
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.55	-3.03	Top of Protective Casing
626.35	-2.83	Top of Riser Pipe
623.52	0.00	Ground Surface
622.44	1.08	Top of Annular Sealant
612.42	11.10	Static Water Level (After Completion) 12/21/2011
613.02	10.50	Top of Seal
610.02	13.50	Top of Sand Pack
609.26	14.26	Top of Screen
604.76	18.76	Bottom of Screen
604.42	19.10	Bottom of Well
603.52	20.00	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)	17.09
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	4.50
Total Length of Casing	(feet)	21.93
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:
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: Montgomery Well #: G155

Site Name: CCB Management Facility Borehole #: G155

State Plane Coordinate: X 2,513,501.8 Y 875,127.7 (or) Latitude: ______ Longitude: ______

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Ryne M. Fiorito Date Started: 12/19/2011 Date Finished: 12/19/2011

Report Form Completed By: Rhonald W. Hasenyager Date: 12/27/2011

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- **Granular** Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 27 min

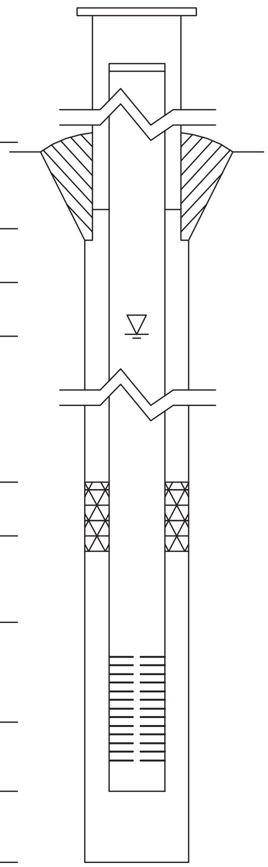
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.07	-3.18	Top of Protective Casing
625.86	-2.97	Top of Riser Pipe
622.89	0.00	Ground Surface
621.39	1.50	Top of Annular Sealant
614.99	7.90	Static Water Level (After Completion) 12/21/2011
611.89	11.00	Top of Seal
609.14	13.75	Top of Sand Pack
607.80	15.09	Top of Screen
603.31	19.58	Bottom of Screen
602.66	20.23	Bottom of Well
602.66	20.23	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: **[circled]**
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:

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)	18.28
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.49
Total Length of Casing	(feet)	23.20
Screen Slot Size **	(inches)	0.010

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G200

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G200

~~State-~~ Plant ~~Plane~~ Coordinate: X 877,930.6 Y 2,515,650.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Suzanna L Simpson Date Started: 2/25/2008 Date Finished: 2/25/2008

Report Form Completed By: Suzanna L Simpson Date: 2/29/2008

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

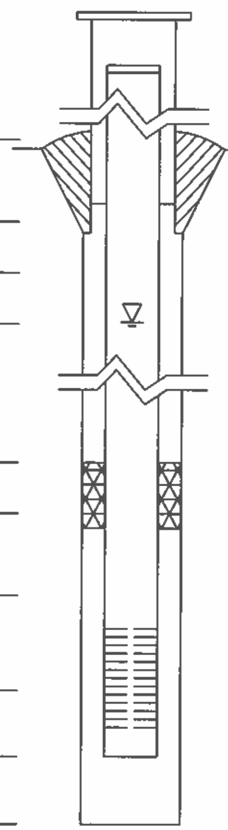
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Formation Sand (if applicable)

Installation Method: Slough



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.54	-2.34	Top of Protective Casing
625.94	-1.74	Top of Riser Pipe
624.20	0.00	Ground Surface
620.70	3.50	Top of Annular Sealant
621.45	2.75	Static Water Level (After Completion) 3/12/2008
620.70	3.50	Top of Seal
614.20	10.00	Top of Sand Pack
612.01	12.19	Top of Screen
607.22	16.98	Bottom of Screen
606.84	17.36	Bottom of Well
606.20	18.00	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)	13.93
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	19.10
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G201

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G201

~~State-~~ ~~Plane~~ Plant Coordinate: X 877,924.9 Y 2,514,849.5 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Suzanna L Simpson Date Started: 2/25/2008 Date Finished: 2/25/2008

Report Form Completed By: Suzanna L Simpson Date: 2/29/2008

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

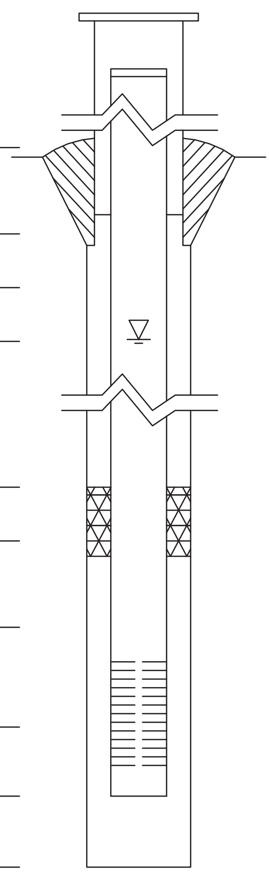
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.66	-3.76	Top of Protective Casing
627.12	-3.22	Top of Riser Pipe
623.90	0.00	Ground Surface
620.60	3.30	Top of Annular Sealant
621.73	2.17	Static Water Level (After Completion) 3/12/2008
620.60	3.30	Top of Seal
611.80	12.10	Top of Sand Pack
610.89	13.01	Top of Screen
606.10	17.80	Bottom of Screen
605.75	18.15	Bottom of Well
605.75	18.15	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)	16.23
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	21.37
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:

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail | Coffeen | Montgomery
Address - Lot Number | City | County

General Description Township 7 (N)(~~S~~) Range 3 (~~E~~)(W) Section 10

SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

Filled with Bentonite grout from 0.5 to 20.0 ft.
(cement or other materials)

Kind of plug Random soil from 0 to 0.5 ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

Rhonald W. Hasenyager, L.P.G. | 196-000246
Name | Complete License Number

Hanson Professional Services Inc., 1525 S. 6th St. | Springfield | IL 62703
Address | City | State/ZIP

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G205

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G205

~~State-~~ Plant ~~Plane~~ Coordinate: X 875,550.2 Y 2,515,914.9 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Suzanna L Simpson Date Started: 2/21/2008 Date Finished: 2/21/2008

Report Form Completed By: Suzanna L Simpson Date: 2/29/2008

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

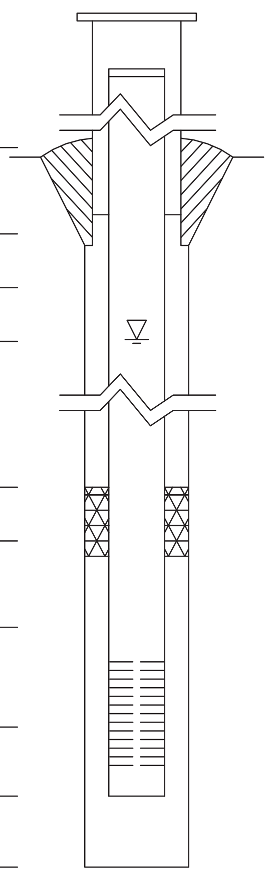
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Formation Sand (if applicable)

Installation Method: Slough



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.87	-2.72	Top of Protective Casing
624.45	-2.30	Top of Riser Pipe
622.15	0.00	Ground Surface
619.95	2.20	Top of Annular Sealant
617.09	5.06	Static Water Level (After Completion) 3/12/2008
619.95	2.20	Top of Seal
613.35	8.80	Top of Sand Pack
612.11	10.04	Top of Screen
607.62	14.53	Bottom of Screen
607.08	15.07	Bottom of Well
606.15	16.00	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)	12.34
Bottom of Screen to End Cap	(feet)	0.54
Screen Length (1st slot to last slot)	(feet)	4.49
Total Length of Casing	(feet)	17.37
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) Coffeen Power Station - GMF (G205)

2. Well Location 134 CIPS Lane (Address - Lot Number) Coffeen (City) Montgomery (County)

General Description Township 7 (N)~~(S)~~ Range 3 ~~(E)~~(W) Section 11

SW Quarter of the NE Quarter of the NW Quarter

3. Year Drilled 2008

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 16 Diameter (inches) 8

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING *(riser pipe and screen pulled and annulus was grouted)*

Filled with Bentonite grout (cement or other materials) from 0 to 16.0 ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month March Day 20 Year 2017.

11. Licensed water well driller or other person approved by the Department performing well sealing.

Name: Rhonald W. Hasenyager, L.P.G.
Complete License Number: 196-000246

Address: Hanson Professional Services Inc., 1525 S. 6th St.
City: Springfield
State/ZIP: IL 62703

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #:
County: Montgomery
Well #: G206

Site Name: CCB Management Facility
Borehole #: G206

State Plane Coordinate: X 2,514,669.2 Y 875,103.9 (or) Latitude: 39° 4' 2.600" Longitude: -89° 23' 54.800"

Surveyed By: Jeffrey D. Emrick
IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co
Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson
Date Started: 10/14/2010 Date Finished: 10/14/2010

Report Form Completed By: Suzanna Simpson
Date: 10/15/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular / Pellet / Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 15 min

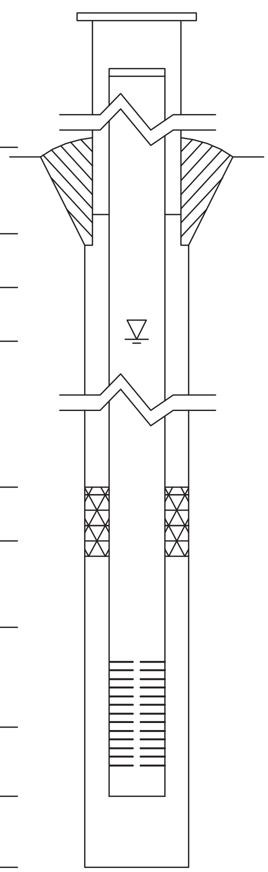
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.07	-2.53	Top of Protective Casing
632.82	-2.28	Top of Riser Pipe
630.54	0.00	Ground Surface
627.84	2.70	Top of Annular Sealant
611.96	18.58	Static Water Level (After Completion) 11/15/2010
616.24	14.30	Top of Seal
615.04	15.50	Top of Sand Pack
613.03	17.51	Top of Screen
608.62	21.92	Bottom of Screen
608.12	22.42	Bottom of Well
606.54	24.00	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)	19.79
Bottom of Screen to End Cap	(feet)	0.50
Screen Length (1st slot to last slot)	(feet)	4.41
Total Length of Casing	(feet)	24.70
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:
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: Montgomery Well #: G207

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G207

State Plane Coordinate: X 2,514,837.9 Y 875,166.4 (or) Latitude: 39 ° 4 ' 3.2 " Longitude: -89 ° 23 ' 52.6 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

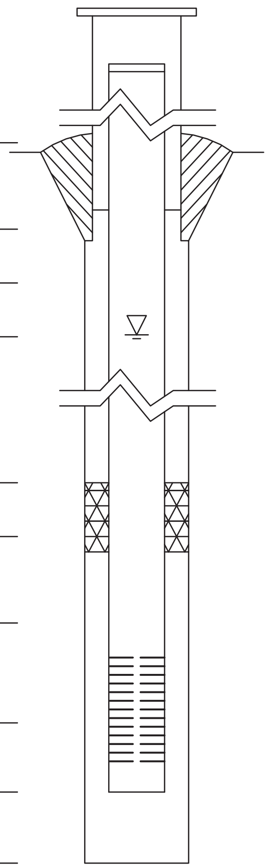
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/8/2010 Date Finished: 10/8/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/8/2010

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

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: n/a

Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.37	-2.76	Top of Protective Casing
633.21	-2.60	Top of Riser Pipe
630.61	0.00	Ground Surface
628.61	2.00	Top of Annular Sealant
612.86	17.75	Static Water Level (After Completion) 11/15/2010
614.76	15.85	Top of Seal
613.63	16.98	Top of Sand Pack
612.37	18.24	Top of Screen
607.84	22.77	Bottom of Screen
607.31	23.30	Bottom of Well
606.61	24.00	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)	20.84
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	25.90
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G208

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G208

State Plane Coordinate: X 2,514,993.6 Y 875,231.5 (or) Latitude: 39 ° 4 ' 3.9 " Longitude: -89 ° 23 ' 50.6 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/7/2010 Date Finished: 10/7/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/8/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- **Granular** Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 9 min

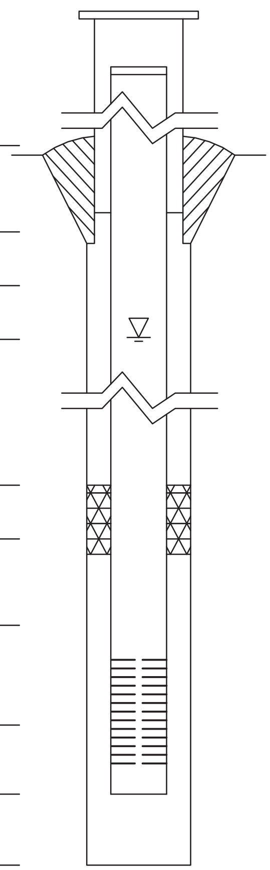
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.43	-2.86	Top of Protective Casing
633.16	-2.59	Top of Riser Pipe
630.57	0.00	Ground Surface
627.77	2.80	Top of Annular Sealant
614.76	15.81	Static Water Level (After Completion) 11/15/2010
616.07	14.50	Top of Seal
613.90	16.67	Top of Sand Pack
613.04	17.53	Top of Screen
608.51	22.06	Bottom of Screen
607.97	22.60	Bottom of Well
606.57	24.00	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)	20.12
Bottom of Screen to End Cap	(feet)	0.54
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	25.19
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: Montgomery Well #: G209

Site Name: CCB Management Facility Borehole #: G209

State Plane Coordinate: X 2,515,149.6 Y 875,298.2 (or) Latitude: 39° 4' 4.500" Longitude: -89° 23' 48.700"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 10/7/2010 Date Finished: 10/7/2010

Report Form Completed By: Suzanna Simpson Date: 10/8/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

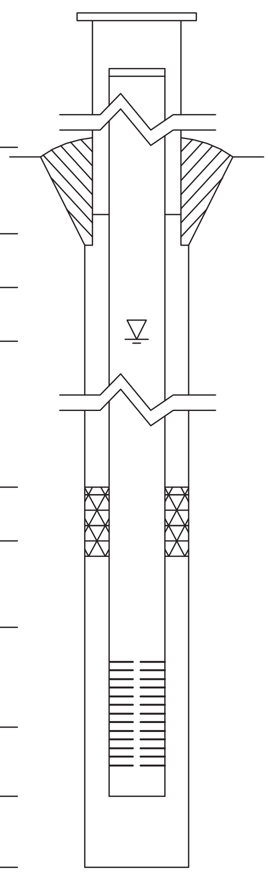
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.16	-2.59	Top of Protective Casing
632.91	-2.34	Top of Riser Pipe
630.57	0.00	Ground Surface
627.57	3.00	Top of Annular Sealant
615.52	15.05	Static Water Level (After Completion) 11/15/2010
616.07	14.50	Top of Seal
614.67	15.90	Top of Sand Pack
612.83	17.74	Top of Screen
608.29	22.28	Bottom of Screen
607.76	22.81	Bottom of Well
606.57	24.00	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)	20.08
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	25.15
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:
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G210

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G210

State Plane Coordinate: X 2,515,299.0 Y 875,359.7 (or) Latitude: 39 ° 4 ' 5.1 " Longitude: -89 ° 23 ' 46.8 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/6/2010 Date Finished: 10/6/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/8/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 15 hrs

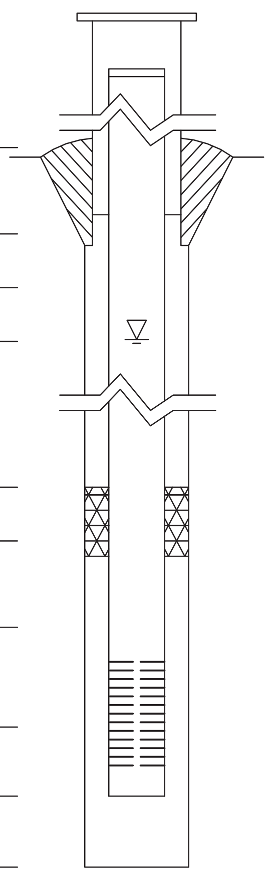
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.17	-2.69	Top of Protective Casing
632.99	-2.51	Top of Riser Pipe
630.48	0.00	Ground Surface
627.48	3.00	Top of Annular Sealant
615.38	15.10	Static Water Level (After Completion) 11/15/2010
614.03	16.45	Top of Seal
612.98	17.50	Top of Sand Pack
611.09	19.39	Top of Screen
606.55	23.93	Bottom of Screen
606.02	24.46	Bottom of Well
605.48	25.00	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)	21.90
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	26.97
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: Montgomery Well #: G211

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G211

State Plane Coordinate: X 2,515,449.1 Y 875,424.5 (or) Latitude: 39 ° 4 ' 5.7 " Longitude: -89 ° 23 ' 44.9 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/11/2010 Date Finished: 10/11/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/15/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular circled]

Installation Method: Gravity

Setting Time: 15 min

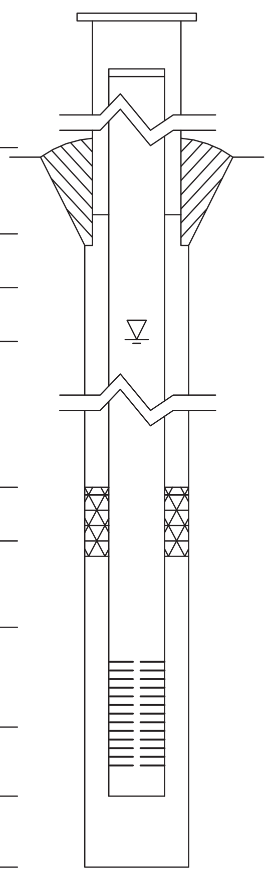
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
632.83	-2.52	Top of Protective Casing
632.64	-2.33	Top of Riser Pipe
630.31	0.00	Ground Surface
627.31	3.00	Top of Annular Sealant
616.17	14.14	Static Water Level (After Completion) 11/15/2010
616.01	14.30	Top of Seal
614.91	15.40	Top of Sand Pack
612.97	17.34	Top of Screen
608.43	21.88	Bottom of Screen
607.90	22.41	Bottom of Well
606.31	24.00	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)	19.67
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	24.74
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:

Well Completion Form (revised 02/06/02)

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____________ County: Montgomery Well #: G212

Site Name: CCB Management Facility Borehole #: G212

State Plane Coordinate: X 2,515,583.0 Y 875,486.5 (or) Latitude: 39° 4' 6.300" Longitude: -89° 23' 43.100"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 10/11/2010 Date Finished: 10/11/2010

Report Form Completed By: Suzanna Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 17 min

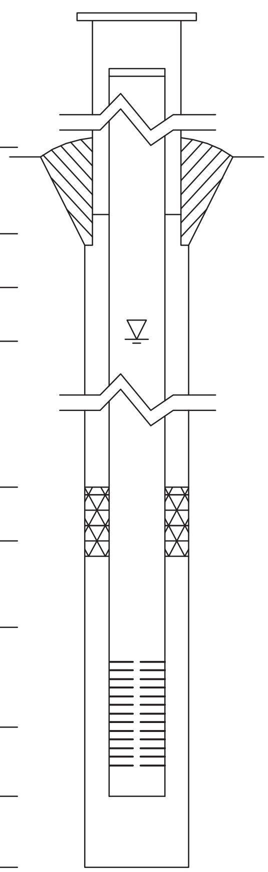
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.12	-2.53	Top of Protective Casing
632.89	-2.30	Top of Riser Pipe
630.59	0.00	Ground Surface
627.59	3.00	Top of Annular Sealant
616.10	14.49	Static Water Level (After Completion) 11/15/2010
616.89	13.70	Top of Seal
615.79	14.80	Top of Sand Pack
613.85	16.74	Top of Screen
609.30	21.29	Bottom of Screen
608.78	21.81	Bottom of Well
606.59	24.00	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)	19.04
Bottom of Screen to End Cap	(feet)	0.52
Screen Length (1st slot to last slot)	(feet)	4.55
Total Length of Casing	(feet)	24.11
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:
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: Montgomery Well #: G213

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G213

State Plane Coordinate: X 2,515,723.5 Y 875,544.4 (or) Latitude: 39 ° 4 ' 6.9 " Longitude: -89 ° 23 ' 41.4 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/12/2010 Date Finished: 10/12/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

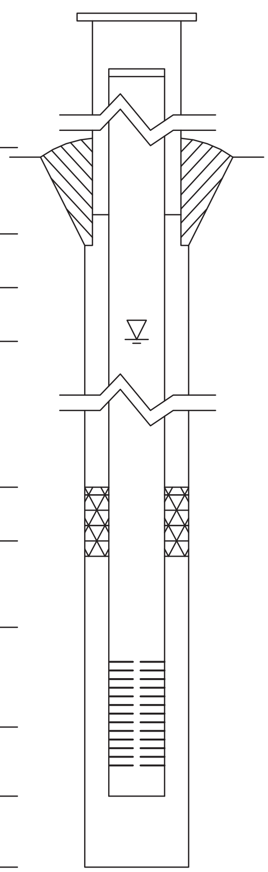
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.08	-2.74	Top of Protective Casing
632.81	-2.47	Top of Riser Pipe
630.34	0.00	Ground Surface
627.64	2.70	Top of Annular Sealant
615.01	15.33	Static Water Level (After Completion) 11/15/2010
616.54	13.80	Top of Seal
615.34	15.00	Top of Sand Pack
613.59	16.75	Top of Screen
609.05	21.29	Bottom of Screen
608.52	21.82	Bottom of Well
606.34	24.00	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)	19.22
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	24.29
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: Montgomery Well #: G214

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G214

State Plane Coordinate: X 2,515,960.8 Y 875,668.0 (or) Latitude: 39 ° 4 ' 8.1 " Longitude: -89 ° 23 ' 38.3 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/14/2010 Date Finished: 10/14/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 14 min

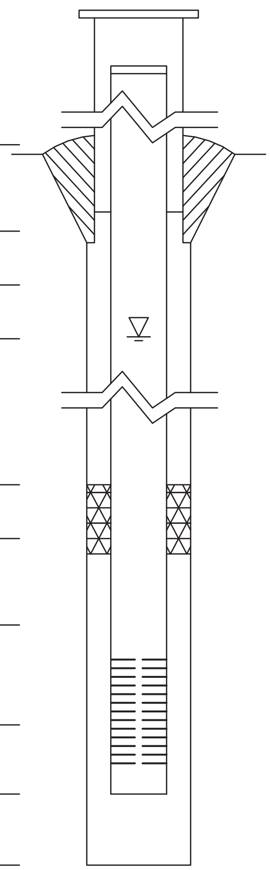
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.08	-2.69	Top of Protective Casing
632.85	-2.46	Top of Riser Pipe
630.39	0.00	Ground Surface
626.99	3.40	Top of Annular Sealant
609.48	20.91	Static Water Level (After Completion) 11/15/2010
615.39	15.00	Top of Seal
614.34	16.05	Top of Sand Pack
612.64	17.75	Top of Screen
608.25	22.14	Bottom of Screen
607.74	22.65	Bottom of Well
606.39	24.00	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)	20.21
Bottom of Screen to End Cap	(feet)	0.51
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	25.11
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: Montgomery Well #: G215

Site Name: CCB Management Facility Borehole #: G215

State Plane Coordinate: X 2,515,971.6 Y 875,810.2 (or) Latitude: 39° 4' 9.500" Longitude: -89° 23' 38.200"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

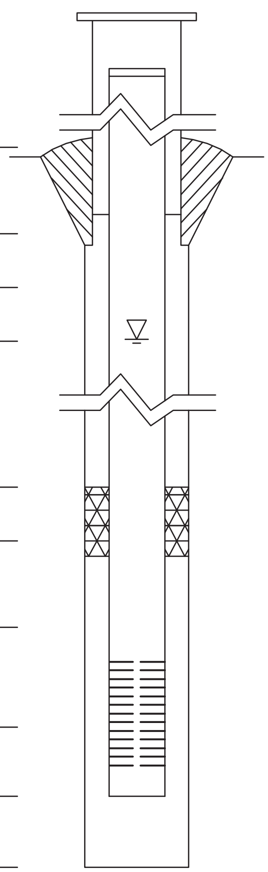
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 10/13/2010 Date Finished: 10/13/2010

Report Form Completed By: Suzanna Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — selected: Granular

Installation Method: Gravity

Setting Time: 20 min

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: n/a

Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.30	-2.82	Top of Protective Casing
633.06	-2.58	Top of Riser Pipe
630.48	0.00	Ground Surface
627.58	2.90	Top of Annular Sealant
607.64	22.84	Static Water Level (After Completion) 11/15/2010
614.08	16.40	Top of Seal
612.98	17.50	Top of Sand Pack
611.07	19.41	Top of Screen
606.68	23.80	Bottom of Screen
606.17	24.31	Bottom of Well
606.17	24.31	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)	21.99
Bottom of Screen to End Cap	(feet)	0.51
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	26.89
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:
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: Montgomery Well #: G216

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G216

State Plane Coordinate: X 2,515,968.5 Y 875,976.1 (or) Latitude: 39 ° 4 ' 11.2 " Longitude: -89 ° 23 ' 38.2 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/13/2010 Date Finished: 10/13/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 15 min

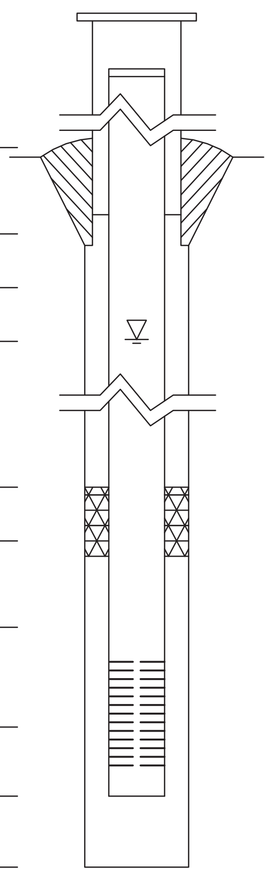
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.02	-2.74	Top of Protective Casing
632.76	-2.48	Top of Riser Pipe
630.28	0.00	Ground Surface
627.78	2.50	Top of Annular Sealant
607.52	22.76	Static Water Level (After Completion) 11/15/2010
613.28	17.00	Top of Seal
612.08	18.20	Top of Sand Pack
610.24	20.04	Top of Screen
605.86	24.42	Bottom of Screen
605.35	24.93	Bottom of Well
604.28	26.00	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)	22.52
Bottom of Screen to End Cap	(feet)	0.51
Screen Length (1st slot to last slot)	(feet)	4.38
Total Length of Casing	(feet)	27.41
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: Montgomery
Well #: G217

Site Name: AEG Coffeen Power Station CCB Management Facility
Borehole #: G217

State Plane Coordinate: X 2,515,963.0 Y 876,185.6 (or) Latitude: 39 ° 4 ' 13.2 " Longitude: -89 ° 23 ' 38.3 "

Surveyed By: Jeffrey D. Emrick
IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co
Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson
Date Started: 10/12/2010 Date Finished: 10/12/2010

Report Form Completed By: Suzanna L. Simpson
Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 11 min

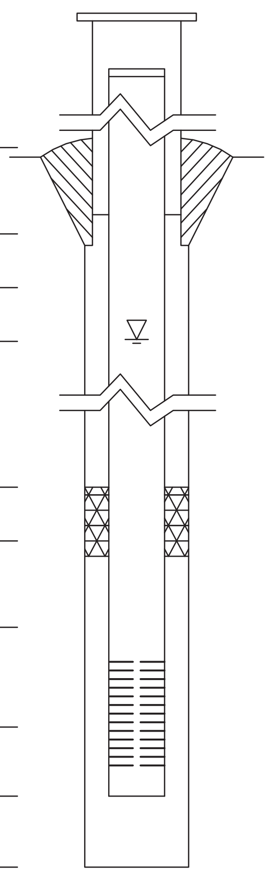
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.34	-2.67	Top of Protective Casing
633.10	-2.43	Top of Riser Pipe
630.67	0.00	Ground Surface
628.27	2.40	Top of Annular Sealant
609.28	21.39	Static Water Level (After Completion) 11/15/2010
612.82	17.85	Top of Seal
611.82	18.85	Top of Sand Pack
610.18	20.49	Top of Screen
605.79	24.88	Bottom of Screen
605.29	25.38	Bottom of Well
604.67	26.00	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)	22.92
Bottom of Screen to End Cap	(feet)	0.50
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	27.81
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: Montgomery Well #: G218

Site Name: CCB Management Facility Borehole #: G218

State Plane Coordinate: X 2,515,962.2 Y 876,380.9 (or) Latitude: 39° 4' 15.200" Longitude: -89° 23' 38.200"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna Simpson Date Started: 10/12/2010 Date Finished: 10/12/2010

Report Form Completed By: Suzanna Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 17 min

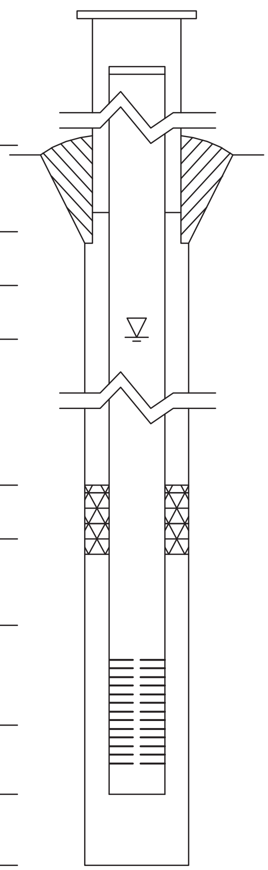
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
633.34	-2.70	Top of Protective Casing
633.11	-2.47	Top of Riser Pipe
630.64	0.00	Ground Surface
627.14	3.50	Top of Annular Sealant
609.89	20.75	Static Water Level (After Completion) 11/15/2010
613.14	17.50	Top of Seal
612.14	18.50	Top of Sand Pack
610.31	20.33	Top of Screen
605.87	24.77	Bottom of Screen
605.37	25.27	Bottom of Well
604.64	26.00	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)	22.80
Bottom of Screen to End Cap	(feet)	0.50
Screen Length (1st slot to last slot)	(feet)	4.44
Total Length of Casing	(feet)	27.74
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:
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: 　　County: Montgomery　　Well #: G270

Site Name: CCB Management Facility　　Borehole #: G270

State Plane Coordinate: X 2,514,996.8　Y 874,801.9　(or)　Latitude: 39°　3'　59.600"　Longitude: -89°　23'　50.700"

Surveyed By: Jeffrey D. Emrick　　IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp.　　Driller: B. Williamson

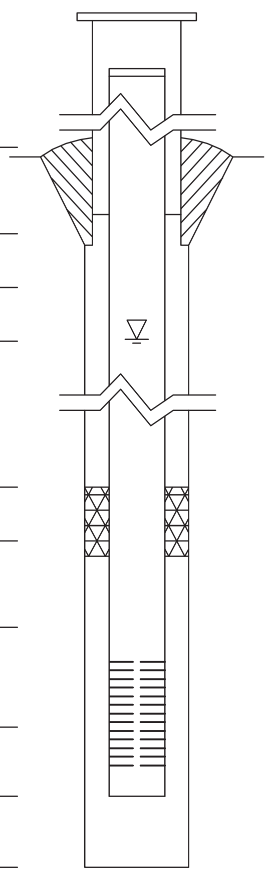
Consulting Firm: Hanson Professional Services Inc.　　Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger　　Drilling Fluid (Type):

Logged By: Suzanna Simpson　　Date Started: 2/26/2008　　Date Finished: 2/26/2008

Report Form Completed By: Suzanna Simpson　　Date: 2/29/2008

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.41	-3.49	Top of Protective Casing
625.97	-3.05	Top of Riser Pipe
622.92	0.00	Ground Surface
619.92	3.00	Top of Annular Sealant
617.30	5.62	Static Water Level (After Completion) 3/12/2008
619.92	3.00	Top of Seal
610.92	12.00	Top of Sand Pack
609.79	13.13	Top of Screen
605.00	17.92	Bottom of Screen
604.65	18.27	Bottom of Well
604.65	18.27	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular　Pellet　Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

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: n/a

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)	16.18
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	21.32
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:
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: Montgomery Well #: G271

Site Name: CCB Management Facility Borehole #: G271

State Plane Coordinate: X 2,515,517.1 Y 874,239.4 (or) Latitude: 39° 3' 54.000" Longitude: -89° 23' 44.100"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/9/2009 Date Finished: 9/10/2009

Report Form Completed By: Suzanna Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular selected]

Installation Method: Gravity

Setting Time: 10 min

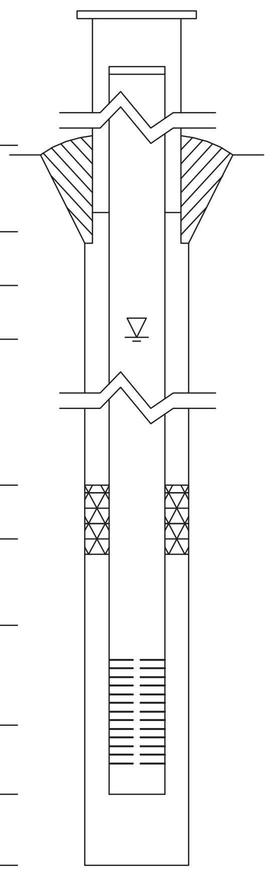
Type of Sand Pack: Quartz sand

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.)
625.88	-2.99	Top of Protective Casing
625.57	-2.68	Top of Riser Pipe
622.89	0.00	Ground Surface
619.89	3.00	Top of Annular Sealant
610.39	12.50	Static Water Level (After Completion) 9/21/2009
616.16	6.73	Top of Seal
613.87	9.02	Top of Sand Pack
612.93	9.96	Top of Screen
608.58	14.31	Bottom of Screen
608.10	14.79	Bottom of Well
606.89	16.00	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)	12.64
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	4.35
Total Length of Casing	(feet)	17.47
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:
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: Montgomery Well #: G272

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G272

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,515,745.0 Y 874,234.8 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/10/2009 Date Finished: 9/10/2009

Report Form Completed By: Suzanna L. Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

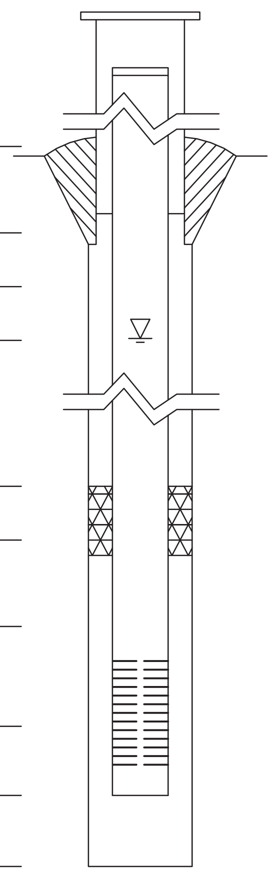
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.11	-3.39	Top of Protective Casing
623.81	-3.09	Top of Riser Pipe
620.72	0.00	Ground Surface
617.72	3.00	Top of Annular Sealant
611.23	9.49	Static Water Level (After Completion) 9/21/2009
614.55	6.17	Top of Seal
612.74	7.98	Top of Sand Pack
611.61	9.11	Top of Screen
606.74	13.98	Bottom of Screen
606.40	14.32	Bottom of Well
606.40	14.32	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)	12.20
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	4.87
Total Length of Casing	(feet)	17.41
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G273

Site Name: CCB Management Facility Borehole #: G273

State Plane Coordinate: X 2,515,975.5 Y 874,235.2 (or) Latitude: 39° 3' 53.900" Longitude: -89° 23' 38.300"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

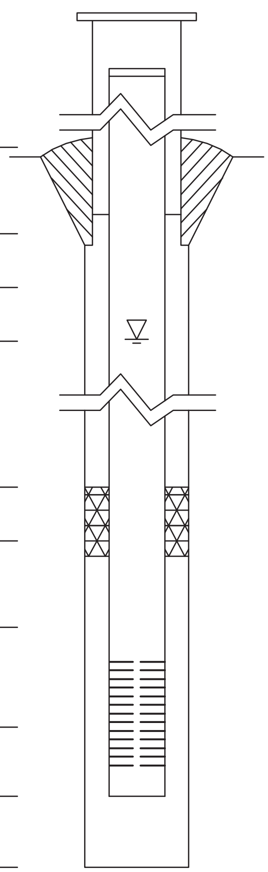
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/10/2009 Date Finished: 9/10/2009

Report Form Completed By: Suzanna Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
623.33	-3.16	Top of Protective Casing
623.02	-2.85	Top of Riser Pipe
620.17	0.00	Ground Surface
617.17	3.00	Top of Annular Sealant
610.28	9.89	Static Water Level (After Completion) 9/21/2009
614.07	6.10	Top of Seal
612.45	7.72	Top of Sand Pack
611.09	9.08	Top of Screen
605.61	14.56	Bottom of Screen
605.07	15.10	Bottom of Well
604.17	16.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 10 min

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

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)	11.93
Bottom of Screen to End Cap	(feet)	0.54
Screen Length (1st slot to last slot)	(feet)	5.48
Total Length of Casing	(feet)	17.95
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: ( )
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency

Well Completion Report

Site #: ______ County: Montgomery Well #: G274

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G274

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,516,195.6 Y 874,239.2 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/16/2009 Date Finished: 9/16/2009

Report Form Completed By: Suzanna L. Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

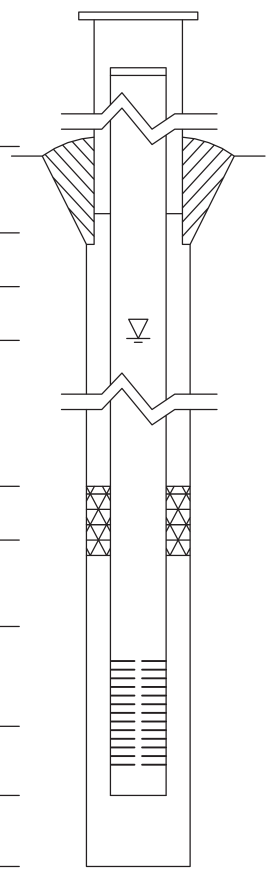
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.32	-2.65	Top of Protective Casing
624.04	-2.37	Top of Riser Pipe
621.67	0.00	Ground Surface
618.67	3.00	Top of Annular Sealant
608.55	13.12	Static Water Level (After Completion) 9/21/2009
611.93	9.74	Top of Seal
610.15	11.52	Top of Sand Pack
608.77	12.90	Top of Screen
604.00	17.67	Bottom of Screen
603.61	18.06	Bottom of Well
603.61	18.06	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)	15.27
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	20.43
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G275

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G275

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,516,375.9 Y 874,298.9 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/16/2009 Date Finished: 9/16/2009

Report Form Completed By: Suzanna L. Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

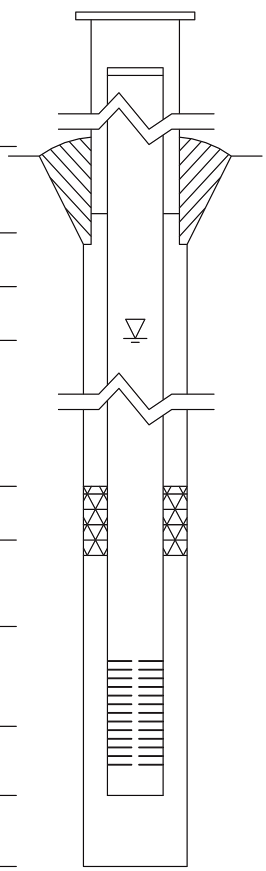
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
618.53	-2.39	Top of Protective Casing
618.26	-2.12	Top of Riser Pipe
616.14	0.00	Ground Surface
613.14	3.00	Top of Annular Sealant
605.89	10.25	Static Water Level (After Completion) 9/21/2009
610.42	5.72	Top of Seal
609.16	6.98	Top of Sand Pack
607.92	8.22	Top of Screen
603.52	12.62	Bottom of Screen
602.95	13.19	Bottom of Well
602.95	13.19	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)	10.34
Bottom of Screen to End Cap	(feet)	0.52
Screen Length (1st slot to last slot)	(feet)	4.45
Total Length of Casing	(feet)	15.31
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: G276

Site Name: CCB Management Facility Borehole #: G276

State Plane Coordinate: X 2,516,358.8 Y 874,438.6 (or) Latitude: 39° 3' 55.900" Longitude: -89° 23' 33.400"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ____

Logged By: Rhonald W. Hasenyager Date Started: 9/16/2009 Date Finished: 9/16/2009

Report Form Completed By: Suzanna Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

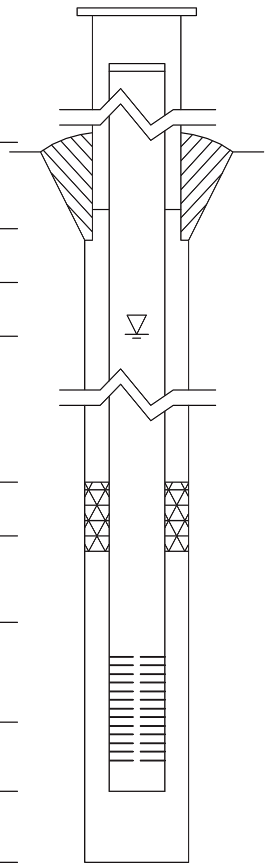
Type of Sand Pack: Quartz sand

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.)
632.40	-3.26	Top of Protective Casing
632.00	-2.86	Top of Riser Pipe
629.14	0.00	Ground Surface
626.14	3.00	Top of Annular Sealant
603.59	25.55	Static Water Level (After Completion) 9/21/2009
610.06	19.08	Top of Seal
608.11	21.03	Top of Sand Pack
606.73	22.41	Top of Screen
601.92	27.22	Bottom of Screen
601.49	27.65	Bottom of Well
601.14	28.00	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)	25.27
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	30.51
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:
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____________ County: Montgomery Well #: G277

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G277

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,516,370.5 Y 874,581.8 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ____________

Logged By: Rhonald W. Hasenyager Date Started: 9/14/2009 Date Finished: 9/14/2009

Report Form Completed By: Suzanna L. Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 18 min

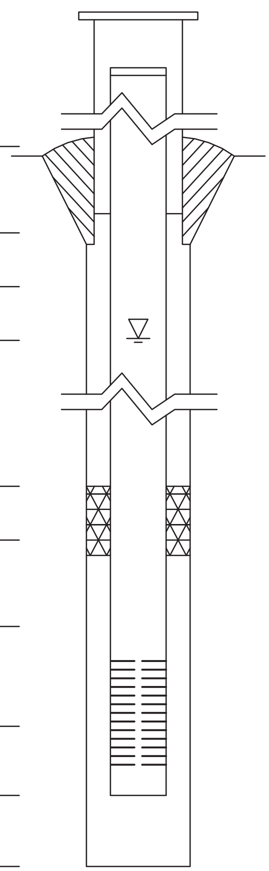
Type of Sand Pack: Quartz sand

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.)
623.35	-2.56	Top of Protective Casing
623.08	-2.29	Top of Riser Pipe
620.79	0.00	Ground Surface
617.79	3.00	Top of Annular Sealant
602.56	18.23	Static Water Level (After Completion) 9/21/2009
608.00	12.79	Top of Seal
607.00	13.79	Top of Sand Pack
606.50	14.29	Top of Screen
602.02	18.77	Bottom of Screen
601.55	19.24	Bottom of Well
600.79	20.00	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)	16.58
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	4.48
Total Length of Casing	(feet)	21.53
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: G278

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: G278

~~State-~~ Plant ~~Plane~~ Coordinate: X 2,516,200.7 Y 874,875.4 (or) Latitude: ° ' " Longitude: ° ' "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type):

Logged By: Rhonald W. Hasenyager Date Started: 9/11/2009 Date Finished: 9/11/2009

Report Form Completed By: Suzanna L. Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 22 min

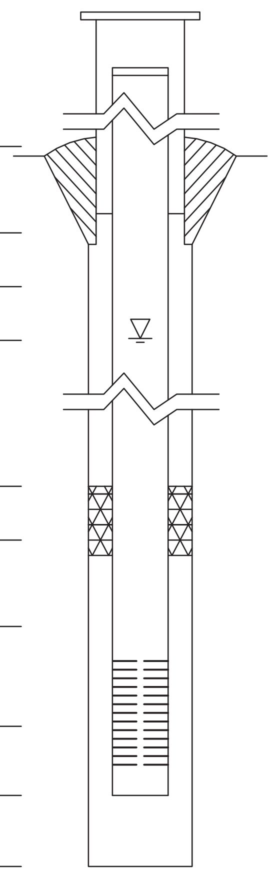
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
631.49	-2.64	Top of Protective Casing
631.17	-2.32	Top of Riser Pipe
628.85	0.00	Ground Surface
625.85	3.00	Top of Annular Sealant
604.87	23.98	Static Water Level (After Completion) 9/21/2009
613.74	15.11	Top of Seal
611.90	16.95	Top of Sand Pack
609.92	18.93	Top of Screen
605.15	23.70	Bottom of Screen
604.79	24.06	Bottom of Well
604.79	24.06	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)	21.25
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	26.38
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: Montgomery Well #: G279

Site Name: CCB Management Facility Borehole #: G279

State Plane Coordinate: X 2,516,245.6 Y 875,028.1 (or) Latitude: 39° 4' 1.800" Longitude: -89° 23' 34.800"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: G. Mills

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 9/10/2009 Date Finished: 9/10/2009

Report Form Completed By: Suzanna Simpson Date: 10/7/2009

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 18 min

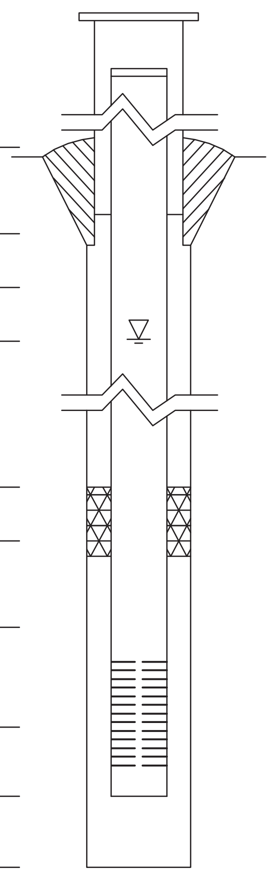
Type of Sand Pack: Quartz sand

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.)
632.33	-3.14	Top of Protective Casing
632.04	-2.85	Top of Riser Pipe
629.19	0.00	Ground Surface
626.19	3.00	Top of Annular Sealant
601.66	27.53	Static Water Level (After Completion) 9/21/2009
610.45	18.74	Top of Seal
608.77	20.42	Top of Sand Pack
606.79	22.40	Top of Screen
602.40	26.79	Bottom of Screen
~~604.51~~	~~24.68~~ 27.3	Bottom of Well
601.19	28.00	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)	25.25
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	30.17
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:
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: 　　County: Montgomery　　Well #: G280

Site Name: CCB Management Facility　　Borehole #: G280

State Plane Coordinate: X 2,515,679.5　Y 875,045.1　(or)　Latitude: 39° 4' 2.000"　Longitude: -89° 23' 42.000"

Surveyed By: Jeffrey D. Emrick　　IL Registration #: 035-003507

Drilling Contractor: Testing Service Corp.　　Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc.　　Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger　　Drilling Fluid (Type):

Logged By: Suzanna Simpson　　Date Started: 2/26/2008　　Date Finished: 2/26/2008

Report Form Completed By: Suzanna Simpson　　Date: 2/29/2008

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular　Pellet　Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hr.

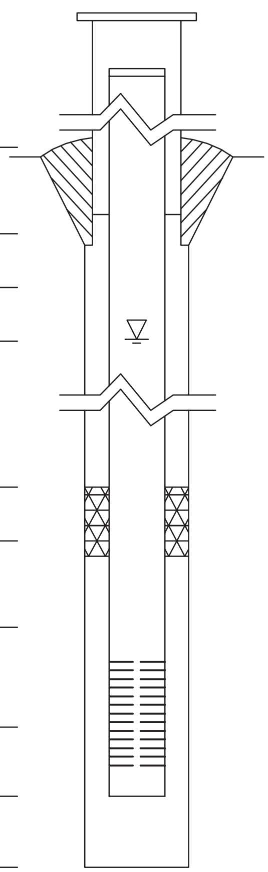
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.79	-2.84	Top of Protective Casing
625.30	-2.35	Top of Riser Pipe
622.95	0.00	Ground Surface
620.85	2.10	Top of Annular Sealant
618.61	4.34	Static Water Level (After Completion) 3/12/2008
620.85	2.10	Top of Seal
611.75	11.20	Top of Sand Pack
610.16	12.79	Top of Screen
605.32	17.63	Bottom of Screen
604.97	17.98	Bottom of Well
604.97	17.98	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)	15.14
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.84
Total Length of Casing	(feet)	20.33
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:
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:

Well Completion Form (revised 02/06/02)

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____________ County: Montgomery Well #: G281

Site Name: Natural Resource Technology, Inc. Coffeen Energy Center Borehole #: G281

State Plane Coordinate: X 874,375.4 Y 2,514,455.5 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: D. Crump

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 9/8/2015 Date Finished: 9/8/2015

Report Form Completed By: Suzanna L. Keim Date: 10/6/2015

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) — Granular (circled)

Installation Method: Gravity

Setting Time: 25 minutes

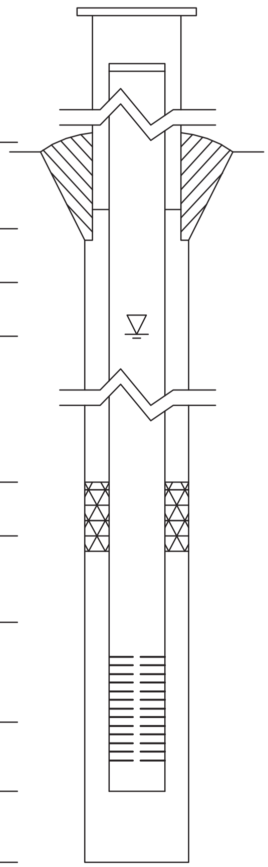
Type of Sand Pack: Quartz Sand

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.)
626.64	-2.82	Top of Protective Casing
626.36	-2.54	Top of Riser Pipe
623.82	0.00	Ground Surface
622.82	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
612.59	11.23	Top of Seal
610.37	13.45	Top of Sand Pack
608.31	15.51	Top of Screen
603.66	20.16	Bottom of Screen
603.53	20.29	Bottom of Well
603.53	20.29	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)	17.80
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.65
Total Length of Casing	(feet)	22.83
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G301

Site Name: Natural Resource Technology, Inc. Coffeen Energy Center Borehole #: G301

State Plane Coordinate: X 872,234.8 Y 2,515,583.0 (or) Latitude: ______ Longitude: ______

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: D. Crump

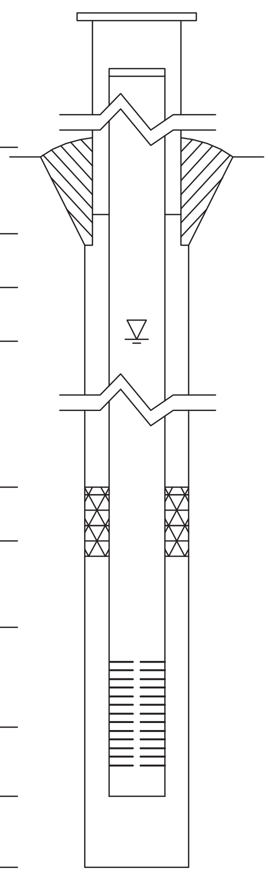
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 9/4/2015 Date Finished: 9/4/2015

Report Form Completed By: Suzanna L. Keim Date: 10/6/2015

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 25 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.)
622.98	-2.71	Top of Protective Casing
622.65	-2.38	Top of Riser Pipe
620.27	0.00	Ground Surface
618.20	2.07	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
612.75	7.52	Top of Sand Pack
608.96	11.31	Top of Screen
604.31	15.96	Bottom of Screen
604.06	16.21	Bottom of Well
604.06	16.21	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)	13.56
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.65
Total Length of Casing	(feet)	18.59
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency

Well Completion Report

Site #: ______ County: Montgomery Well #: G302

Site Name: Natural Resource Technology, Inc. Coffeen Energy Center Borehole #: G302

State Plane Coordinate: X 872,253.0 Y 2,516,214.2 (or) Latitude: ______ Longitude: ______

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: D. Crump

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 9/3/2015 Date Finished: 9/4/2015

Report Form Completed By: Suzanna L. Keim Date: 10/7/2015

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: 25 minutes

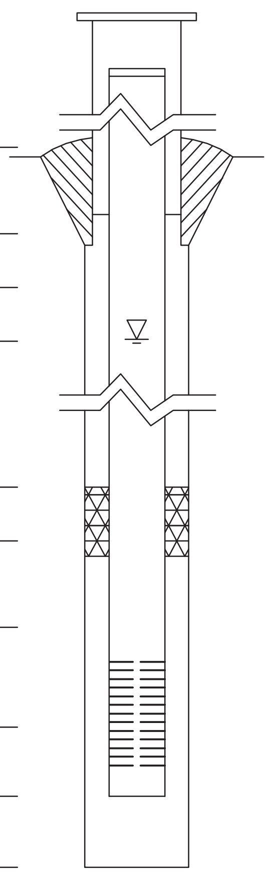
Type of Sand Pack: Quartz Sand

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.)
620.34	-2.39	Top of Protective Casing
620.04	-2.09	Top of Riser Pipe
617.95	0.00	Ground Surface
615.95	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
607.78	10.17	Top of Seal
605.88	12.07	Top of Sand Pack
604.74	13.21	Top of Screen
600.09	17.86	Bottom of Screen
599.56	18.39	Bottom of Well
599.56	18.39	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)	15.30
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.65
Total Length of Casing	(feet)	20.48
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:

Well Completion Form (revised 02/06/02)

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

Surface Elevation: 619.10

Datum msl

Completion Date: 8/26/10

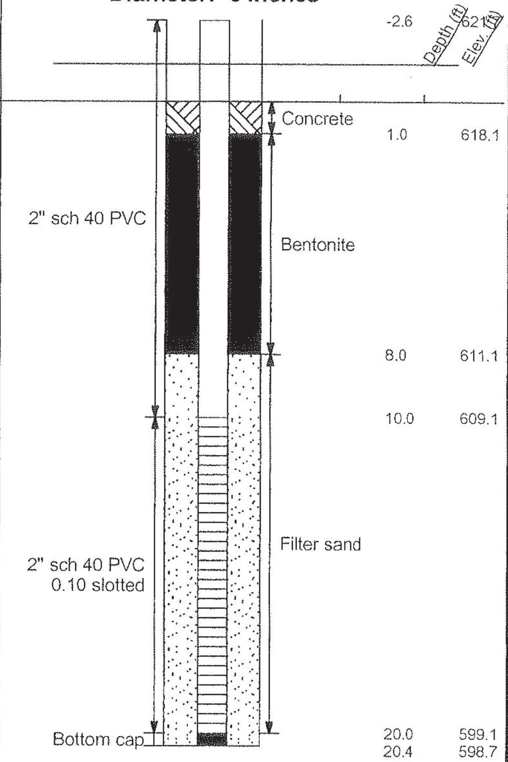
Northing: 871382.45

Easting: 2516641.06

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	FILL: brown, silty clay		1-2-3	SS1
	Medium stiff, grayish-brown, silty CLAY with lignite - CL		1-3-3	SS2
5			1-3-4	SS3
	Soft, brown, silty CLAY - CL		2-3-3	SS4
10	Stiff to hard, brown to grayish-brown, silty CLAY - CL (TILL)			
15			27-44 -50/1"	SS5
			44-50/2"	SS6
20	Boring terminated at 20 feet.			
25				
30				
35				

WELL DIAGRAM

Stickup Diameter: 6 inches



GROUNDWATER DATA

ENCOUNTERED AT 9 FEET ⊻

DRILLING DATA

__ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM __ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DRK	App'vd. by: RBF
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G303

LOG OF BORING: APW-3

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01- COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

Surface Elevation: 623.46

Datum: msl

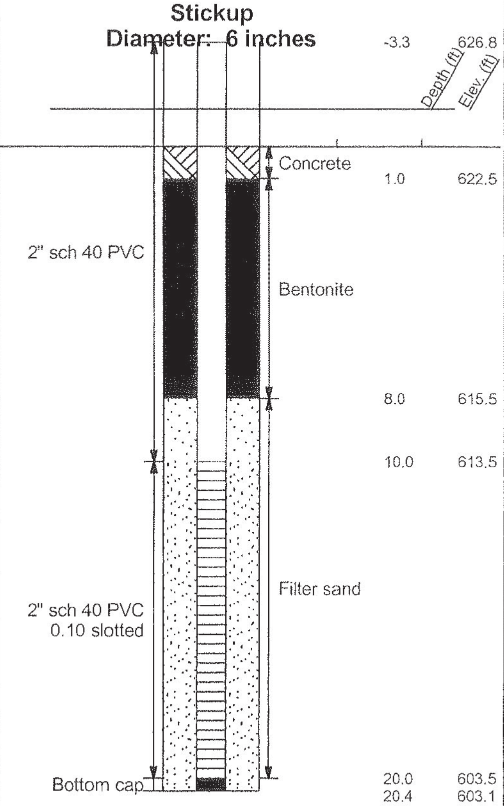
Completion Date: 8/26/10

Northing: 871397.48

Easting: 2515520.23

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Medium stiff, grayish-brown, silty CLAY - CL			
			0-1-1	SS1
			1-2-5	SS2
5				
			1-3-4	SS3
			1-2-3	SS4
10				
14	Medium to fine SAND - SP		1-2-1	SS5
15	Hard, gray, silty CLAY - CL (TILL)			
			14-47	SS6
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 14 FEET ∇

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DTK	App'vd. by: RBS
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G304

LOG OF BORING: APW-4

Project No. J017150.01

LOG OF BORING 2002 WL J017150.01- COFFEEN.GPJ GTINC 0638301.GPJ 12/13/10

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail (Address - Lot Number) Coffeen (City) Montgomery (County)

   General Description Township 7 (N)~~(S)~~ Range 3 ~~(E)~~(W) Section 10

   SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

   Filled with Bentonite grout (cement or other materials) from 0.5 to 20.0 ft.

   Kind of plug Random soil from 0 to 0.5 ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

    Rhonald W. Hasenyager, L.P.G. (Name) — 196-000246 (Complete License Number)

    Hanson Professional Services Inc., 1525 S. 6th St. (Address) — Springfield (City) — IL 62703 (State/ZIP)

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: G305

Site Name: Coffeen Power Station Borehole #: G305

State Plane Coordinate: X 871,156.3 Y 2,515,199.4 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering LLC Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Suzanna L. Keim Date Started: 5/3/2016 Date Finished: 5/3/2016

Report Form Completed By: Suzanna L. Keim Date: 5/19/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: >12 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: n/a

Setting Time: n/a

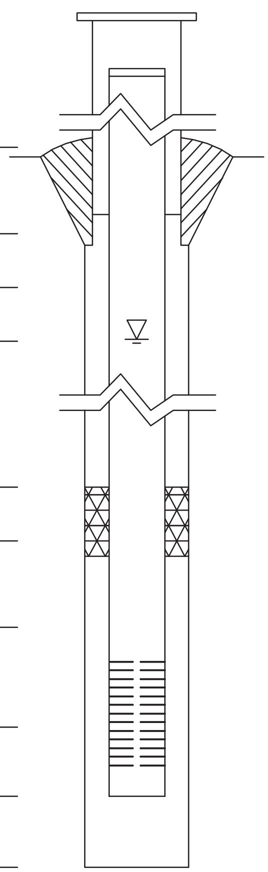
Type of Sand Pack: Quartz Sand

Grain Size: 10-40 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ____



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.88	-3.34	Top of Protective Casing
625.55	-3.01	Top of Riser Pipe
622.54	0.00	Ground Surface
621.54	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
611.04	11.50	Top of Sand Pack
609.10	13.44	Top of Screen
604.27	18.27	Bottom of Screen
604.09	18.45	Bottom of Well
604.09	18.45	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)	16.45
Bottom of Screen to End Cap	(feet)	0.18
Screen Length (1st slot to last slot)	(feet)	4.83
Total Length of Casing	(feet)	21.46
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: Montgomery Well #: G306

Site Name: Coffeen Power Station Borehole #: G306

State Plane Coordinate: X 871,141.0 Y 2,516,120.4 (or) Latitude: ______ Longitude: ______

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering LLC Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Suzanna L. Keim Date Started: 5/3/2016 Date Finished: 5/3/2016

Report Form Completed By: Suzanna L. Keim Date: 5/19/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: >12 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: n/a

Setting Time: n/a

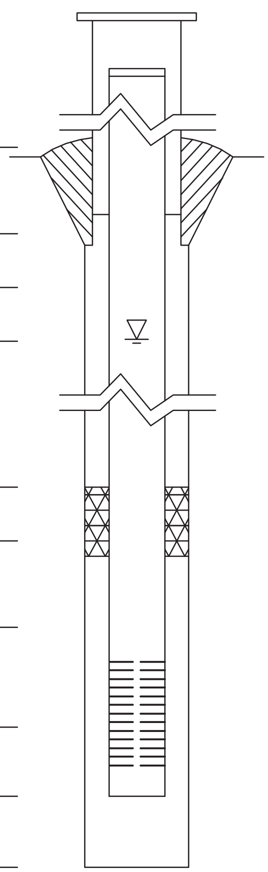
Type of Sand Pack: Quartz Sand

Grain Size: 10-40 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.12	-3.28	Top of Protective Casing
625.72	-2.88	Top of Riser Pipe
622.84	0.00	Ground Surface
621.84	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
611.24	11.60	Top of Sand Pack
609.77	13.07	Top of Screen
605.16	17.68	Bottom of Screen
604.98	17.86	Bottom of Well
604.84	18.00	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)	15.95
Bottom of Screen to End Cap	(feet)	0.18
Screen Length (1st slot to last slot)	(feet)	4.61
Total Length of Casing	(feet)	20.74
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: Montgomery Well #: G307

Site Name: Coffeen Power Station Ash Pond 1 Borehole #: G307

State Plane Coordinate: X 2,515,553.3 Y 871,398.6 (or) Latitude: ______ Longitude: ______

Surveyed By: ______ IL Registration #: ______

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): none

Logged By: Rhonald W. Hasenyager Date Started: 7/26/2016 Date Finished: 7/27/2016

Report Form Completed By: Rhonald W. Hasenyager Date: 7/28/2016

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: 18 hrs.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

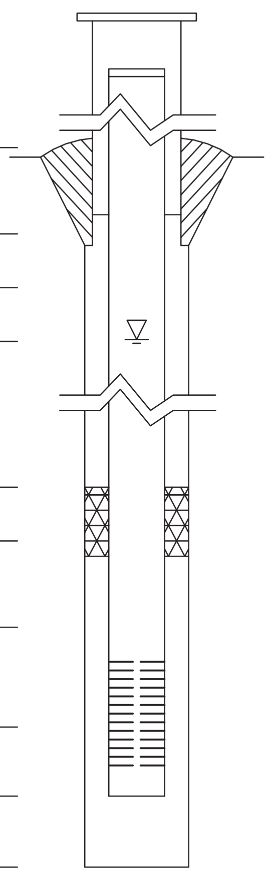
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: none (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.72	-2.64	Top of Protective Casing
624.47	-2.39	Top of Riser Pipe
622.08	0.00	Ground Surface
620.08	2.00	Top of Annular Sealant
623.84	-1.76	Static Water Level (After Completion) 7/27/2016
n/a	n/a	Top of Seal
610.10	11.98	Top of Sand Pack
609.12	12.96	Top of Screen
604.28	17.80	Bottom of Screen
603.86	18.22	Bottom of Well
603.86	18.22	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)	15.37
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.84
Total Length of Casing	(feet)	20.61
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: Montgomery Well #: G401

Site Name: Natural Resource Technology, Inc. Coffeen Energy Center Borehole #: G401

State Plane Coordinate: X 872,510.6 Y 2,515,614.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: D. Crump

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 9/14/2015 Date Finished: 9/14/2015

Report Form Completed By: Suzanna L. Keim Date: 10/7/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 25 minutes

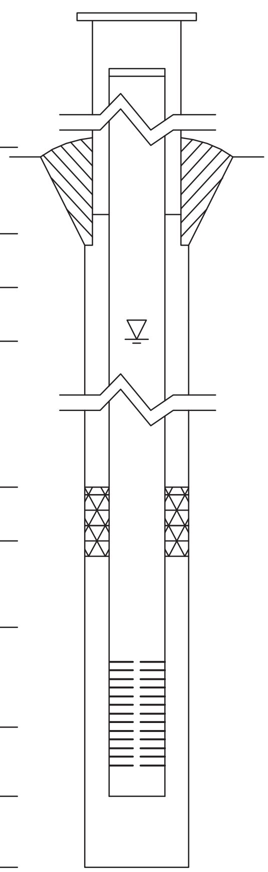
Type of Sand Pack: Quartz Sand

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.)
625.84	-2.81	Top of Protective Casing
625.57	-2.54	Top of Riser Pipe
623.03	0.00	Ground Surface
621.33	1.70	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
610.12	12.91	Top of Sand Pack
608.67	14.36	Top of Screen
604.24	18.79	Bottom of Screen
603.74	19.29	Bottom of Well
603.73	19.30	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)	16.70
Bottom of Screen to End Cap	(feet)	0.50
Screen Length (1st slot to last slot)	(feet)	4.63
Total Length of Casing	(feet)	21.83
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	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC	OTHER:
Screen	SS304	SS316	PTFE	PVC	OTHER:

Surface Elevation: 610.56

Datum: msl

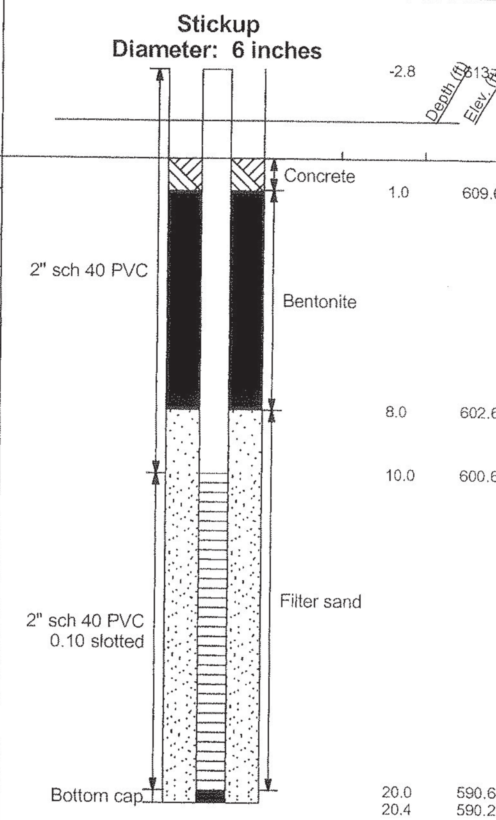
Completion Date: 8/27/10

Northing: 872502.26

Easting: 2516632.59

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
0	Medium stiff, brown, silty CLAY - CL			
			6-3-3	SS1
			1-2-4	SS2
5	Medium stiff, gray, silty CLAY, trace sand - CL			
	∇		1-2-5	SS3
	Hard to stiff, brown to gray, silty CLAY, trace sand seams - CL (TILL)			
10			9-22-28	SS4
15			1-6-12	SS5
20			3-4-9	SS6
	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 7 FEET ∇

DRILLING DATA

___ AUGER 4 1/4" HOLLOW STEM

WASHBORING FROM ___ FEET

MVU DRILLER SWG LOGGER

CME 55TRK DRILL RIG

HAMMER TYPE Auto

REMARKS:

Drawn by: KSA	Checked by: DTK	App'vd. by: KRB
Date: 9/10/10	Date: 1-4-11	Date: 1/4/11

GEOTECHNOLOGY INC
FROM THE GROUND UP

Ameren-Coffeen Ash Pond Evaluation

Renamed G402

LOG OF BORING: APW-2

Project No. J017150.01

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G403

Site Name: Natural Resource Technology, Inc. Coffeen Energy Center Borehole #: G403

State Plane Coordinate: X 873,561.3 Y 2,514,616.6 (or) Latitude: ______ Longitude: ______

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: D. Crump

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 9/11/2015 Date Finished: 9/11/2015

Report Form Completed By: Suzanna L. Keim Date: 10/7/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: n/a

Setting Time: n/a

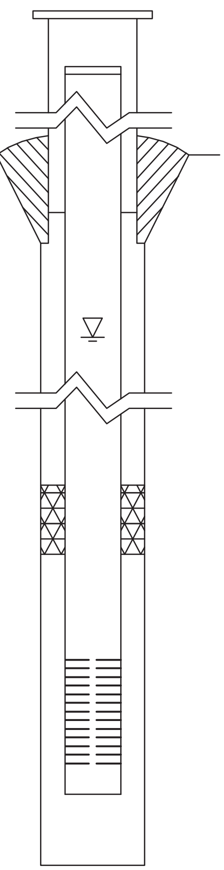
Type of Sand Pack: Quartz Sand

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.)
626.72	-2.91	Top of Protective Casing
626.47	-2.66	Top of Riser Pipe
623.81	0.00	Ground Surface
621.81	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
612.64	11.17	Top of Sand Pack
610.70	13.11	Top of Screen
606.03	17.78	Bottom of Screen
605.66	18.15	Bottom of Well
605.66	18.15	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)	15.77
Bottom of Screen to End Cap	(feet)	0.37
Screen Length (1st slot to last slot)	(feet)	4.67
Total Length of Casing	(feet)	20.81
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G404
Formerly MW22S

Site Name: Coffeen Energy Center Borehole #: SB22

State Plane Coordinate: X 2,516,397.9 Y 873,999.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: A. Rachford

Consulting Firm: Hanson Professional Services Inc. Geologist: , LPG #

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 5/1/2007 Date Finished: 5/1/2007

Report Form Completed By: Rhonald W. Hasenyager Date: 5/2/2007

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: gravity

Setting Time: >12 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

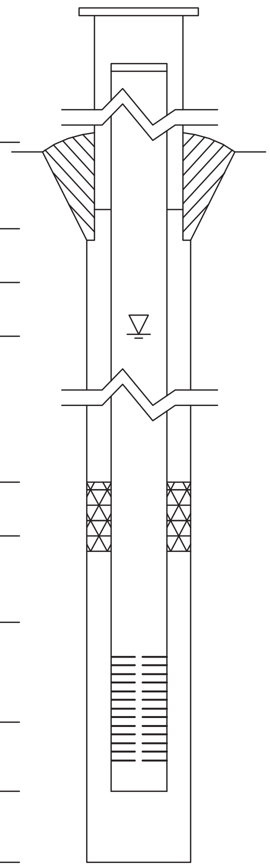
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: gravity

Type of Backfill Material: Formation sand (if applicable)

Installation Method: slough



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
616.02	-2.92	Top of Protective Casing
615.77	-2.67	Top of Riser Pipe
613.10	0.00	Ground Surface
613.10	0.00	Top of Annular Sealant
611.03	2.07	Static Water Level (After Completion) 5/10/2007
n/a	n/a	Top of Seal
608.05	5.05	Top of Sand Pack
606.68	6.42	Top of Screen
601.93	11.17	Bottom of Screen
601.48	11.62	Bottom of Well
601.10	12.00	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)	9.09
Bottom of Screen to End Cap	(feet)	0.45
Screen Length (1st slot to last slot)	(feet)	4.75
Total Length of Casing	(feet)	14.29
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G405
Formerly MW21S

Site Name: Coffeen Energy Center Borehole #: SB21

State Plane Coordinate: X 2,515,335.7 Y 873,996.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: A. Rachford

Consulting Firm: Hanson Professional Services Inc. Geologist: , LPG #

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 5/1/2007 Date Finished: 5/1/2007

Report Form Completed By: Rhonald W. Hasenyager Date: 5/2/2007

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: gravity

Setting Time: >12 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

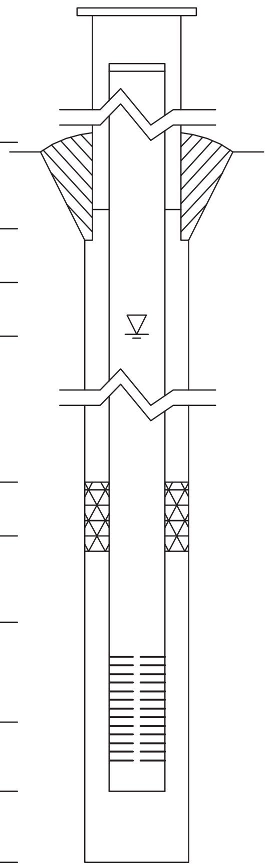
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: gravity

Type of Backfill Material: ______ (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.04	-3.14	Top of Protective Casing
623.78	-2.88	Top of Riser Pipe
620.90	0.00	Ground Surface
620.90	0.00	Top of Annular Sealant
619.67	1.23	Static Water Level (After Completion) 5/10/2007
n/a	n/a	Top of Seal
613.19	7.71	Top of Sand Pack
611.89	9.01	Top of Screen
607.14	13.76	Bottom of Screen
606.69	14.21	Bottom of Well
606.69	14.21	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)	11.89
Bottom of Screen to End Cap	(feet)	0.45
Screen Length (1st slot to last slot)	(feet)	4.75
Total Length of Casing	(feet)	17.09
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: Montgomery Well #: G406

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G406

State Plane Coordinate: X 2,514,702.4 Y 872,521.3 (or) Latitude: 39° 3' 37.114" Longitude: -89° 23' 54.628"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/19/2016 Date Finished: 8/19/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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: 30 minutes

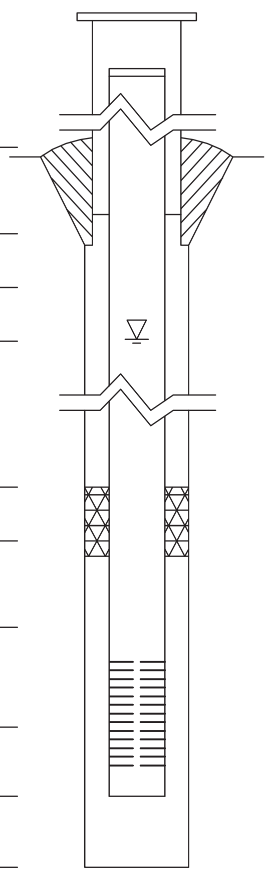
Type of Sand Pack: Quartz Sand

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.)
625.70	-3.84	Top of Protective Casing
625.36	-3.50	Top of Riser Pipe
621.86	0.00	Ground Surface
619.86	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
610.74	11.12	Top of Seal
609.65	12.21	Top of Sand Pack
608.30	13.56	Top of Screen
603.49	18.37	Bottom of Screen
603.11	18.75	Bottom of Well
603.11	18.75	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)	17.06
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	22.25
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: Montgomery Well #: G407

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G407

State Plane Coordinate: X 2,513,705.9 Y 872,973.4 (or) Latitude: 39° 3' 41.665" Longitude: -89° 24' 7.213"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/16/2016 Date Finished: 8/16/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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 (selected) / Pellet / Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 minutes

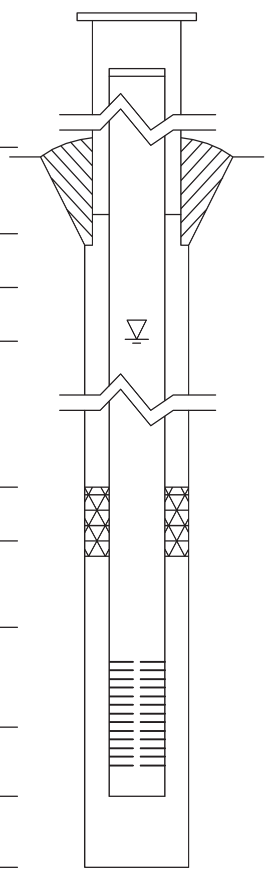
Type of Sand Pack: Quartz Sand

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.)
621.70	-3.35	Top of Protective Casing
621.32	-2.97	Top of Riser Pipe
618.35	0.00	Ground Surface
616.35	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
607.50	10.85	Top of Seal
605.50	12.85	Top of Sand Pack
604.57	13.78	Top of Screen
599.74	18.61	Bottom of Screen
599.31	19.04	Bottom of Well
598.35	20.00	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)	16.75
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.83
Total Length of Casing	(feet)	22.01
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 (selected)
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: Montgomery Well #: G410

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G410

State Plane Coordinate: X 2,513,206.3 Y 872,968.5 (or) Latitude: 39° 3' 41.658" Longitude: -89° 24' 13.546"

Surveyed By: Matthew H. Schrader IL Registration #: 035-003487

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): none

Logged By: Rhonald W. Hasenyager Date Started: 2/23/2018 Date Finished: 2/23/2018

Report Form Completed By: Suzanna L. Keim Date: 2/26/2018

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: ____

Installation Method: ____

Setting Time: ____

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hours

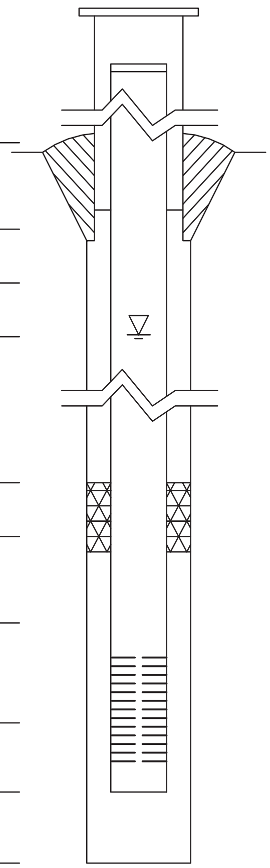
Type of Sand Pack: Filter Sand

Grain Size: 20/40 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
620.18	-2.97	Top of Protective Casing
619.79	-2.58	Top of Riser Pipe
617.21	0.00	Ground Surface
	n/a	Top of Annular Sealant
612.39	4.82	Static Water Level (After Completion) 3/1/2018
616.71	0.50	Top of Seal
609.81	7.40	Top of Sand Pack
608.32	8.89	Top of Screen
603.53	13.68	Bottom of Screen
603.12	14.09	Bottom of Well
603.12	14.09	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)	11.47
Bottom of Screen to End Cap	(feet)	0.41
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	16.67
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G411

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: G411

State Plane Coordinate: X 2,513,122.4 Y 873,844.8 (or) Latitude: 39° 3' 50.326" Longitude: -89° 24' 14.517"

Surveyed By: Matthew H. Schrader IL Registration #: 035-003487

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): none

Logged By: Rhonald W. Hasenyager Date Started: 2/22/2018 Date Finished: 2/22/2018

Report Form Completed By: Suzanna L. Keim Date: 2/26/2018

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: ______

Installation Method: ______

Setting Time: ______

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: >24 hours

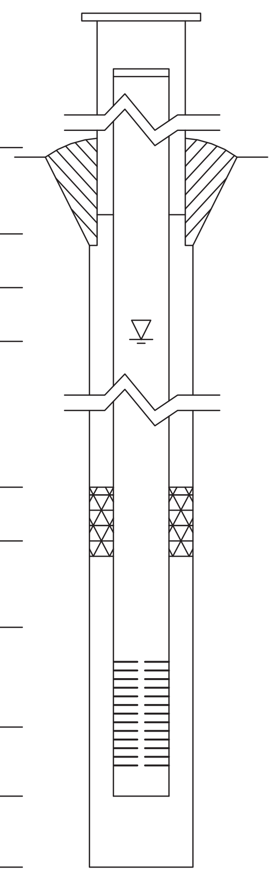
Type of Sand Pack: Filter Sand

Grain Size: 20/40 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
623.60	-3.11	Top of Protective Casing
623.25	-2.76	Top of Riser Pipe
620.49	0.00	Ground Surface
	n/a	Top of Annular Sealant
617.84	2.65	Static Water Level (After Completion) 3/1/2018
619.99	0.50	Top of Seal
610.42	10.07	Top of Sand Pack
609.28	11.21	Top of Screen
604.42	16.07	Bottom of Screen
604.02	16.47	Bottom of Well
604.02	16.47	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)	13.97
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.86
Total Length of Casing	(feet)	19.23
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: Montgomery Well #: MW1D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-01

State Plane Coordinate: X 874,972.6 Y 2,513,478.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/3/2006 Date Finished: 5/3/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 21 min.

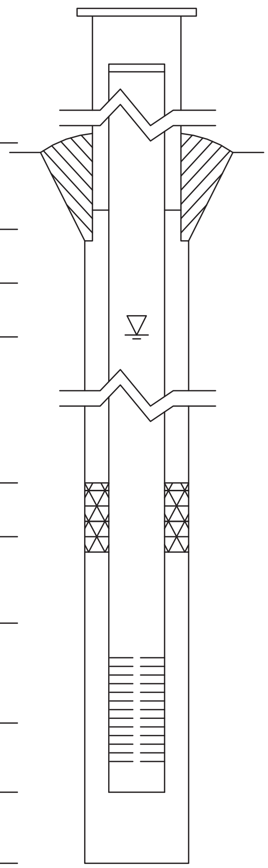
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
609.29	-1.89	Top of Protective Casing
609.01	-1.61	Top of Riser Pipe
607.40	0.00	Ground Surface
604.80	2.60	Top of Annular Sealant
571.12	36.28	Static Water Level (After Completion) 6/1/2006
578.90	28.50	Top of Seal
575.82	31.58	Top of Sand Pack
574.11	33.29	Top of Screen
569.35	38.05	Bottom of Screen
568.99	38.41	Bottom of Well
567.40	40.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	35.17
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.76
Total Length of Casing	(feet)	40.29
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 DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY | **RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT**

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. **Ownership (Name of Controlling Party)** AEG Coffeen Power Station (G104)

2. **Well Location** 134 CIPS Trail — Coffeen — Montgomery
   Address - Lot Number — **City** — **County**

   General Description **Township** 7 **(N)(~~S~~)** **Range** 3 **(~~E~~)(W)** **Section** 10

   SE **Quarter of the** NE **Quarter of the** NE **Quarter**

3. **Year Drilled** 2010

4. **Drilling Permit Number (and date, if known)** n/a

5. **Type of Well** **Bored** ____ **Drilled** ✓ **Other** ____

6. **Total Depth** 20.0 ft. **Diameter (inches)** 2

7. **Formation clear of obstruction** ✓ **Yes** ____ **No**

8. **DETAILS OF PLUGGING**

   Filled with Bentonite grout **from** 0.5 **to** 20.0 **ft.**
   (cement or other materials)

   Kind of plug Random soil **from** 0 **to** 0.5 **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

9. **CASING RECORD** **Upper 2 feet of casing removed** ✓ **Yes** ____ **No**

10. **Date well was sealed** **Month** October **Day** 8 **Year** 2010.

11. **Licensed water well driller or other person approved by the Department performing well sealing.**

   Rhonald W. Hasenyager, L.P.G. — 196-000246
   Name — **Complete License Number**

   Hanson Professional Services Inc., 1525 S. 6th St. — Springfield — IL 62703
   Address — **City** — **State/ZIP**

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. **IL 482-0631**

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: MW2D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-02b

State Plane Coordinate: X 876,414.0 Y 2,513,209.7 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/5/2006 Date Finished: 5/5/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular / Pellet / Slurry (choose one): Granular

Installation Method: Gravity

Setting Time: 20 min.

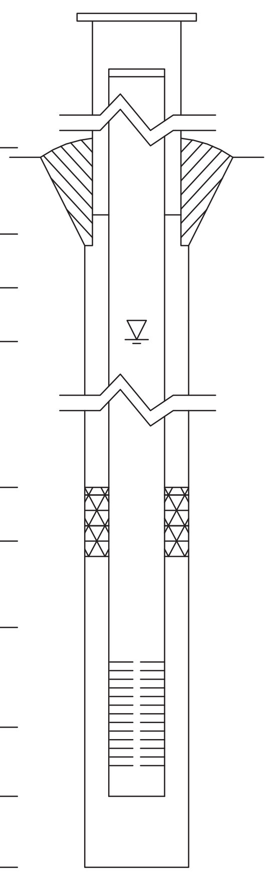
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: Re-drill borehole



Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
627.52	-3.42	Top of Protective Casing
627.07	-2.97	Top of Riser Pipe
624.10	0.00	Ground Surface
621.00	3.10	Top of Annular Sealant
616.74	7.36	Static Water Level (After Completion) 6/1/2006
606.00	18.10	Top of Seal
603.92	20.18	Top of Sand Pack
602.07	22.03	Top of Screen
597.27	26.83	Bottom of Screen
596.88	27.22	Bottom of Well
596.88	27.22	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)	25.00
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	30.19
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 DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

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1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail | Coffeen | Montgomery
   Address - Lot Number | City | County

   General Description Township 7 (N)(~~S~~) Range 3 (~~E~~)(W) Section 10

   SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

   Filled with Bentonite grout from 0.5 to 20.0 ft.
   (cement or other materials)

   Kind of plug Random soil from 0 to 0.5 ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

    Rhonald W. Hasenyager, L.P.G. | 196-000246
    Name | Complete License Number

    Hanson Professional Services Inc., 1525 S. 6th St. | Springfield | IL 62703
    Address | City | State/ZIP

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW2S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-02a

State Plane Coordinate: X 876,408.9 Y 2,513,210.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/5/2006 Date Finished: 5/5/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

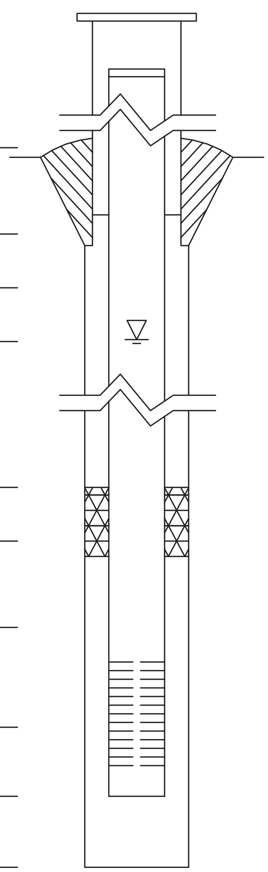
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.55	-3.45	Top of Protective Casing
627.07	-2.97	Top of Riser Pipe
624.10	0.00	Ground Surface
619.72	4.38	Top of Annular Sealant
616.68	7.42	Static Water Level (After Completion) 6/1/2006
619.72	4.38	Top of Seal
614.60	9.50	Top of Sand Pack
613.76	10.34	Top of Screen
608.98	15.12	Bottom of Screen
608.59	15.51	Bottom of Well
608.59	15.51	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	13.31
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.78
Total Length of Casing	(feet)	18.48
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. **Ownership (Name of Controlling Party)** AEG Coffeen Power Station (G104)

2. **Well Location** 134 CIPS Trail | Coffeen | Montgomery
   Address - Lot Number | **City** | **County**

   General Description **Township** 7 **(N)(~~S~~)** **Range** 3 **(~~E~~)(W)** **Section** 10

   SE **Quarter of the** NE **Quarter of the** NE **Quarter**

3. **Year Drilled** 2010

4. **Drilling Permit Number (and date, if known)** n/a

5. **Type of Well** **Bored** ____ **Drilled** ✓ **Other** ____

6. **Total Depth** 20.0 ft. **Diameter (inches)** 2

7. **Formation clear of obstruction** ✓ **Yes** ____ **No**

8. **DETAILS OF PLUGGING**

   Filled with Bentonite grout **from** 0.5 **to** 20.0 **ft.**
   (cement or other materials)

   Kind of plug Random soil **from** 0 **to** 0.5 **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

   Filled with ____ **from** ____ **to** ____ **ft.**

   Kind of plug ____ **from** ____ **to** ____ **ft.**

9. **CASING RECORD** **Upper 2 feet of casing removed** ✓ **Yes** ____ **No**

10. **Date well was sealed** **Month** October **Day** 8 **Year** 2010.

11. **Licensed water well driller or other person approved by the Department performing well sealing.**

    Rhonald W. Hasenyager, L.P.G. | 196-000246
    Name | **Complete License Number**

    Hanson Professional Services Inc., 1525 S. 6th St. | Springfield | IL 62703
    Address | **City** | **State/ZIP**

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW3D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-03

State Plane Coordinate: X 876,554.5 Y 2,514,535.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 4/27/2006 Date Finished: 4/27/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 25 min.

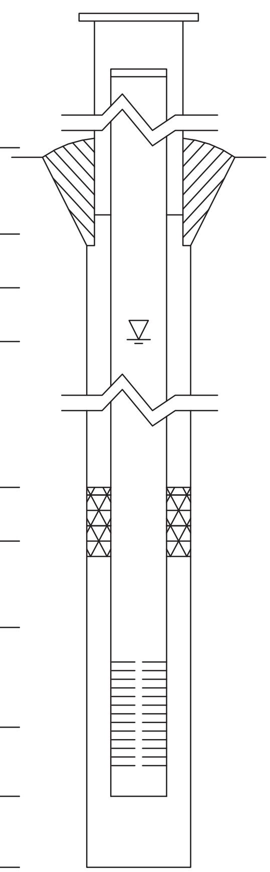
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Cuttings (if applicable)

Installation Method: Over-drill borehole



Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
629.37	-3.67	Top of Protective Casing
628.94	-3.24	Top of Riser Pipe
625.70	0.00	Ground Surface
623.00	2.70	Top of Annular Sealant
570.30	55.40	Static Water Level (After Completion) 6/1/2006
576.70	49.00	Top of Seal
575.60	50.10	Top of Sand Pack
573.41	52.29	Top of Screen
568.64	57.06	Bottom of Screen
568.30	57.40	Bottom of Well
567.70	58.00	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)	55.51
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	60.64
Screen Slot Size **	(inches)	0.010

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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: MW4S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-04a

State Plane Coordinate: X 877,999.7 Y 2,514,450.6 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

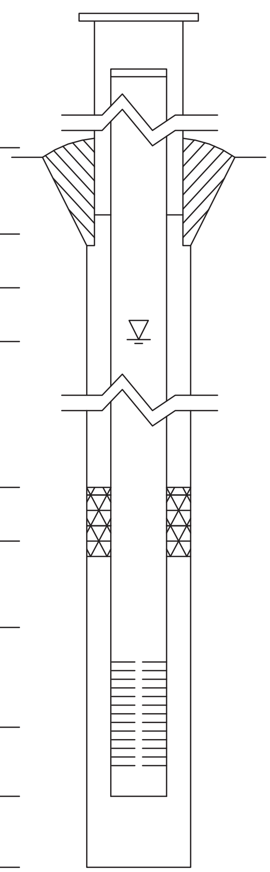
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/11/2006 Date Finished: 5/11/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.07	-3.67	Top of Protective Casing
625.60	-3.20	Top of Riser Pipe
622.40	0.00	Ground Surface
619.57	2.83	Top of Annular Sealant
616.73	5.67	Static Water Level (After Completion) 6/1/2006
619.57	2.83	Top of Seal
614.15	8.25	Top of Sand Pack
612.57	9.83	Top of Screen
608.14	14.26	Bottom of Screen
607.63	14.77	Bottom of Well
607.63	14.77	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	14.25
Bottom of Screen to End Cap	(feet)	0.51
Screen Length (1st slot to last slot)	(feet)	4.43
Total Length of Casing	(feet)	19.19
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW5D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-05

State Plane Coordinate: X 878,174.8 Y 2,513,290.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/12/2006 Date Finished: 5/17/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 18 min.

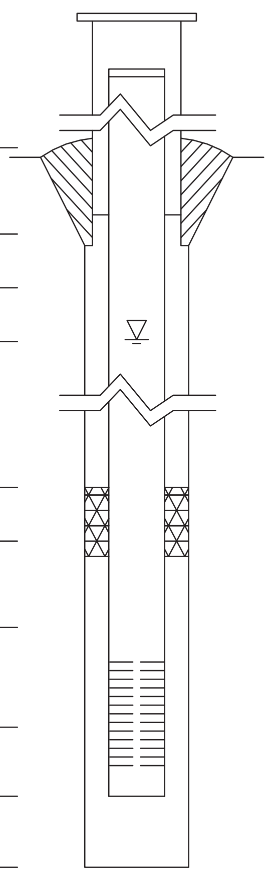
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.21	-3.61	Top of Protective Casing
625.78	-3.18	Top of Riser Pipe
622.60	0.00	Ground Surface
620.77	1.83	Top of Annular Sealant
572.16	50.44	Static Water Level (After Completion) 6/1/2006
582.29	40.31	Top of Seal
579.14	43.46	Top of Sand Pack
577.03	45.57	Top of Screen
572.27	50.33	Bottom of Screen
571.88	50.72	Bottom of Well
568.60	54.00	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)	48.74
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.76
Total Length of Casing	(feet)	53.89
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: Montgomery Well #: MW5S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-05a

State Plane Coordinate: X 878,175.6 Y 2,513,285.5 (or) Latitude: ____° ____' ____" Longitude: ____° ____' ____"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/17/2006 Date Finished: 5/17/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

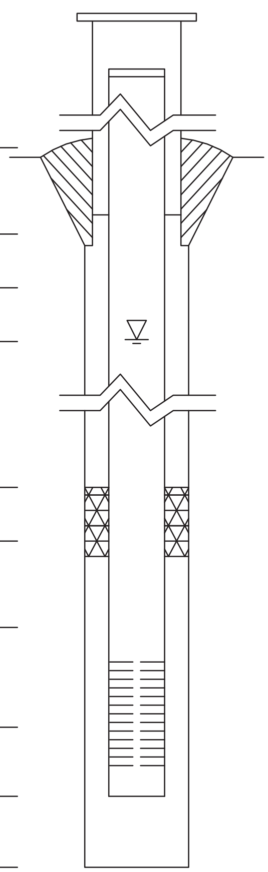
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: Cuttings (if applicable)

Installation Method: Over-drill borehole



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.14	-3.54	Top of Protective Casing
625.73	-3.13	Top of Riser Pipe
622.60	0.00	Ground Surface
620.49	2.11	Top of Annular Sealant
615.86	6.74	Static Water Level (After Completion) 6/1/2006
620.49	2.11	Top of Seal
611.06	11.54	Top of Sand Pack
609.94	12.66	Top of Screen
605.19	17.41	Bottom of Screen
604.89	17.71	Bottom of Well
604.89	17.71	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)	15.69
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.75
Total Length of Casing	(feet)	20.84
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: MW6S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-06a

State Plane Coordinate: X 879,021.2 Y 2,513,189.4 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Testing Services Corp. Date Started: 5/4/2006 Date Finished: 5/4/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular / Pellet / Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: +24 hr.

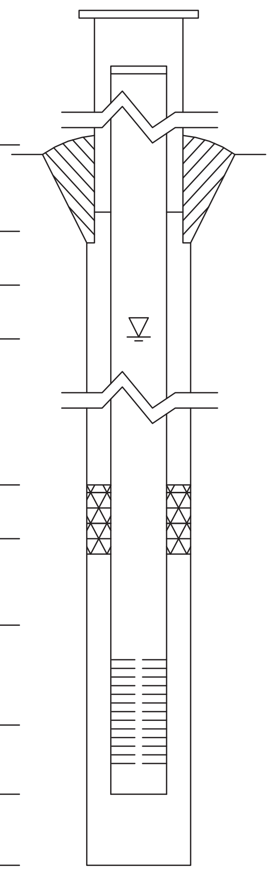
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.67	-3.57	Top of Protective Casing
626.21	-3.11	Top of Riser Pipe
623.10	0.00	Ground Surface
620.10	3.00	Top of Annular Sealant
616.89	6.21	Static Water Level (After Completion) 6/1/2006
620.10	3.00	Top of Seal
613.34	9.76	Top of Sand Pack
612.06	11.04	Top of Screen
607.48	15.62	Bottom of Screen
607.02	16.08	Bottom of Well
607.02	16.08	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	14.15
Bottom of Screen to End Cap	(feet)	0.46
Screen Length (1st slot to last slot)	(feet)	4.58
Total Length of Casing	(feet)	19.19
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW7S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-07a

State Plane Coordinate: X 879,181.1 Y 2,514,397.5 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: P. McIntire

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Rhonald W Hasenyager Date Started: 5/9/2006 Date Finished: 5/9/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular selected

Installation Method: Gravity

Setting Time: +24 hr.

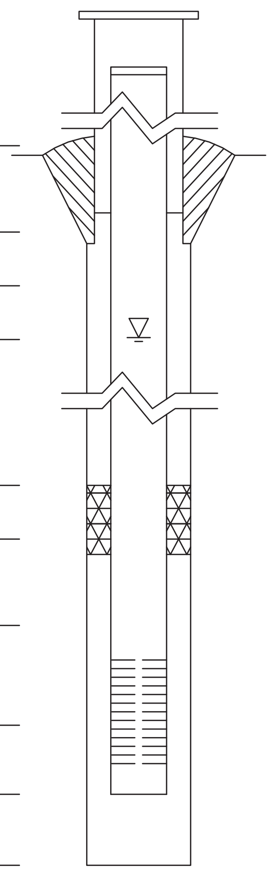
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.71	-3.21	Top of Protective Casing
627.56	-3.06	Top of Riser Pipe
624.50	0.00	Ground Surface
621.70	2.80	Top of Annular Sealant
619.60	4.90	Static Water Level (After Completion) 6/1/2006
621.70	2.80	Top of Seal
616.23	8.27	Top of Sand Pack
614.59	9.91	Top of Screen
610.71	13.79	Bottom of Screen
610.11	14.39	Bottom of Well
610.11	14.39	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)	12.37
Bottom of Screen to End Cap	(feet)	0.60
Screen Length (1st slot to last slot)	(feet)	4.48
Total Length of Casing	(feet)	17.45
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: Montgomery Well #: MW8S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-08a

State Plane Coordinate: X 879,776.6 Y 2,514,478.8 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/10/2006 Date Finished: 5/10/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: +24 hr.

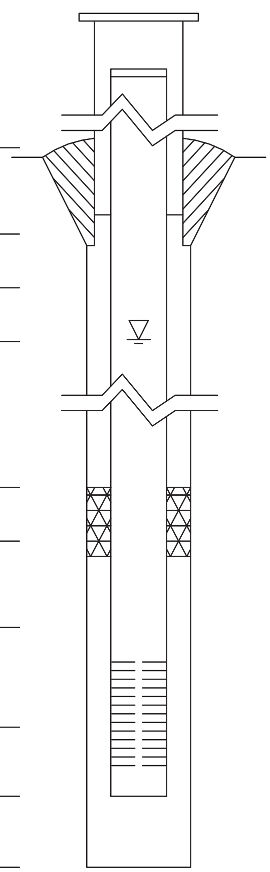
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz sand (if applicable)

Installation Method: Gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
628.26	-3.56	Top of Protective Casing
627.92	-3.22	Top of Riser Pipe
624.70	0.00	Ground Surface
622.20	2.50	Top of Annular Sealant
619.37	5.33	Static Water Level (After Completion) 6/1/2006
622.20	2.50	Top of Seal
614.72	9.98	Top of Sand Pack
613.19	11.51	Top of Screen
608.70	16.00	Bottom of Screen
608.10	16.60	Bottom of Well
607.62	17.08	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)	14.73
Bottom of Screen to End Cap	(feet)	0.60
Screen Length (1st slot to last slot)	(feet)	4.49
Total Length of Casing	(feet)	19.82
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:

Illinois Environmental Protection Agency — Well Completion Report

Site #:
County: Montgomery
Well #: MW9D

Site Name: AEG Coffeen Power Station CCB Management Facility
Borehole #: SB-09

State Plane Coordinate: X 879,679.7 Y 2,515,666.3 (or) Latitude: ° ' " Longitude: ° ' "

Surveyed By: Darren E. Forgy
IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp.
Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp.
Date Started: 5/3/2006
Date Finished: 5/3/2006

Report Form Completed By: Rhonald W Hasenyager
Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) [Granular circled]

Installation Method: Gravity

Setting Time: 15 min.

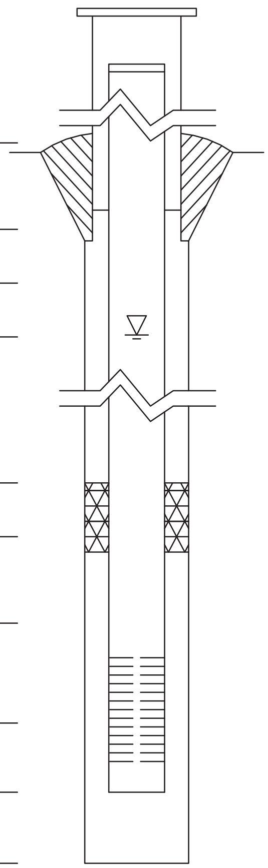
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz sand (if applicable)

Installation Method: Gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.84	-3.24	Top of Protective Casing
627.52	-2.92	Top of Riser Pipe
624.60	0.00	Ground Surface
621.70	2.90	Top of Annular Sealant
572.14	52.46	Static Water Level (After Completion) 6/1/2006
582.60	42.00	Top of Seal
580.80	43.80	Top of Sand Pack
578.79	45.81	Top of Screen
574.03	50.57	Bottom of Screen
573.60	51.00	Bottom of Well
570.60	54.00	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)	52.25
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.76
Total Length of Casing	(feet)	57.44
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: Montgomery Well #: MW9S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-09a

State Plane Coordinate: X 879,684.9 Y 2,515,666.2 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/3/2006 Date Finished: 5/3/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

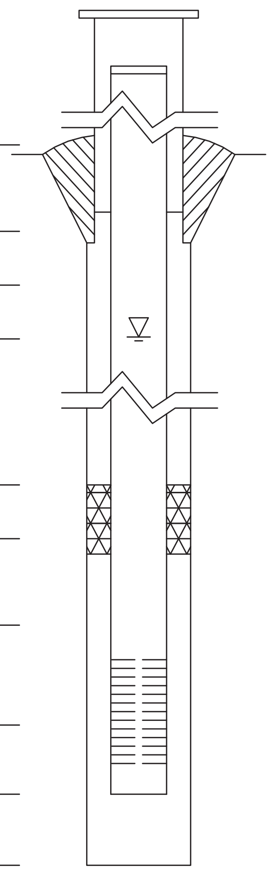
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.84	-3.24	Top of Protective Casing
627.51	-2.91	Top of Riser Pipe
624.60	0.00	Ground Surface
621.35	3.25	Top of Annular Sealant
619.37	5.23	Static Water Level (After Completion) 6/1/2006
621.35	3.25	Top of Seal
615.49	9.11	Top of Sand Pack
613.39	11.21	Top of Screen
608.98	15.62	Bottom of Screen
608.40	16.20	Bottom of Well
608.40	16.20	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)	14.12
Bottom of Screen to End Cap	(feet)	0.58
Screen Length (1st slot to last slot)	(feet)	4.41
Total Length of Casing	(feet)	19.11
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW10D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-10

State Plane Coordinate: X 878,245.1 Y 2,515,914.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/1/2006 Date Finished: 5/1/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet **Slurry** (choose one)

Installation Method: Tremie

Setting Time: 22 min.

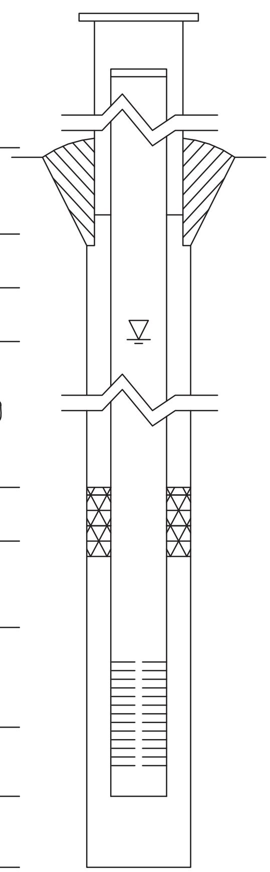
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz sand (if applicable)

Installation Method: Gravity



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.72	-3.52	Top of Protective Casing
624.42	-3.22	Top of Riser Pipe
621.20	0.00	Ground Surface
619.77	1.43	Top of Annular Sealant
573.72	47.48	Static Water Level (After Completion) 6/1/2006
619.77	1.43	Top of Seal
581.65	39.55	Top of Sand Pack
579.46	41.74	Top of Screen
574.63	46.57	Bottom of Screen
574.18	47.02	Bottom of Well
572.45	48.75	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)	45.06
Bottom of Screen to End Cap	(feet)	0.45
Screen Length (1st slot to last slot)	(feet)	4.73
Total Length of Casing	(feet)	50.24
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW10S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-10a

State Plane Coordinate: X 878,250.5 Y 2,515,914.4 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/2/2006 Date Finished: 5/2/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

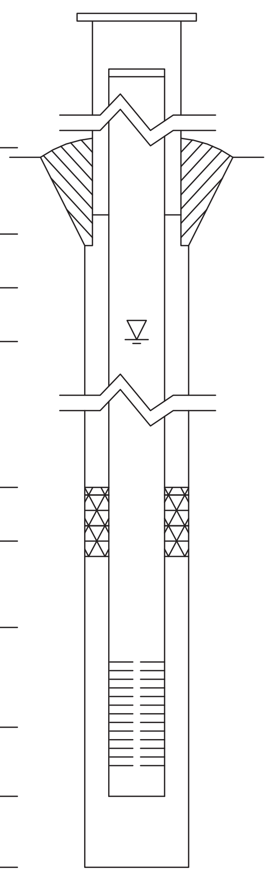
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
624.55	-3.35	Top of Protective Casing
624.24	-3.04	Top of Riser Pipe
621.20	0.00	Ground Surface
618.83	2.37	Top of Annular Sealant
616.29	4.91	Static Water Level (After Completion) 6/1/2006
618.83	2.37	Top of Seal
611.90	9.30	Top of Sand Pack
609.92	11.28	Top of Screen
605.44	15.76	Bottom of Screen
604.90	16.30	Bottom of Well
604.90	16.30	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)	14.32
Bottom of Screen to End Cap	(feet)	0.54
Screen Length (1st slot to last slot)	(feet)	4.48
Total Length of Casing	(feet)	19.34
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: Montgomery Well #: MW11D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-11

State Plane Coordinate: X 876,749.6 Y 2,515,976.7 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 4/27/2006 Date Finished: 4/28/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 18 min.

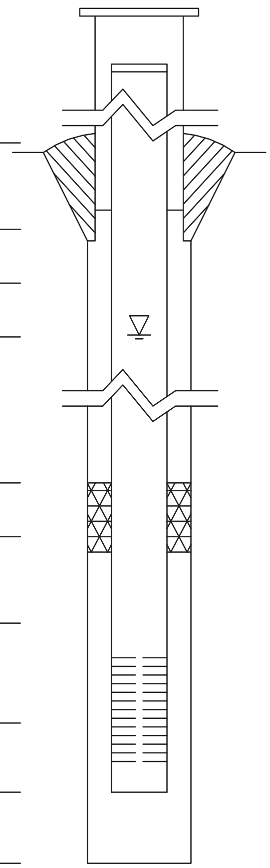
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.70	-3.70	Top of Protective Casing
625.36	-3.36	Top of Riser Pipe
622.00	0.00	Ground Surface
618.89	3.11	Top of Annular Sealant
615.97	6.03	Static Water Level (After Completion) 6/1/2006
597.20	24.80	Top of Seal
595.59	26.41	Top of Sand Pack
593.69	28.31	Top of Screen
588.96	33.04	Bottom of Screen
588.50	33.50	Bottom of Well
585.67	36.33	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)	31.67
Bottom of Screen to End Cap	(feet)	0.46
Screen Length (1st slot to last slot)	(feet)	4.73
Total Length of Casing	(feet)	36.86
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: Montgomery Well #: MW11S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-11a

State Plane Coordinate: X 876,749.4 Y 2,515,971.2 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 4/28/2006 Date Finished: 4/28/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 26 min.

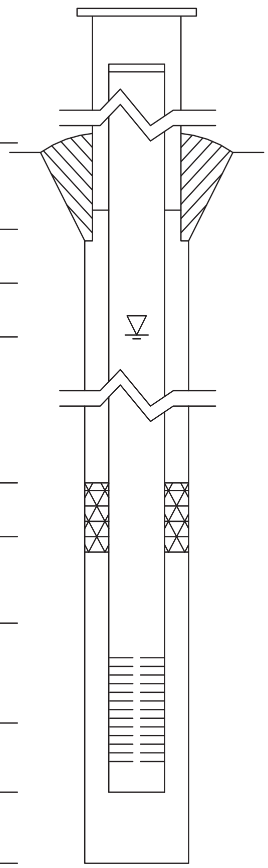
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.47	-3.47	Top of Protective Casing
625.16	-3.16	Top of Riser Pipe
622.00	0.00	Ground Surface
620.00	2.00	Top of Annular Sealant
616.58	5.42	Static Water Level (After Completion) 6/1/2006
620.00	2.00	Top of Seal
615.25	6.75	Top of Sand Pack
613.11	8.89	Top of Screen
608.37	13.63	Bottom of Screen
607.92	14.08	Bottom of Well
607.92	14.08	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)	12.04
Bottom of Screen to End Cap	(feet)	0.46
Screen Length (1st slot to last slot)	(feet)	4.74
Total Length of Casing	(feet)	17.24
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW12D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-12

State Plane Coordinate: X 875,515.1 Y 2,515,900.6 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/10/2006 Date Finished: 5/10/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: +24 hr.

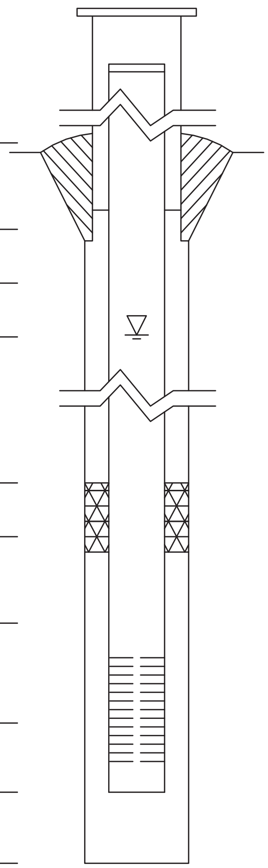
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: Over-drill borehole



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.49	-3.29	Top of Protective Casing
625.03	-2.83	Top of Riser Pipe
622.20	0.00	Ground Surface
619.43	2.77	Top of Annular Sealant
575.30	46.90	Static Water Level (After Completion) 6/1/2006
585.50	36.70	Top of Seal
581.69	40.51	Top of Sand Pack
579.74	42.46	Top of Screen
575.21	46.99	Bottom of Screen
574.73	47.47	Bottom of Well
572.20	50.00	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)	45.29
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	50.30
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____________ County: Montgomery Well #: MW12S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-12a

State Plane Coordinate: X 875,520.1 Y 2,515,900.5 (or) Latitude: ____° ____' ____" Longitude: ____° ____' ____"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/10/2006 Date Finished: 5/10/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 18 min.

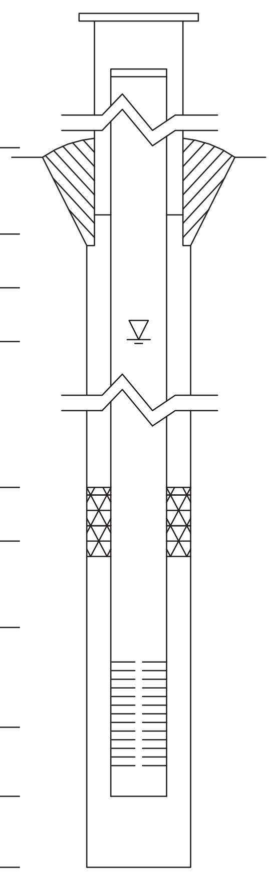
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.58	-3.38	Top of Protective Casing
625.10	-2.90	Top of Riser Pipe
622.20	0.00	Ground Surface
619.20	3.00	Top of Annular Sealant
615.44	6.76	Static Water Level (After Completion) 6/1/2006
619.20	3.00	Top of Seal
613.95	8.25	Top of Sand Pack
611.59	10.61	Top of Screen
607.02	15.18	Bottom of Screen
606.59	15.61	Bottom of Well
606.59	15.61	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	13.51
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.57
Total Length of Casing	(feet)	18.51
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: Montgomery Well #: MW13D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-13

State Plane Coordinate: X 874,694.3 Y 2,513,929.9 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/9/2006 Date Finished: 5/9/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

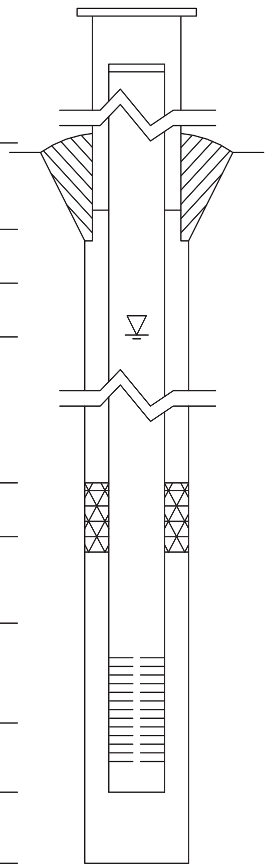
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
626.33	-3.63	Top of Protective Casing
625.87	-3.17	Top of Riser Pipe
622.70	0.00	Ground Surface
619.64	3.06	Top of Annular Sealant
566.67	56.03	Static Water Level (After Completion) 6/1/2006
577.48	45.22	Top of Seal
574.76	47.94	Top of Sand Pack
572.89	49.81	Top of Screen
568.10	54.60	Bottom of Screen
567.70	55.00	Bottom of Well
567.70	55.00	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)	52.98
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	58.17
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW13S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-13a

State Plane Coordinate: X 874,695.7 Y 2,513,925.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/9/2006 Date Finished: 5/9/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 21 min.

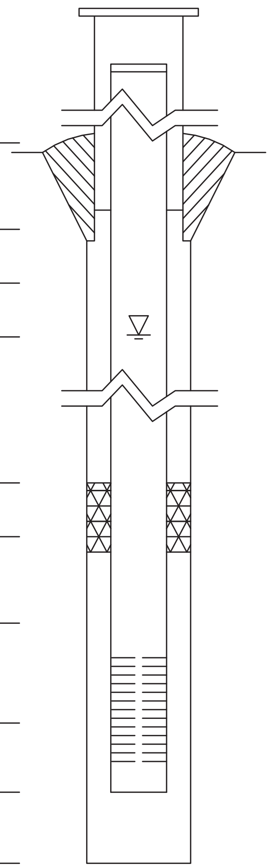
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.42	-3.72	Top of Protective Casing
625.92	-3.22	Top of Riser Pipe
622.70	0.00	Ground Surface
619.35	3.35	Top of Annular Sealant
614.46	8.24	Static Water Level (After Completion) 6/1/2006
619.35	3.35	Top of Seal
612.65	10.05	Top of Sand Pack
611.27	11.43	Top of Screen
606.47	16.23	Bottom of Screen
606.08	16.62	Bottom of Well
606.08	16.62	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.3
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	14.65
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	19.84
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: Montgomery Well #: MW14S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: Sb-14a

State Plane Coordinate: X 875,737.8 Y 2,514,125.9 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/2/2006 Date Finished: 5/2/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 23 min.

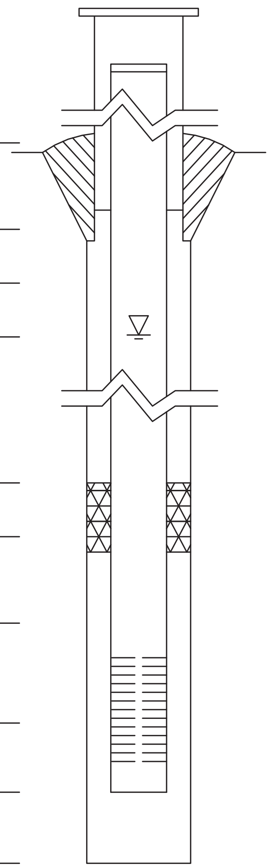
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.23	-2.63	Top of Protective Casing
626.82	-2.22	Top of Riser Pipe
624.60	0.00	Ground Surface
622.20	2.40	Top of Annular Sealant
620.11	4.49	Static Water Level (After Completion) 6/1/2006
622.20	2.40	Top of Seal
613.67	10.93	Top of Sand Pack
612.34	12.26	Top of Screen
607.58	17.02	Bottom of Screen
607.22	17.38	Bottom of Well
607.22	17.38	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)	14.48
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.76
Total Length of Casing	(feet)	19.60
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:

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail (Address - Lot Number) Coffeen (City) Montgomery (County)

General Description Township 7 (N)~~(S)~~ Range 3 ~~(E)~~(W) Section 10

SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

Filled with Bentonite grout (cement or other materials) from 0.5 to 20.0 ft.

Kind of plug Random soil from 0 to 0.5 ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

Name: Rhonald W. Hasenyager, L.P.G.
Complete License Number: 196-000246

Address: Hanson Professional Services Inc., 1525 S. 6th St.
City: Springfield
State/ZIP: IL 62703

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW15D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-15b

State Plane Coordinate: X 875,970.5 Y 2,515,080.7 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 4/24/2006 Date Finished: 4/25/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular selected

Installation Method: Gravity

Setting Time: +24 hr.

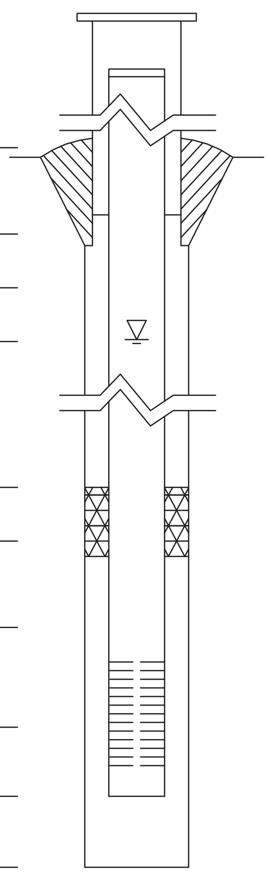
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: Re-drill borehole



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.93	-3.13	Top of Protective Casing
626.45	-2.65	Top of Riser Pipe
623.80	0.00	Ground Surface
620.55	3.25	Top of Annular Sealant
618.56	5.24	Static Water Level (After Completion) 6/1/2006
594.80	29.00	Top of Seal
591.80	32.00	Top of Sand Pack
590.12	33.68	Top of Screen
585.35	38.45	Bottom of Screen
585.00	38.80	Bottom of Well
585.00	38.80	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)	36.32
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	41.45
Screen Slot Size **	(inches)	0.010

WELL CONSTRUCTION MATERIALS

(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel (selected)
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:

**Hand-Slotted Well Screens Are Unacceptable

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

Sealing Form for MW15D - Original Mislabelled as MW15S

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

RETURN ALL COPIES TO IDPH OR LOCAL HEALTH DEPARTMENT

This form shall be submitted to this Department or the local health department not more than 30 days after a water well, boring or monitoring well is sealed. Such wells are to be sealed not more than 30 days after they are abandoned in accordance with the sealing requirements in the Water Well Construction Code. THE LOCAL HEALTH DEPARTMENT OR REGIONAL PUBLIC HEALTH DEPARTMENT MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO SEALING.

1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail, Coffeen, Montgomery
   Address - Lot Number / City / County

   General Description Township 7 (N)~~(S)~~ Range 3 ~~(E)~~(W) Section 10

   SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

   Filled with Bentonite grout from 0.5 to 20.0 ft.
   (cement or other materials)

   Kind of plug Random soil from 0 to 0.5 ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

   Filled with ____ from ____ to ____ ft.

   Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

   Rhonald W. Hasenyager, L.P.G. — Name
   196-000246 — Complete License Number

   Hanson Professional Services Inc., 1525 S. 6th St. — Address
   Springfield — City
   IL 62703 — State/ZIP

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW15S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-15a

State Plane Coordinate: X 875,971.1 Y 2,515,076.3 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Testing Service Corporation Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 4/25/2006 Date Finished: 4/25/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 20 min.

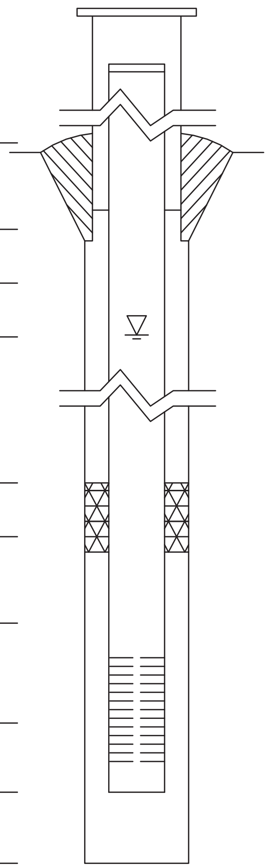
Type of Sand Pack: Quartz sand

Grain Size: #5 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
627.06	-3.26	Top of Protective Casing
626.60	-2.80	Top of Riser Pipe
623.80	0.00	Ground Surface
623.30	0.50	Top of Annular Sealant
618.81	4.99	Static Water Level (After Completion) 6/1/2006
614.30	9.50	Top of Seal
611.60	12.20	Top of Sand Pack
609.39	14.41	Top of Screen
604.64	19.16	Bottom of Screen
604.18	19.62	Bottom of Well
604.18	19.62	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)	17.28
Bottom of Screen to End Cap	(feet)	19.62
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	41.67
Screen Slot Size **	(inches)	0.010

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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

**Hand-Slotted Well Screens Are Unacceptable

4/2000

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF ENVIRONMENTAL HEALTH
525 W. JEFFERSON ST.
SPRINGFIELD, IL 62761

WATER WELL SEALING FORM

TYPE OR PRESS FIRMLY

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1. Ownership (Name of Controlling Party) AEG Coffeen Power Station (G104)

2. Well Location 134 CIPS Trail (Address - Lot Number) Coffeen (City) Montgomery (County)

General Description Township 7 (N)(~~S~~) Range 3 (~~E~~)(W) Section 10

SE Quarter of the NE Quarter of the NE Quarter

3. Year Drilled 2010

4. Drilling Permit Number (and date, if known) n/a

5. Type of Well Bored ____ Drilled ✓ Other ____

6. Total Depth 20.0 ft. Diameter (inches) 2

7. Formation clear of obstruction ✓ Yes ____ No

8. DETAILS OF PLUGGING

Filled with Bentonite grout (cement or other materials) from 0.5 to 20.0 ft.

Kind of plug Random soil from 0 to 0.5 ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

Filled with ____ from ____ to ____ ft.

Kind of plug ____ from ____ to ____ ft.

9. CASING RECORD Upper 2 feet of casing removed ✓ Yes ____ No

10. Date well was sealed Month October Day 8 Year 2010.

11. Licensed water well driller or other person approved by the Department performing well sealing.

Name: Rhonald W. Hasenyager, L.P.G.
Complete License Number: 196-000246

Address: Hanson Professional Services Inc., 1525 S. 6th St.
City: Springfield
State/ZIP: IL 62703

This state agency is requesting disclosure of information that is necessary to accomplish the statutory purpose as outlined under Public Act 85-0863. Disclosure of this information is mandatory. This form has been approved by the Forms Management Center. IL 482-0631

Printed by Authority of the State of Illinois
P.O. #530379 9.6M 4/00

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW16D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-16b

State Plane Coordinate: X 877,354.9 Y 2,515,079.4 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Rhonald W Hasenyager Date Started: 4/21/2006 Date Finished: 4/25/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular (circled) / Pellet / Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

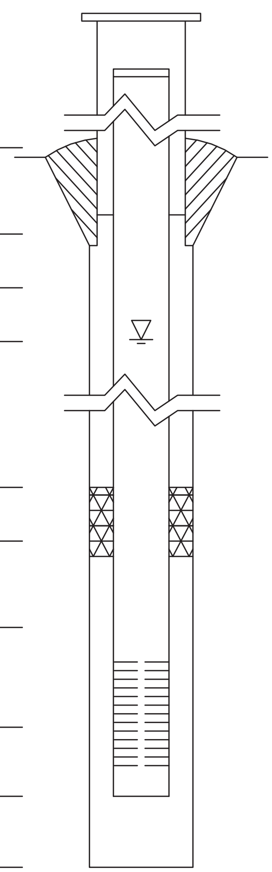
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: Re-drill borehole



Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
629.68	-3.58	Top of Protective Casing
629.33	-3.23	Top of Riser Pipe
626.10	0.00	Ground Surface
623.77	2.33	Top of Annular Sealant
574.73	51.37	Static Water Level (After Completion) 6/1/2006
584.65	41.45	Top of Seal
582.65	43.45	Top of Sand Pack
580.20	45.90	Top of Screen
575.76	50.34	Bottom of Screen
575.32	50.78	Bottom of Well
575.10	51.00	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)	48.83
Bottom of Screen to End Cap	(feet)	0.44
Screen Length (1st slot to last slot)	(feet)	4.74
Total Length of Casing	(feet)	54.01
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW16S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-16a

State Plane Coordinate: X 877,355.1 Y 2,515,088.0 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

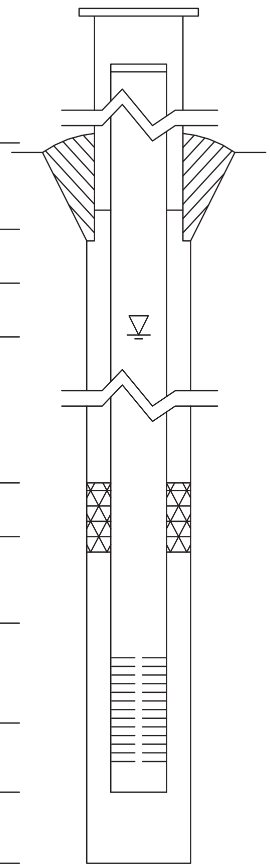
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Rhonald W Hasenyager Date Started: 4/25/2006 Date Finished: 4/25/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
629.62	-3.52	Top of Protective Casing
629.28	-3.18	Top of Riser Pipe
626.10	0.00	Ground Surface
624.66	1.44	Top of Annular Sealant
620.36	5.74	Static Water Level (After Completion) 6/1/2006
624.66	1.44	Top of Seal
612.40	13.70	Top of Sand Pack
611.51	14.59	Top of Screen
606.69	19.41	Bottom of Screen
606.34	19.76	Bottom of Well
606.20	19.90	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 17 min.

Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: Quartz sand (if applicable)

Installation Method: Gravity

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)	17.74
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.82
Total Length of Casing	(feet)	22.94
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW17D

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-17

State Plane Coordinate: X 878,659.0 Y 2,515,090.4 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/4/2006 Date Finished: 5/4/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite grout

Installation Method: Tremie

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: +24 hr.

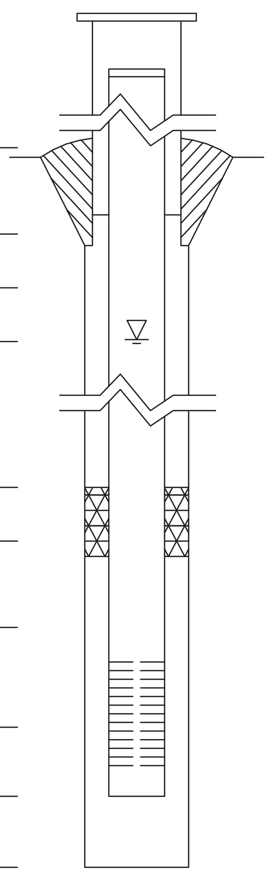
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
630.62	-3.52	Top of Protective Casing
630.29	-3.19	Top of Riser Pipe
627.10	0.00	Ground Surface
624.92	2.18	Top of Annular Sealant
572.65	54.45	Static Water Level (After Completion) 6/1/2006
581.55	45.55	Top of Seal
580.25	46.85	Top of Sand Pack
578.28	48.82	Top of Screen
573.78	53.32	Bottom of Screen
573.23	53.87	Bottom of Well
573.23	53.87	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)	52.01
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.50
Total Length of Casing	(feet)	57.06
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: MW17S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-17a

State Plane Coordinate: X 878,658.5 Y 2,515,084.8 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: K. Doetzel

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/4/2006 Date Finished: 5/4/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 22 min.

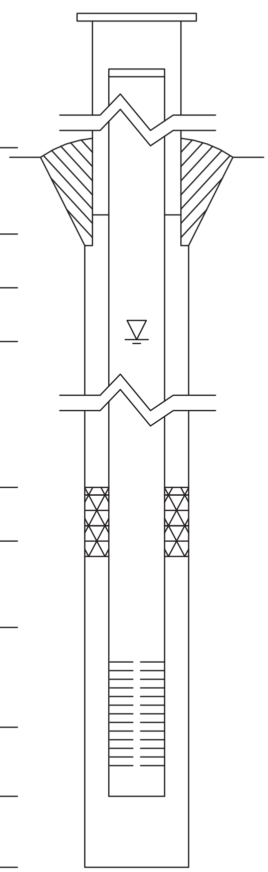
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
630.68	-3.58	Top of Protective Casing
630.34	-3.24	Top of Riser Pipe
627.10	0.00	Ground Surface
626.40	0.70	Top of Annular Sealant
620.21	6.89	Static Water Level (After Completion) 6/1/2006
617.33	9.77	Top of Seal
614.80	12.30	Top of Sand Pack
613.08	14.02	Top of Screen
603.54	23.56	Bottom of Screen
602.99	24.11	Bottom of Well
602.99	24.11	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)	17.26
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	9.54
Total Length of Casing	(feet)	27.35
Screen Slot Size **	(inches)	0.010

WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

Protective Casing	SS304	SS316	PTFE	PVC	OTHER: Steel (circled)
Riser Pipe Above W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ____ County: Montgomery Well #: MW18S

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: SB-18a

State Plane Coordinate: X 878,604.7 Y 2,513,745.2 (or) Latitude: ___° ___' ___" Longitude: ___° ___' ___"

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): Potable water

Logged By: Reynolds Drilling Corp. Date Started: 5/11/2006 Date Finished: 5/11/2006

Report Form Completed By: Rhonald W Hasenyager Date: 6/7/2006

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: +24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 25 min.

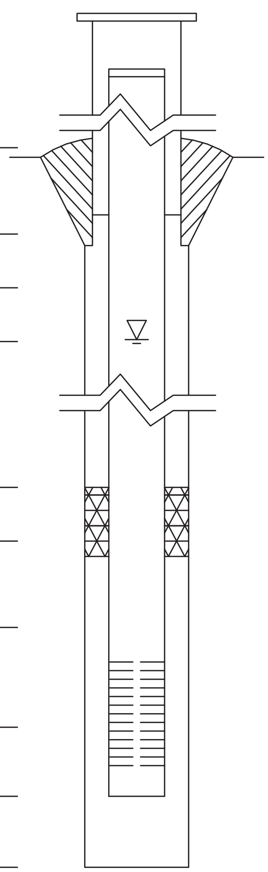
Type of Sand Pack: Quartz sand

Grain Size: #JC50FS (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
629.02	-3.42	Top of Protective Casing
628.71	-3.11	Top of Riser Pipe
625.60	0.00	Ground Surface
622.13	3.47	Top of Annular Sealant
618.73	6.87	Static Water Level (After Completion) 6/1/2006
622.13	3.47	Top of Seal
615.79	9.81	Top of Sand Pack
614.29	11.31	Top of Screen
609.81	15.79	Bottom of Screen
609.20	16.40	Bottom of Well
609.20	16.40	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)	14.42
Bottom of Screen to End Cap	(feet)	0.61
Screen Length (1st slot to last slot)	(feet)	4.48
Total Length of Casing	(feet)	19.51
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: Montgomery Well #: MW20S

Site Name: Ash Pond Investigation Borehole #: SB20

State Plane Coordinate: X 2,515,867.9 Y 874,226.4 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____

Surveyed By: Darren E. Forgy IL Registration #: 035-003637

Drilling Contractor: Reynolds Drilling Corp. Driller: A. Rachford

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 5/1/2007 Date Finished: 5/1/2007

Report Form Completed By: Rhonald W. Hasenyager Date: 5/2/2007

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: gravity

Setting Time: >12 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ____

Setting Time: ____

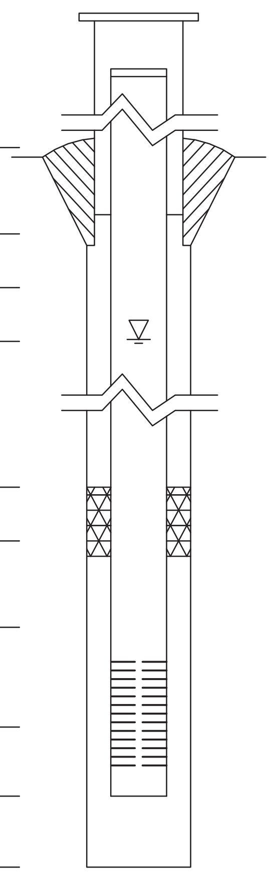
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: gravity

Type of Backfill Material: ____ (if applicable)

Installation Method: ____



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
623.26	-2.96	Top of Protective Casing
623.00	-2.70	Top of Riser Pipe
620.30	0.00	Ground Surface
620.30	0.00	Top of Annular Sealant
616.02	4.28	Static Water Level (After Completion) 5/10/2007
n/a	n/a	Top of Seal
613.05	7.25	Top of Sand Pack
611.89	8.41	Top of Screen
607.08	13.22	Bottom of Screen
606.63	13.67	Bottom of Well
604.30	16.00	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)	11.11
Bottom of Screen to End Cap	(feet)	0.45
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	16.37
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: Montgomery Well #: R104

Site Name: CCB Management Facility Borehole #: R104

State Plane Coordinate: X 2,514,503.4 Y 875,857.8 (or) Latitude: 39° 4' 10.000" Longitude: -89° 23' 56.800"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Rhonald W. Hasenyager Date Started: 10/8/2010 Date Finished: 10/8/2010

Report Form Completed By: Suzanna Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

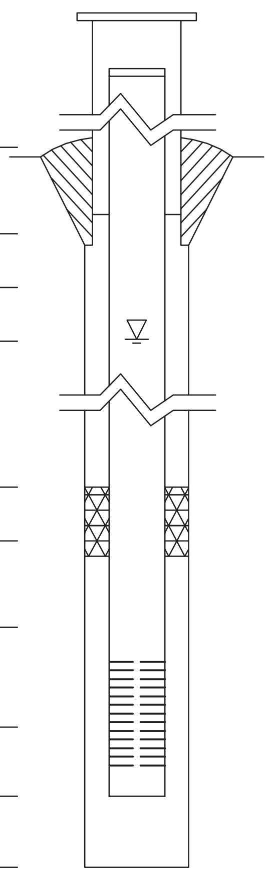
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
632.02	-2.99	Top of Protective Casing
631.84	-2.81	Top of Riser Pipe
629.03	0.00	Ground Surface
627.03	2.00	Top of Annular Sealant
612.85	16.18	Static Water Level (After Completion) 11/15/2010
617.03	12.00	Top of Seal
616.01	13.02	Top of Sand Pack
614.44	14.59	Top of Screen
609.71	19.32	Bottom of Screen
609.18	19.85	Bottom of Well
609.18	19.85	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)	17.60
Bottom of Screen to End Cap	(feet)	0.53
Screen Length (1st slot to last slot)	(feet)	4.53
Total Length of Casing	(feet)	22.66
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:
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: Montgomery Well #: R201

Site Name: CCB Management Facility Borehole #: R201

State Plane Coordinate: X 2,514,842.0 Y 877,925.3 (or) Latitude: 39° 4' 30.500" Longitude: -89° 23' 52.300"

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Rhonald W. Hasenyager Date Started: 10/15/2010 Date Finished: 10/15/2010

Report Form Completed By: Suzanna Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 48 min

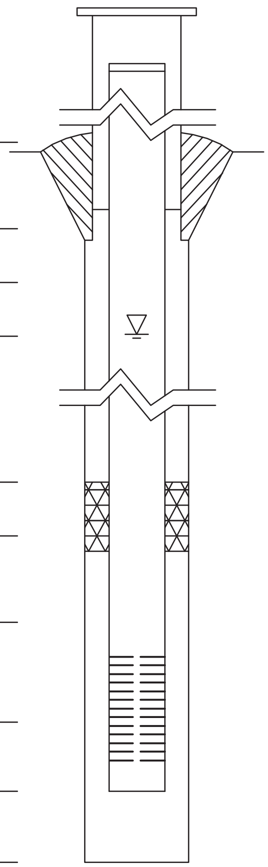
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.51	-2.49	Top of Protective Casing
626.34	-2.32	Top of Riser Pipe
624.02	0.00	Ground Surface
621.52	2.50	Top of Annular Sealant
618.70	5.32	Static Water Level (After Completion) 11/15/2010
614.47	9.55	Top of Seal
612.90	11.12	Top of Sand Pack
611.75	12.27	Top of Screen
607.36	16.66	Bottom of Screen
606.80	17.22	Bottom of Well
606.80	17.22	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)	14.59
Bottom of Screen to End Cap	(feet)	0.56
Screen Length (1st slot to last slot)	(feet)	4.39
Total Length of Casing	(feet)	19.54
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:
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: Montgomery Well #: R205

Site Name: Coffeen Power Station - Gypsum Mgmt Facility Borehole #: R205

State Plane Coordinate: X 2,515,910.1 Y 875,548.8 (or) Latitude: 39° 4' 6.935" Longitude: -89° 23' 38.991"

Surveyed By: Gary C. Rogers IL Registration #: 035-02957

Drilling Contractor: Bulldog Drilling Driller: J. Gates

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): ______

Logged By: Rhonald W. Hasenyager Date Started: 3/20/2017 Date Finished: 3/20/2017

Report Form Completed By: Suzanna L. Keim Date: 3/27/2017

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 95 minutes

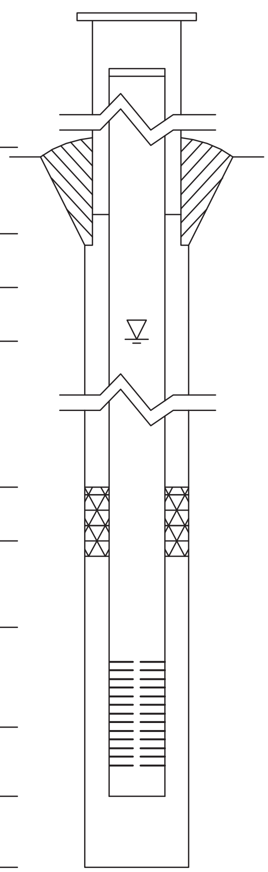
Type of Sand Pack: Quartz sand

Grain Size: #0 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.94	-3.03	Top of Protective Casing
624.52	-2.61	Top of Riser Pipe
621.91	0.00	Ground Surface
619.91	2.00	Top of Annular Sealant
619.41	2.50	Static Water Level (After Completion) 3/21/2017
614.26	7.65	Top of Seal
611.99	9.92	Top of Sand Pack
610.59	11.32	Top of Screen
605.90	16.01	Bottom of Screen
605.49	16.42	Bottom of Well
605.49	16.42	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)	13.93
Bottom of Screen to End Cap	(feet)	0.41
Screen Length (1st slot to last slot)	(feet)	4.69
Total Length of Casing	(feet)	19.03
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: Montgomery Well #: T127

Site Name: CCB Management Facility Borehole #: T127

State Plane Coordinate: X 2,513,911.0 Y 875,359.2 (or) Latitude: 39° 4' 5.200" Longitude: -89° 24' 4.400"

Surveyed By: ______ IL Registration #: ______

Drilling Contractor: Layne-Western Co Driller: T. List

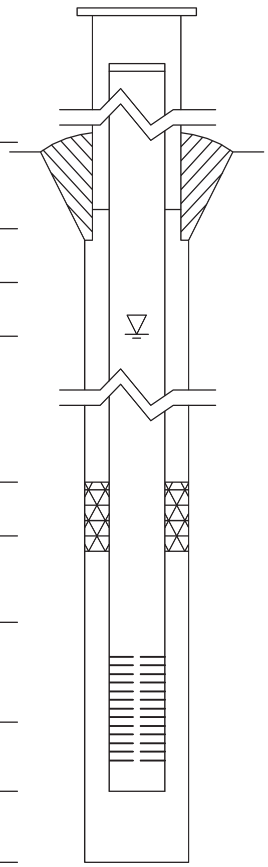
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: ______ Date Started: 2/10/2010 Date Finished: 2/10/2010

Report Form Completed By: ______ Date: 2/19/2010

ANNULAR SPACE DETAILS



	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	631.29	-3.22	Top of Protective Casing
	630.96	-2.89	Top of Riser Pipe
Type of Surface Seal: Concrete	628.07	0.00	Ground Surface
Type of Annular Sealant: High-solids bentonite	622.43	5.64	Top of Annular Sealant
Installation Method: Tremie			
Setting Time: >24 hr.	616.81	11.26	Static Water Level (After Completion) 3/1/2010
Type of Bentonite Seal -- Granular / Pellet / Slurry (choose one): Granular			
Installation Method: Granular	613.43	14.64	Top of Seal
Setting Time: 10 min	612.32	15.75	Top of Sand Pack
Type of Sand Pack: Quartz sand			
Grain Size: 10/20 (sieve size)	610.54	17.53	Top of Screen
Installation Method: Gravity			
	606.00	22.07	Bottom of Screen
Type of Backfill Material: n/a (if applicable)	605.43	22.64	Bottom of Well
Installation Method: n/a	605.43	22.64	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)	20.42
Bottom of Screen to End Cap	(feet)	0.57
Screen Length (1st slot to last slot)	(feet)	4.54
Total Length of Casing	(feet)	25.53
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:
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: Montgomery Well #: T128

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: T128

~~State~~ Plant ~~Plane~~ Coordinate: X 2,513,909.5 Y 875,509.7 (or) Latitude: ____° ____' ____" Longitude: ____° ____' ____"

Surveyed By: ____ IL Registration #: ____

Drilling Contractor: Layne-Western Co Driller: T. List

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 2/9/2010 Date Finished: 2/9/2010

Report Form Completed By: Suzanna L. Simpson Date: 2/18/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Granular

Setting Time: 10 min

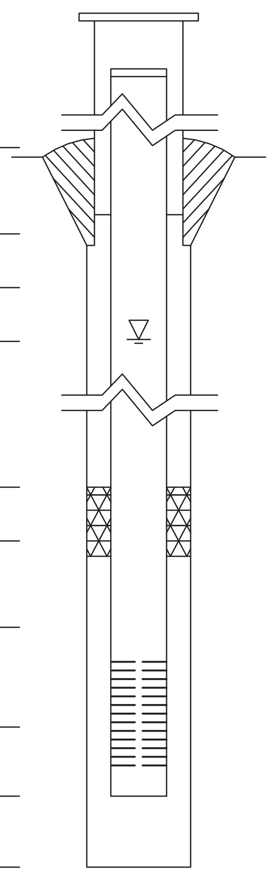
Type of Sand Pack: Quartz sand

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.)
631.23	-2.79	Top of Protective Casing
630.93	-2.49	Top of Riser Pipe
628.44	0.00	Ground Surface
623.38	5.06	Top of Annular Sealant
616.09	12.35	Static Water Level (After Completion) 3/1/2010
615.53	12.91	Top of Seal
614.13	14.31	Top of Sand Pack
611.91	16.53	Top of Screen
607.40	21.04	Bottom of Screen
606.80	21.64	Bottom of Well
604.38	24.06	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)	20.02
Bottom of Screen to End Cap	(feet)	0.60
Screen Length (1st slot to last slot)	(feet)	4.51
Total Length of Casing	(feet)	25.13
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: Montgomery Well #: T202

Site Name: AEG Coffeen Power Station CCB Management Facility Borehole #: T202

State Plane Coordinate: X 2,514,895.0 Y 876,699.4 (or) Latitude: 39 ° 4 ' 18.4 " Longitude: -89 ° 23 ' 51.7 "

Surveyed By: Jeffrey D. Emrick IL Registration #: 035-003507

Drilling Contractor: Layne-Western Co Driller: D. Mahurin

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): n/a

Logged By: Suzanna L. Simpson Date Started: 10/15/2010 Date Finished: 10/15/2010

Report Form Completed By: Suzanna L. Simpson Date: 10/19/2010

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hr.

Type of Bentonite Seal -- **Granular** Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 15 min

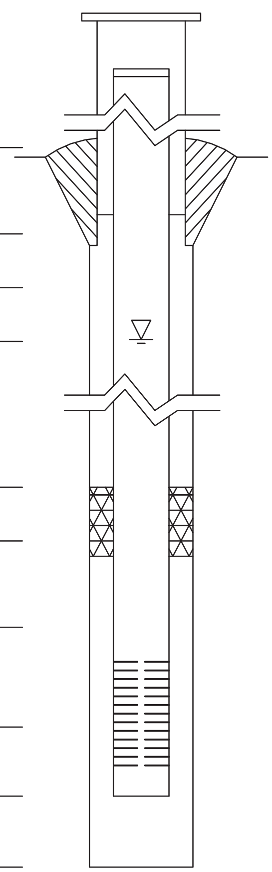
Type of Sand Pack: Quartz sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: n/a



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
628.79	-2.57	Top of Protective Casing
628.63	-2.41	Top of Riser Pipe
626.22	0.00	Ground Surface
623.42	2.80	Top of Annular Sealant
613.72	12.50	Static Water Level (After Completion) 11/15/2010
616.50	9.72	Top of Seal
615.27	10.95	Top of Sand Pack
613.95	12.27	Top of Screen
609.57	16.65	Bottom of Screen
609.01	17.21	Bottom of Well
608.22	18.00	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)	14.68
Bottom of Screen to End Cap	(feet)	0.56
Screen Length (1st slot to last slot)	(feet)	4.38
Total Length of Casing	(feet)	19.62
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: Montgomery Well #: T408

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: T408

State Plane Coordinate: X 2,515,314.9 Y 873,999.4 (or) Latitude: 39° 3' 51.671" Longitude: -89° 23' 46.704"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

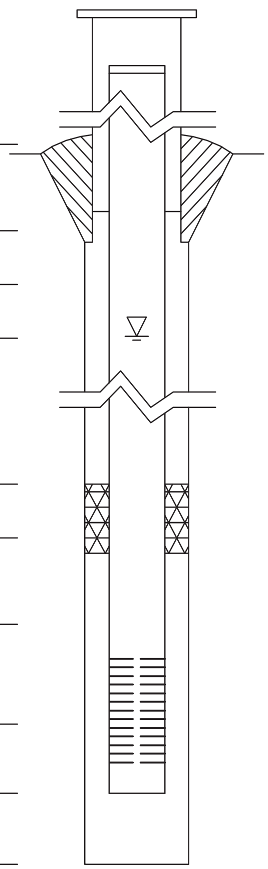
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/17/2016 Date Finished: 8/17/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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) [Granular]

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: ______ (if applicable)

Installation Method: ______

Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
624.44	-3.35	Top of Protective Casing
624.08	-2.99	Top of Riser Pipe
621.09	0.00	Ground Surface
619.09	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
602.99	18.10	Top of Seal
602.04	19.05	Top of Sand Pack
600.43	20.66	Top of Screen
595.60	25.49	Bottom of Screen
595.17	25.92	Bottom of Well
595.17	25.92	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)	23.65
Bottom of Screen to End Cap	(feet)	0.43
Screen Length (1st slot to last slot)	(feet)	4.83
Total Length of Casing	(feet)	28.91
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: Montgomery Well #: T409

Site Name: Coffeen Power Station - Ash Pond 2 Borehole #: T409

State Plane Coordinate: X 2,514,693.9 Y 872,517.8 (or) Latitude: 39° 3' 37.079" Longitude: -89° 23' 54.736"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Bulldog Drilling, Inc. Driller: J. Dittmaier

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): none

Logged By: Kristen L. Theesfeld Date Started: 8/19/2016 Date Finished: 8/19/2016

Report Form Completed By: Suzanna L. Keim Date: 8/24/2016

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: 30 minutes

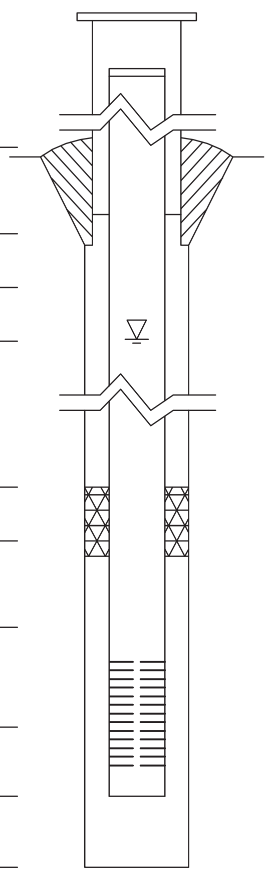
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: ______ (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.35	-3.50	Top of Protective Casing
625.01	-3.16	Top of Riser Pipe
621.85	0.00	Ground Surface
619.85	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
602.65	19.20	Top of Seal
601.30	20.55	Top of Sand Pack
600.06	21.79	Top of Screen
595.26	26.59	Bottom of Screen
594.86	26.99	Bottom of Well
594.86	26.99	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)	24.95
Bottom of Screen to End Cap	(feet)	0.40
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	30.15
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: ______ Well #: TA31

Site Name: Coffeen Power Station Borehole #: TA31

State Plane Coordinate: X 2,513,856.8 Y 876,542.2 (or) Latitude: 39° 4' 16.930" Longitude: 89° 24' 4.920"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 10/28/2014 Date Finished: 10/28/2014

Report Form Completed By: Rhonald W. Hasenyager Date: 11/5/2014

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite

Installation Method: tremie

Setting Time: 45 min.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 30 min.

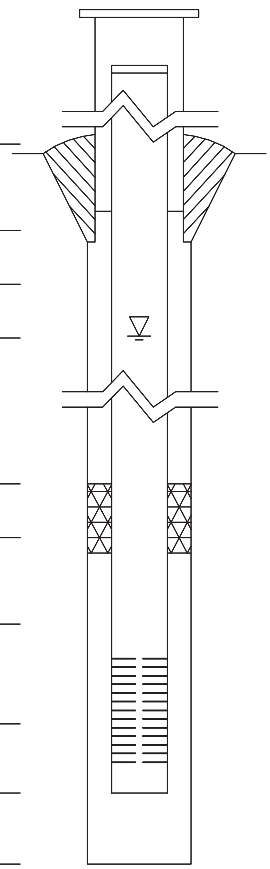
Type of Sand Pack: Quartz Sand

Grain Size: 10/20 (sieve size)

Installation Method: Gravity & Surge

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
626.90	-3.01	Top of Protective Casing
626.55	-2.66	Top of Riser Pipe
623.89	0.00	Ground Surface
620.89	3.00	Top of Annular Sealant
615.78	8.11	Static Water Level (After Completion) 10/30/2014
613.56	10.33	Top of Seal
610.81	13.08	Top of Sand Pack
608.80	15.09	Top of Screen
604.32	19.57	Bottom of Screen
603.70	20.19	Bottom of Well
603.70	20.19	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)	17.82
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.48
Total Length of Casing	(feet)	22.85
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: ______ Well #: TA32

Site Name: Coffeen Power Station Borehole #: TA32

State Plane Coordinate: X 2,513,605.2 Y 877,532.6 (or) Latitude: 39° 4' 26.730" Longitude: 89° 24' 8.000"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 10/27/2014 Date Finished: 10/27/2014

Report Form Completed By: Rhonald W. Hasenyager Date: 11/5/2014

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite

Installation Method: tremie

Setting Time: 30 min.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 35 min.

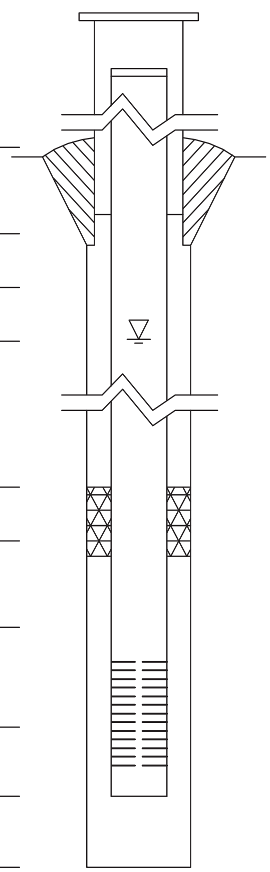
Type of Sand Pack: Quartz Sand

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.)
621.76	-2.83	Top of Protective Casing
621.42	-2.49	Top of Riser Pipe
618.93	0.00	Ground Surface
616.03	2.90	Top of Annular Sealant
604.88	14.05	Static Water Level (After Completion) 10/30/2014
611.09	7.84	Top of Seal
609.18	9.75	Top of Sand Pack
607.62	11.31	Top of Screen
603.25	15.68	Bottom of Screen
602.46	16.47	Bottom of Well
602.46	16.47	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)	13.94
Bottom of Screen to End Cap	(feet)	0.65
Screen Length (1st slot to last slot)	(feet)	4.37
Total Length of Casing	(feet)	18.96
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: Montgomery Well #: TA33

Site Name: Coffeen Well Sealing & Assmt Well Install Borehole #: TA33b

State Plane Coordinate: X 2,513,248.7 Y 876,605.4 (or) Latitude: 39° 4' 17.500" Longitude: 89° 24' 12.700"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

Logged By: Suzanna L. Keim Date Started: 6/2/2015 Date Finished: 6/2/2015

Report Form Completed By: Suzanna L. Keim Date: 6/4/2015

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >48 hrs.

Type of Bentonite Seal -- Granular (circled) Pellet Slurry (choose one)

Installation Method: Gravity

Setting Time: 30 minutes

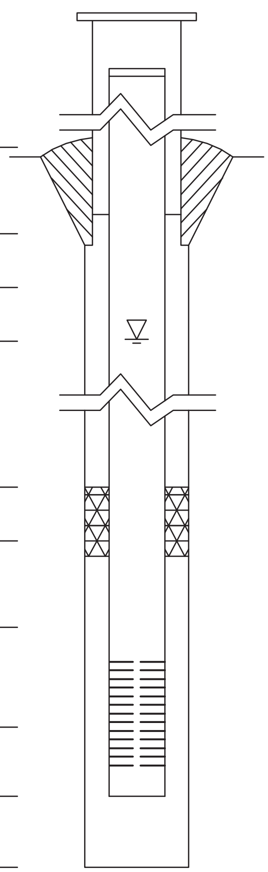
Type of Sand Pack: Quartz sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: n/a (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.05	-2.54	Top of Protective Casing
625.27	-2.76	Top of Riser Pipe
622.51	0.00	Ground Surface
620.51	2.00	Top of Annular Sealant
615.51	7.00	Static Water Level (After Completion) 6/16/2015
614.51	8.00	Top of Seal
612.11	10.40	Top of Sand Pack
610.28	12.23	Top of Screen
605.62	16.89	Bottom of Screen
605.07	17.44	Bottom of Well
605.07	17.44	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.5
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	14.99
Bottom of Screen to End Cap	(feet)	0.55
Screen Length (1st slot to last slot)	(feet)	4.66
Total Length of Casing	(feet)	20.20
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: Montgomery Well #: TA34

Site Name: Coffeen Well Sealing & Assmt Well Install Borehole #: TA34

State Plane Coordinate: X 2,513,466.7 Y 875,906.1 (or) Latitude: 39° 4' 10.500" Longitude: 89° 24' 10.000"

Surveyed By: Gary C. Rogers IL Registration #: 035-002957

Drilling Contractor: Ramsey Driller: B. Williamson

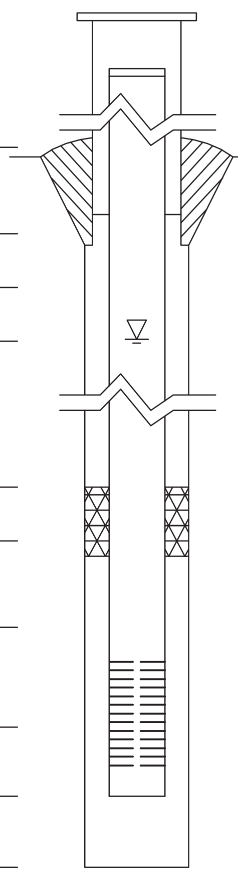
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): None

Logged By: Suzanna L. Keim Date Started: 6/3/2015 Date Finished: 6/3/2015

Report Form Completed By: Suzanna L. Keim Date: 6/4/2015

ANNULAR SPACE DETAILS



	Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
	626.77	-2.67	Top of Protective Casing
	626.52	-2.42	Top of Riser Pipe
Type of Surface Seal: Concrete	624.10	0.00	Ground Surface
Type of Annular Sealant: Bentonite chips	623.10	1.00	Top of Annular Sealant
Installation Method: Gravity			
Setting Time: 1 hour	616.00	8.10	Static Water Level (After Completion) 6/16/2015
Type of Bentonite Seal -- Granular Pellet Slurry (choose one)			
Installation Method: n/a	n/a	n/a	Top of Seal
Setting Time: n/a	615.10	9.00	Top of Sand Pack
Type of Sand Pack: Quartz sand			
Grain Size: 10-20 (sieve size)	613.18	10.92	Top of Screen
Installation Method: Gravity			
	608.69	15.41	Bottom of Screen
Type of Backfill Material: n/a (if applicable)	608.00	16.10	Bottom of Well
Installation Method:	608.00	16.10	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	7.5
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	13.34
Bottom of Screen to End Cap	(feet)	0.69
Screen Length (1st slot to last slot)	(feet)	4.49
Total Length of Casing	(feet)	18.52
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: ____ Well #: TR32

Site Name: Coffeen Power Station Borehole #: TR32

State Plane Coordinate: X 2,513,605.0 Y 877,523.7 (or) Latitude: 39° 4' 2663.000" Longitude: 89° 24' 8.070"

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Ramsey Geotechnical Engineering, LLC Driller: B. Williamson

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow Stem Auger Drilling Fluid (Type): none

Logged By: Rhonald W. Hasenyager Date Started: 7/2/2019 Date Finished: 7/2/2019

Report Form Completed By: Rhonald W. Hasenyager Date: 7/3/2019

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite

Installation Method: Gravity

Setting Time: 30 min.

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ____

Setting Time: ____

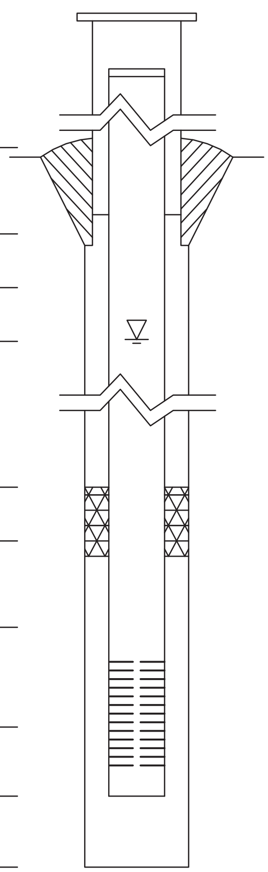
Type of Sand Pack: Quartz Sand

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.)
621.97	-2.69	Top of Protective Casing
621.68	-2.40	Top of Riser Pipe
619.28	0.00	Ground Surface
616.28	3.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
609.77	9.51	Top of Sand Pack
608.28	11.00	Top of Screen
603.60	15.68	Bottom of Screen
603.11	16.17	Bottom of Well
603.11	16.17	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)	13.40
Bottom of Screen to End Cap	(feet)	0.49
Screen Length (1st slot to last slot)	(feet)	4.68
Total Length of Casing	(feet)	18.57
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: Montgomery Well #: G307D

Site Name: Coffeen Part 845 Groundwater Borehole #: G307D

State Plane Coordinate: X 2,515,560.3 Y 871,397.2 (or) Latitude: ______ ______ ______ Longitude: ______ ______ ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/9/2021 Date Finished: 2/9/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

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) [Granular circled]

Installation Method: Gravity

Setting Time: 30 minutes

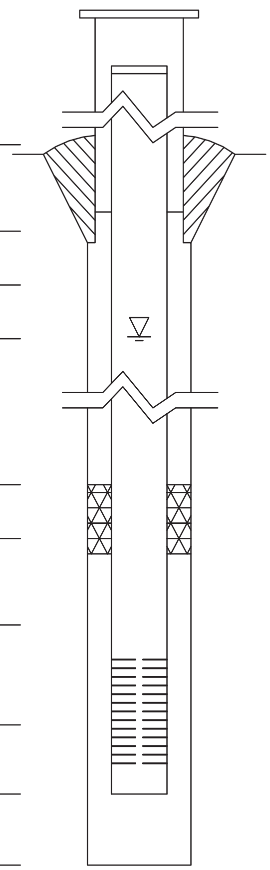
Type of Sand Pack: Quartz sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
625.29	-2.78	Top of Protective Casing
624.88	-2.37	Top of Riser Pipe
622.51	0.00	Ground Surface
621.51	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
575.51	47.00	Top of Seal
574.51	48.00	Top of Sand Pack
573.53	48.98	Top of Screen
563.76	58.75	Bottom of Screen
562.91	59.60	Bottom of Well
562.51	60.00	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)	51.85
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	9.77
Total Length of Casing	(feet)	61.97
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: Montgomery Well #: G308

Site Name: Coffeen Part 845 Groundwater Borehole #: G308

State Plane Coordinate: X 2,515,101.4 Y 871,454.7 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/13/2021 Date Finished: 1/13/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

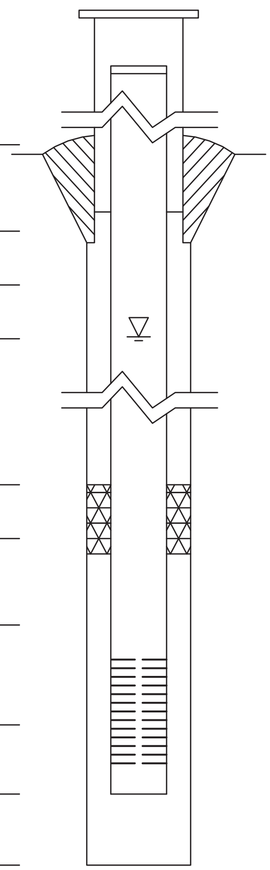
Type of Sand Pack: Quartz Sand

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.)
624.96	-3.37	Top of Protective Casing
624.59	-3.00	Top of Riser Pipe
621.59	0.00	Ground Surface
621.39	0.20	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
612.59	9.00	Top of Sand Pack
611.49	10.10	Top of Screen
606.70	14.89	Bottom of Screen
606.35	15.24	Bottom of Well
605.79	15.80	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)	13.10
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	18.24
Screen Slot Size **	(inches)	0.010

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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G309

Site Name: Coffeen Part 845 Groundwater Borehole #: G309

State Plane Coordinate: X 2,515,067.1 Y 871,865.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/12/2021 Date Finished: 1/12/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

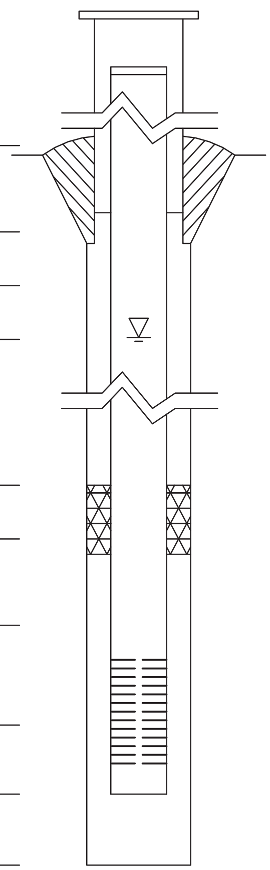
Type of Sand Pack: Quartz sand

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.)
626.20	-3.43	Top of Protective Casing
625.88	-3.11	Top of Riser Pipe
622.77	0.00	Ground Surface
622.27	0.50	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
610.77	12.00	Top of Sand Pack
609.80	12.97	Top of Screen
605.02	17.75	Bottom of Screen
604.67	18.10	Bottom of Well
604.67	18.10	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)	16.08
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.78
Total Length of Casing	(feet)	21.21
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: Montgomery Well #: G310

Site Name: Coffeen Part 845 Groundwater Borehole #: G310

State Plane Coordinate: X 2,515,159.4 Y 872,239.4 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/15/2021 Date Finished: 1/15/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

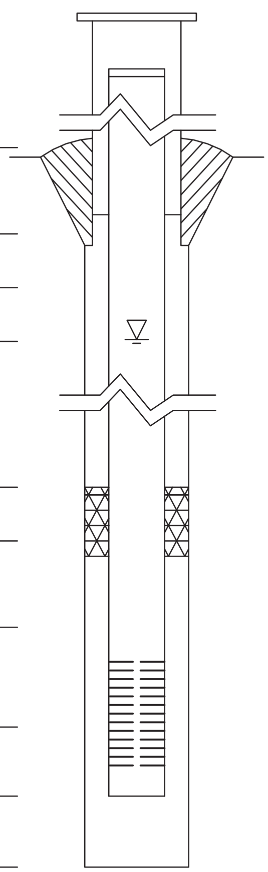
Type of Sand Pack: Quartz sand

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.)
623.32	-3.43	Top of Protective Casing
622.87	-2.98	Top of Riser Pipe
619.89	0.00	Ground Surface
619.39	0.50	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
610.69	9.20	Top of Sand Pack
609.65	10.24	Top of Screen
604.86	15.03	Bottom of Screen
604.51	15.38	Bottom of Well
603.99	15.90	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)	13.22
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	18.36
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: Montgomery Well #: G311

Site Name: Coffeen Part 845 Groundwater Borehole #: G311

State Plane Coordinate: X 2,515,881.8 Y 872,238.7 (or) Latitude: ______ ______ ______ Longitude: ______ ______ ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/5/2021 Date Finished: 2/5/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

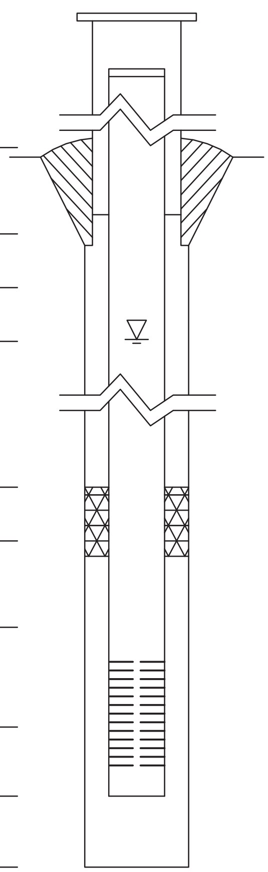
Type of Sand Pack: Quartz sand

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.)
621.55	-3.23	Top of Protective Casing
621.04	-2.72	Top of Riser Pipe
618.32	0.00	Ground Surface
617.52	0.80	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
610.12	8.20	Top of Sand Pack
609.05	9.27	Top of Screen
604.28	14.04	Bottom of Screen
603.92	14.40	Bottom of Well
603.92	14.40	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)	11.99
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	17.12
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: Montgomery
Well #: G311D

Site Name: Coffeen Part 845 Groundwater
Borehole #: G311D

State Plane Coordinate: X 2,515,881.8 Y 872,238.7 (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___

Surveyed By: Kyle J. Nolan
IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc.
Driller: Matt

Consulting Firm: Hanson Professional Services Inc.
Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger
Drilling Fluid (Type): None

Logged By: Colin Winter
Date Started: 2/5/2021
Date Finished: 2/5/2021

Report Form Completed By: Colin Winter
Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: 1 hour

Type of Bentonite Seal -- Granular Pellet Slurry (choose one) — Granular

Installation Method: Gravity

Setting Time: 30 minutes

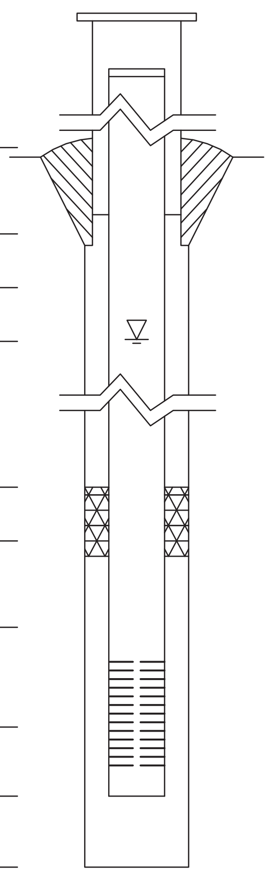
Type of Sand Pack: Quartz sand

Grain Size: 10-20 (sieve size)

Installation Method: Tremie

Type of Backfill Material: N/A (if applicable)

Installation Method:



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
621.75	-3.36	Top of Protective Casing
621.24	-2.85	Top of Riser Pipe
618.39	0.00	Ground Surface
617.09	1.30	Top of Annular Sealant
		Static Water Level (After Completion)
572.39	46.00	Top of Seal
569.39	49.00	Top of Sand Pack
568.23	50.16	Top of Screen
558.29	60.10	Bottom of Screen
557.81	60.58	Bottom of Well
557.81	60.58	Bottom of Borehole

* Referenced to a National Geodetic Datum

CASING MEASUREMENTS

Diameter of Borehole	(inches)	6.0
ID of Riser Pipe	(inches)	2.0
Protective Casing Length	(feet)	5.0
Riser Pipe Length	(feet)	53.01
Bottom of Screen to End Cap	(feet)	0.48
Screen Length (1st slot to last slot)	(feet)	9.94
Total Length of Casing	(feet)	63.43
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 (circled)	OTHER:
Riser Pipe Below W.T.	SS304	SS316	PTFE	PVC (circled)	OTHER:
Screen	SS304	SS316	PTFE	PVC (circled)	OTHER:

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G312

Site Name: Coffeen Part 845 Groundwater Borehole #: G312

State Plane Coordinate: X 2,516,557.4 Y 872,260.9 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/4/2021 Date Finished: 2/4/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

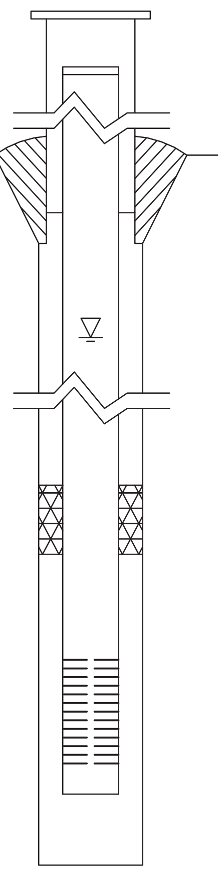
Type of Sand Pack: Quartz sand

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.)
620.11	-3.19	Top of Protective Casing
619.78	-2.86	Top of Riser Pipe
616.92	0.00	Ground Surface
615.92	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
608.92	8.00	Top of Sand Pack
607.13	9.79	Top of Screen
602.34	14.58	Bottom of Screen
601.99	14.93	Bottom of Well
601.67	15.25	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)	12.65
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	17.79
Screen Slot Size **	(inches)	0.010

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:

Well Completion Form (revised 02/06/02)

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G313

Site Name: Coffeen Part 845 Groundwater Borehole #: G313

State Plane Coordinate: X 2,516,803.7 Y 871,976.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/14/2021 Date Finished: 1/14/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

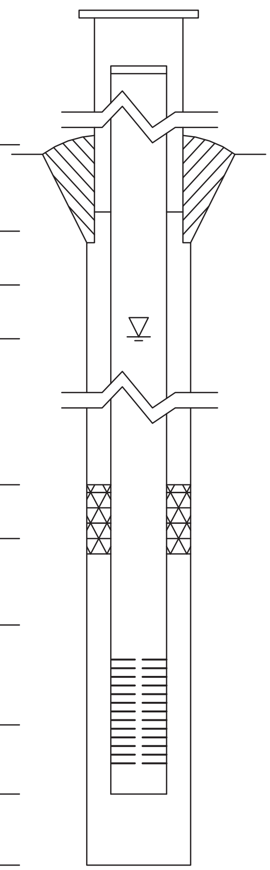
Type of Sand Pack: Quartz sand

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.)
614.62	-3.11	Top of Protective Casing
614.30	-2.79	Top of Riser Pipe
611.51	0.00	Ground Surface
611.11	0.40	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
606.51	5.00	Top of Sand Pack
605.21	6.30	Top of Screen
600.40	11.11	Bottom of Screen
600.05	11.46	Bottom of Well
599.51	12.00	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)	9.09
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.81
Total Length of Casing	(feet)	14.25
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: Montgomery Well #: G314

Site Name: Coffeen Part 845 Groundwater Borehole #: G314

State Plane Coordinate: X 2,516,852.1 Y 871,630.2 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Holcomb Foundation Engineering Co. Driller: Steve

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/26/2021 Date Finished: 2/26/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: 1 hour

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

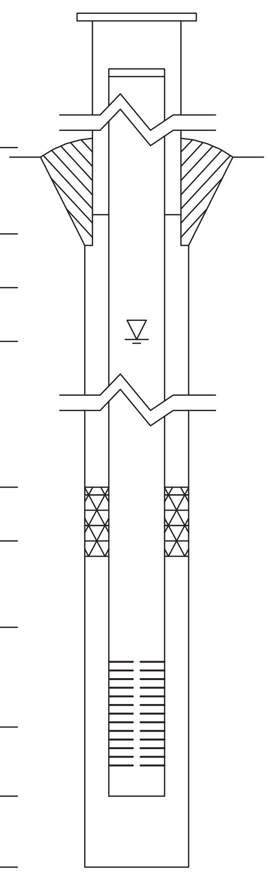
Type of Sand Pack: Quartz sand

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.)
614.28	-3.17	Top of Protective Casing
613.88	-2.77	Top of Riser Pipe
611.11	0.00	Ground Surface
609.11	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
597.61	13.50	Top of Sand Pack
596.55	14.56	Top of Screen
591.53	19.58	Bottom of Screen
591.09	20.02	Bottom of Well
591.06	20.05	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)	17.30
Bottom of Screen to End Cap	(feet)	0.47
Screen Length (1st slot to last slot)	(feet)	5.02
Total Length of Casing	(feet)	22.79
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: Montgomery Well #: G314D

Site Name: Coffeen Part 845 Groundwater Borehole #: G314D

State Plane Coordinate: X 2,516,853.9 Y 871,642.0 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

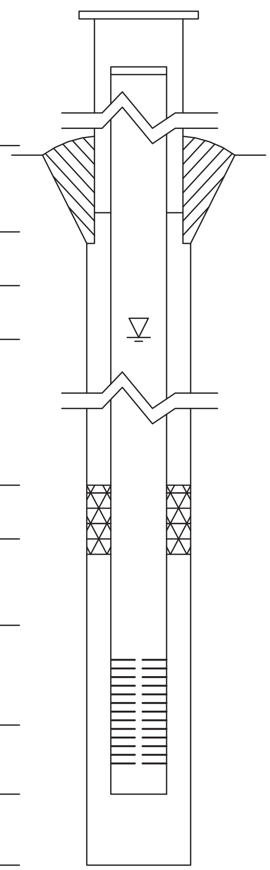
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/10/2021 Date Finished: 2/12/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
614.10	-3.23	Top of Protective Casing
613.70	-2.83	Top of Riser Pipe
610.87	0.00	Ground Surface
608.87	2.00	Top of Annular Sealant
		Static Water Level (After Completion)
574.07	36.80	Top of Seal
572.97	37.90	Top of Sand Pack
571.53	39.34	Top of Screen
561.76	49.11	Bottom of Screen
561.40	49.47	Bottom of Well
510.57	100.30	Bottom of Borehole

* Referenced to a National Geodetic Datum

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hours

Type of Bentonite Seal -- Granular (circled) 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: N/A (if applicable)

Installation Method: ____

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)	42.17
Bottom of Screen to End Cap	(feet)	0.36
Screen Length (1st slot to last slot)	(feet)	9.77
Total Length of Casing	(feet)	52.30
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: Montgomery Well #: G315

Site Name: Coffeen Part 845 Groundwater Borehole #: G315

State Plane Coordinate: X 2,516,086.6 Y 871,385.0 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/13/2021 Date Finished: 1/13/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

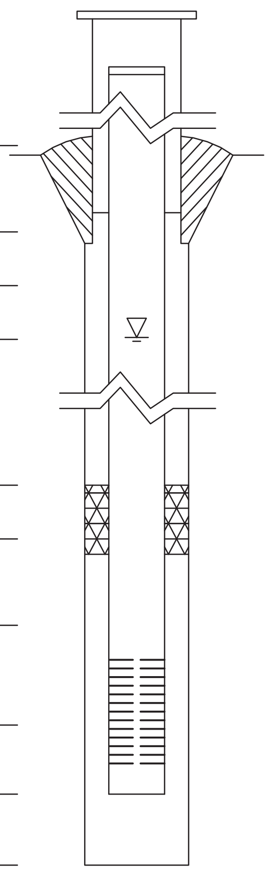
Type of Sand Pack: Quartz sand

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.)
623.89	-2.95	Top of Protective Casing
623.52	-2.58	Top of Riser Pipe
620.94	0.00	Ground Surface
620.54	0.40	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
612.64	8.30	Top of Sand Pack
611.25	9.69	Top of Screen
606.46	14.48	Bottom of Screen
606.09	14.85	Bottom of Well
605.04	15.90	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)	12.27
Bottom of Screen to End Cap	(feet)	0.37
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	17.43
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: Montgomery Well #: G316

Site Name: Coffeen Part 845 Groundwater Borehole #: G316

State Plane Coordinate: X 2,517,211.6 Y 871,643.1 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

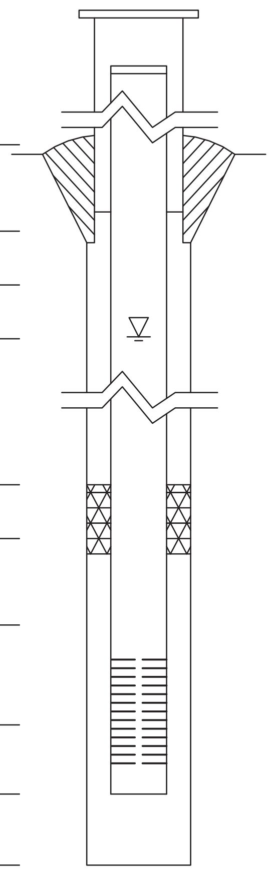
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/14/2021 Date Finished: 1/14/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

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.)
603.06	-3.42	Top of Protective Casing
602.59	-2.95	Top of Riser Pipe
599.64	0.00	Ground Surface
598.84	0.80	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
590.64	9.00	Top of Sand Pack
589.62	10.02	Top of Screen
584.82	14.82	Bottom of Screen
584.48	15.16	Bottom of Well
583.89	15.75	Bottom of Borehole

* Referenced to a National Geodetic Datum

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:

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)	12.97
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	4.80
Total Length of Casing	(feet)	18.11
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency — Well Completion Report

Site #: ______ County: Montgomery Well #: G317

Site Name: Coffeen Part 845 Groundwater Borehole #: G317

State Plane Coordinate: X 2,517,087.4 Y 871,234.2 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

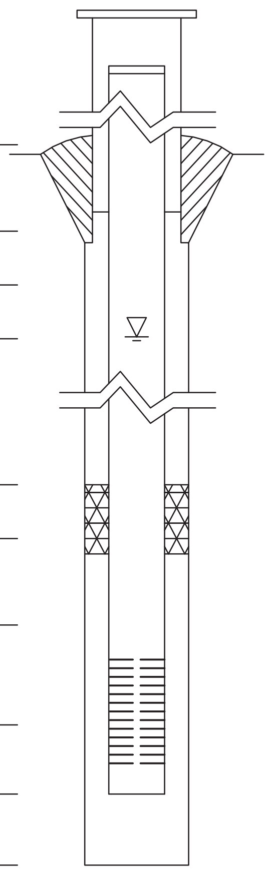
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/13/2021 Date Finished: 1/14/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS



Elevations (MSL)*	Depths (BGS)	(0.01 ft.)
642.26	-3.41	Top of Protective Casing
641.93	-3.08	Top of Riser Pipe
638.85	0.00	Ground Surface
638.05	0.80	Top of Annular Sealant
		Static Water Level (After Completion)
612.55	26.30	Top of Seal
609.75	29.10	Top of Sand Pack
608.71	30.14	Top of Screen
603.92	34.93	Bottom of Screen
603.57	35.28	Bottom of Well
602.85	36.00	Bottom of Borehole

* Referenced to a National Geodetic Datum

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): Granular

Installation Method: Gravity

Setting Time: 24 hours

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: ______

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)	33.22
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	38.36
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Illinois Environmental Protection Agency

Well Completion Report

Site #: ______ County: Montgomery Well #: XPW01

Site Name: Coffeen Part 845 Groundwater Borehole #: XPW01

State Plane Coordinate: X 2,515,366.3 Y 871,638.7 (or) Latitude: ______ Longitude: ______

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

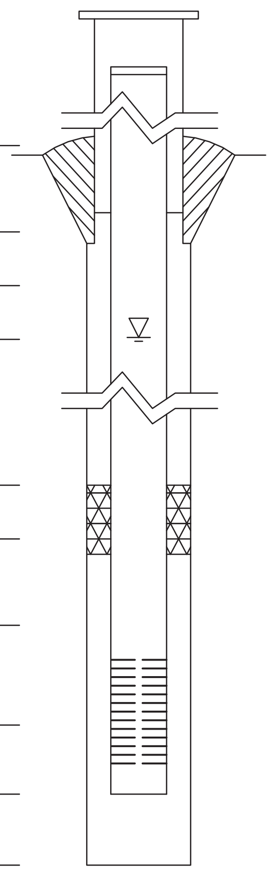
Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/8/2021 Date Finished: 2/8/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS



Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

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.)
634.92	-3.07	Top of Protective Casing
634.57	-2.72	Top of Riser Pipe
631.85	0.00	Ground Surface
631.15	0.70	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
624.85	7.00	Top of Sand Pack
623.64	8.21	Top of Screen
618.87	12.98	Bottom of Screen
618.49	13.36	Bottom of Well
617.85	14.00	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)	10.93
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	16.08
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: Montgomery Well #: XPW02

Site Name: Coffeen Part 845 Groundwater Borehole #: XPW02

State Plane Coordinate: X 2,515,627.3 Y 871,987.1 (or) Latitude: ____ ____ ____ Longitude: ____ ____ ____

Surveyed By: Kyle J. Nolan IL Registration #: 035-003919

Drilling Contractor: Roberts Env. Drilling Inc. Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 2/8/2021 Date Finished: 2/8/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

ANNULAR SPACE DETAILS

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ____________

Setting Time: ____________

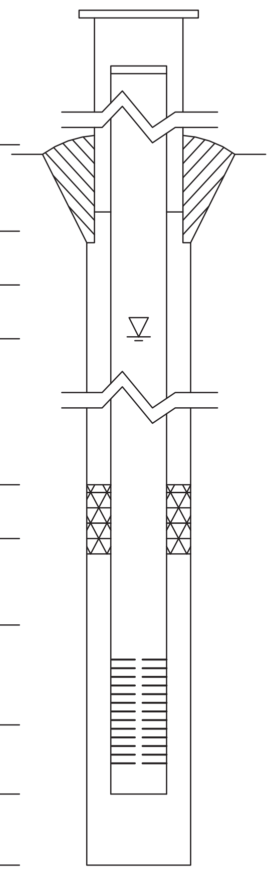
Type of Sand Pack: Quartz sand

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.)
640.02	-3.38	Top of Protective Casing
639.69	-3.05	Top of Riser Pipe
636.64	0.00	Ground Surface
636.04	0.60	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
629.64	7.00	Top of Sand Pack
628.59	8.05	Top of Screen
618.79	17.85	Bottom of Screen
618.44	18.20	Bottom of Well
618.44	18.20	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)	11.10
Bottom of Screen to End Cap	(feet)	0.35
Screen Length (1st slot to last slot)	(feet)	9.80
Total Length of Casing	(feet)	21.25
Screen Slot Size **	(inches)	0.010

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:

**Hand-Slotted Well Screens Are Unacceptable

Depi t pn Wi CpUt i Nl i me AUt mhLmpt i v Sli LT — h lægt Nrdmpti PlrtUm

Site #: ______ County: Montgomery Well #: G275D

Site Name: Coffeen Part 845 Groundwater Borehole #: G275D

State Plane Coordinate: X 2,516,366.5 Y 874,285.3 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski IL Registration #: 035-003919

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/28/2021 Date Finished: 2/3/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

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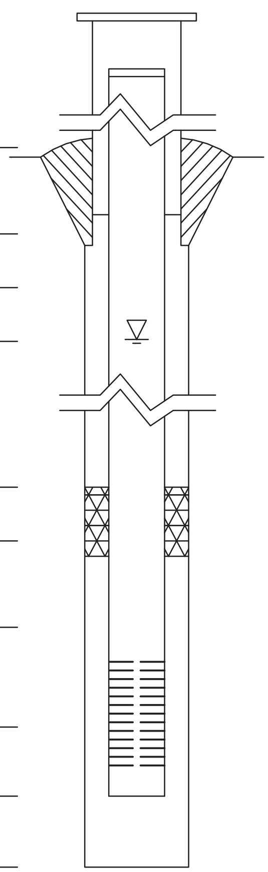

Type of Surface Seal: Concrete

Type of Annular Sealant: High-solids bentonite

Installation Method: Tremie

Setting Time: >24 hours

Type of Bentonite Seal -- Granular (selected) / 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: N/A (if applicable)

Installation Method: ______

Well Completion Elevations (MSL)*	Depths (BGS) (0.01 ft.)	
620.69	-3.17	Top of Protective Casing
620.31	-2.79	Top of Riser Pipe
617.52	0.00	Ground Surface
617.02	0.50	Top of Annular Sealant
		Static Water Level (After Completion)
572.02	45.50	Top of Seal
571.02	46.50	Top of Sand Pack
567.76	49.76	Top of Screen
557.97	59.55	Bottom of Screen
557.63	59.89	Bottom of Well
517.82	99.70	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)	52.55
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	9.79
Total Length of Casing	(feet)	62.68
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 (selected)
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:

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Site #: ______ County: Montgomery Well #: G206D

Site Name: Coffeen Part 845 Groundwater Borehole #: G282D

State Plane Coordinate: X 2,514,684.6 Y 875,111.4 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski IL Registration #: 035-003919

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/25/2021 Date Finished: 1/25/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

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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: 15 hours

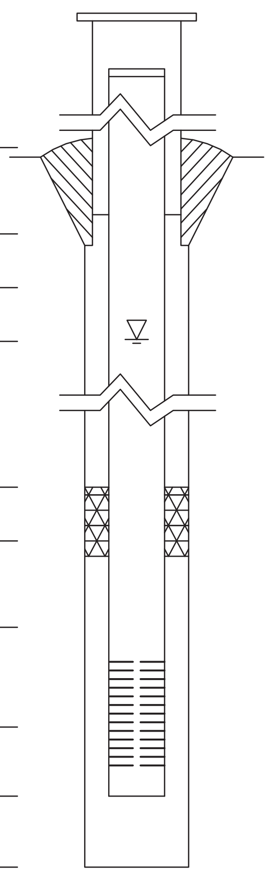
Type of Sand Pack: Quartz sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Wel Comptin (MSL)*	Rlr mEn (BGS)	(0.01 ft.)
634.35	-2.94	Top of Protective Casing
634.14	-2.73	Top of Riser Pipe
631.41	0.00	Ground Surface
631.11	0.30	Top of Annular Sealant
		Static Water Level (After Completion)
585.81	45.60	Top of Seal
583.41	48.00	Top of Sand Pack
582.21	49.20	Top of Screen
572.41	59.00	Bottom of Screen
572.02	59.39	Bottom of Well
571.41	60.00	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)	51.93
Bottom of Screen to End Cap	(feet)	0.39
Screen Length (1st slot to last slot)	(feet)	9.77
Total Length of Casing	(feet)	62.09
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:

Dcepi t pn Wi CpUt i Nli me AUtmhLnpti v Sli LT   h lœgt Nrdmpti PlrtUm

Site #: ______ County: Montgomery Well #: G283

Site Name: Coffeen Part 845 Groundwater Borehole #: G283

State Plane Coordinate: X 2,516,503.0 Y 874,113.0 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski IL Registration #: 035-003919

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/18/2021 Date Finished: 1/18/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

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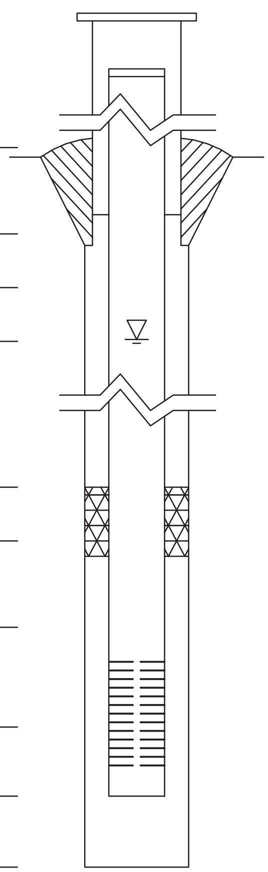


Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

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: ______

WelCompti n (MSL)*	RlrmEn (BGS)	(0.01 ft.)
611.07	-2.77	Top of Protective Casing
610.75	-2.45	Top of Riser Pipe
608.30	0.00	Ground Surface
607.70	0.60	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
600.80	7.50	Top of Sand Pack
599.91	8.39	Top of Screen
590.13	18.17	Bottom of Screen
589.94	18.36	Bottom of Well
589.94	18.36	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)	10.84
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	9.78
Total Length of Casing	(feet)	21.00
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:

Depi t pn Wi CpUt i Nli me AUtmhLmpt i v Sli LT   h læg t Nrdmpt i Plrt Um

Site #: ______   County: Montgomery   Well #: G284

Site Name: Coffeen Part 845 Groundwater   Borehole #: G284

State Plane Coordinate: X 2,516,922.9 Y 874,423.6 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski   IL Registration #: 035-003919

Drilling Contractor: Roberts   Driller: Matt

Consulting Firm: Hanson Professional Services Inc.   Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger   Drilling Fluid (Type): None

Logged By: Colin Winter   Date Started: 1/20/2021   Date Finished: 1/20/2021

Report Form Completed By: Colin Winter   Date: 5/3/2021

v a a s I v P c Av g WRWy v Il c

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

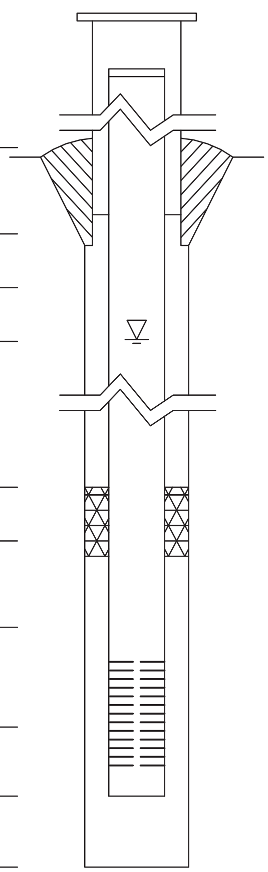
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Wel Compt i n (MSL)*	Rl r mEn (BGS)	(0.01 ft.)
618.66	-3.33	Top of Protective Casing
618.42	-3.09	Top of Riser Pipe
615.33	0.00	Ground Surface
614.33	1.00	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
608.33	7.00	Top of Sand Pack
607.25	8.08	Top of Screen
602.48	12.85	Bottom of Screen
602.10	13.23	Bottom of Well
601.33	14.00	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)	11.17
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	4.77
Total Length of Casing	(feet)	16.32
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:

Depi t pn Wi CpUt i Nli me AUt m hLmpt i v Sli LT — h lægt Nr dmpt i Pl rt Um

Site #: ______ County: Montgomery Well #: G285

Site Name: Coffeen Part 845 Groundwater Borehole #: G285

State Plane Coordinate: X 2,516,680.4 Y 874,795.0 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/19/2021 Date Finished: 1/19/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

v a a s I v P c Av g WRWy v I I c

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

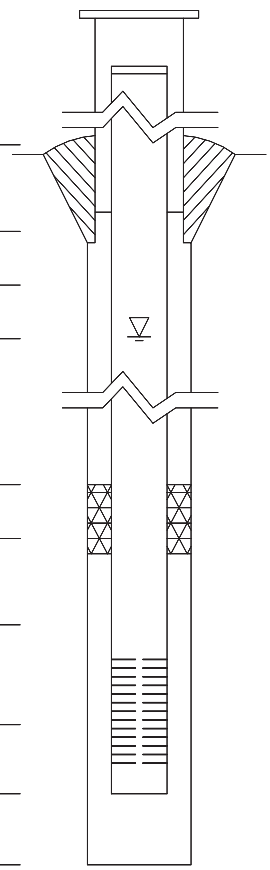
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



We l Co mpt i n (MSL)*	Rl r m En (BGS)	(0.01 ft.)
613.90	-3.36	Top of Protective Casing
613.52	-2.98	Top of Riser Pipe
610.54	0.00	Ground Surface
610.24	0.30	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
598.24	12.30	Top of Sand Pack
596.86	13.68	Top of Screen
587.09	23.45	Bottom of Screen
586.71	23.83	Bottom of Well
584.54	26.00	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)	16.66
Bottom of Screen to End Cap	(feet)	0.38
Screen Length (1st slot to last slot)	(feet)	9.77
Total Length of Casing	(feet)	26.81
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:

Deeitpn Wi CpUti Nlime AUtmhLmpti v Sli LT h lœgt Nrdmpti PlrtUm

Site #: ______ County: Montgomery Well #: G286

Site Name: Coffeen Part 845 Groundwater Borehole #: G286

State Plane Coordinate: X 2,516,561.8 Y 875,072.2 (or) Latitude: ______ ______ ______ Longitude: ______ ______ ______

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/19/2021 Date Finished: 1/19/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

vaasIvPcAvgWRWyvDIc

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

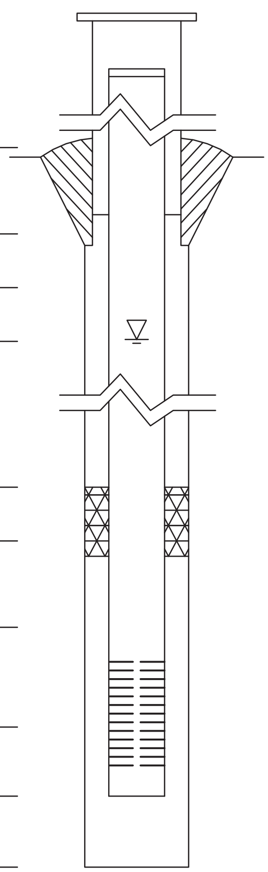
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Wel Comptin (MSL)*	Rlrm En (BGS)	(0.01 ft.)
613.57	-3.60	Top of Protective Casing
613.13	-3.16	Top of Riser Pipe
609.97	0.00	Ground Surface
609.47	0.50	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
607.27	2.70	Top of Sand Pack
606.60	3.37	Top of Screen
601.81	8.16	Bottom of Screen
601.47	8.50	Bottom of Well
599.97	10.00	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)	6.53
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	4.79
Total Length of Casing	(feet)	11.66
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:

Deqi t pn Wi CpUti Nlime AUtmhLnpti v Sli LT   h leegt Nrdmpti PlrtUm

Site #: ______ County: Montgomery Well #: G287

Site Name: Coffeen Part 845 Groundwater Borehole #: G287

State Plane Coordinate: X 2,516,415.5 Y 875,442.8 (or) Latitude: ______ Longitude: ______

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/18/2021 Date Finished: 1/18/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

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vaasIvPcAvgWRWyvDIc

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

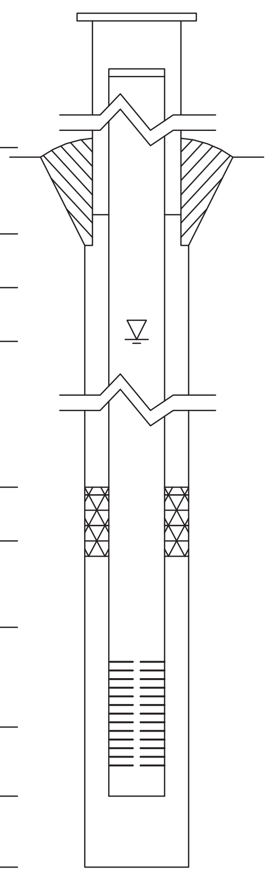
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Wel Comptin (MSL)*	RlrmEn (BGS)	(0.01 ft.)
617.88	-3.54	Top of Protective Casing
617.45	-3.11	Top of Riser Pipe
614.34	0.00	Ground Surface
613.74	0.60	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
609.84	4.50	Top of Sand Pack
608.91	5.43	Top of Screen
604.09	10.25	Bottom of Screen
603.75	10.59	Bottom of Well
602.54	11.80	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)	8.54
Bottom of Screen to End Cap	(feet)	0.34
Screen Length (1st slot to last slot)	(feet)	4.82
Total Length of Casing	(feet)	13.70
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:

Dœpi tpm Wi CplUt i Nlime AUt mhLmpti v Sli LT **h lœgt Nrdmpti Plrt Um**

Site #: ________________ County: Montgomery Well #: G288

Site Name: Coffeen Part 845 Groundwater Borehole #: G288

State Plane Coordinate: X 2,517,071.4 Y 875,279.6 (or) Latitude: ______ ______ ______ Longitude: ______ ______ ______

Surveyed By: Michael J. Graminski IL Registration #: 035-002901

Drilling Contractor: Roberts Driller: Matt

Consulting Firm: Hanson Professional Services Inc. Geologist: Rhonald W. Hasenyager, LPG #196-000246

Drilling Method: Hollow stem auger Drilling Fluid (Type): None

Logged By: Colin Winter Date Started: 1/21/2021 Date Finished: 1/21/2021

Report Form Completed By: Colin Winter Date: 5/3/2021

v a a s I v P c Av g WRWy v DI c

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite chips

Installation Method: Gravity

Setting Time: >24 hours

Type of Bentonite Seal -- Granular Pellet Slurry (choose one)

Installation Method: ______

Setting Time: ______

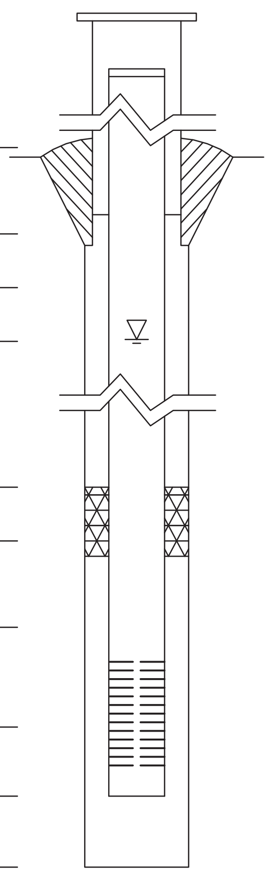
Type of Sand Pack: Quartz Sand

Grain Size: 10-20 (sieve size)

Installation Method: Gravity

Type of Backfill Material: N/A (if applicable)

Installation Method: ______



Wel Complti n (MSL)*	**Rl r mEn** (BGS)	(0.01 ft.)
620.37	-3.29	Top of Protective Casing
620.07	-2.99	Top of Riser Pipe
617.08	0.00	Ground Surface
616.78	0.30	Top of Annular Sealant
		Static Water Level (After Completion)
n/a	n/a	Top of Seal
611.08	6.00	Top of Sand Pack
609.49	7.59	Top of Screen
604.82	12.26	Bottom of Screen
604.33	12.75	Bottom of Well
603.08	14.00	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)	10.58
Bottom of Screen to End Cap	(feet)	0.49
Screen Length (1st slot to last slot)	(feet)	4.67
Total Length of Casing	(feet)	15.74
Screen Slot Size **	(inches)	0.010

**Hand-Slotted Well Screens Are Unacceptable

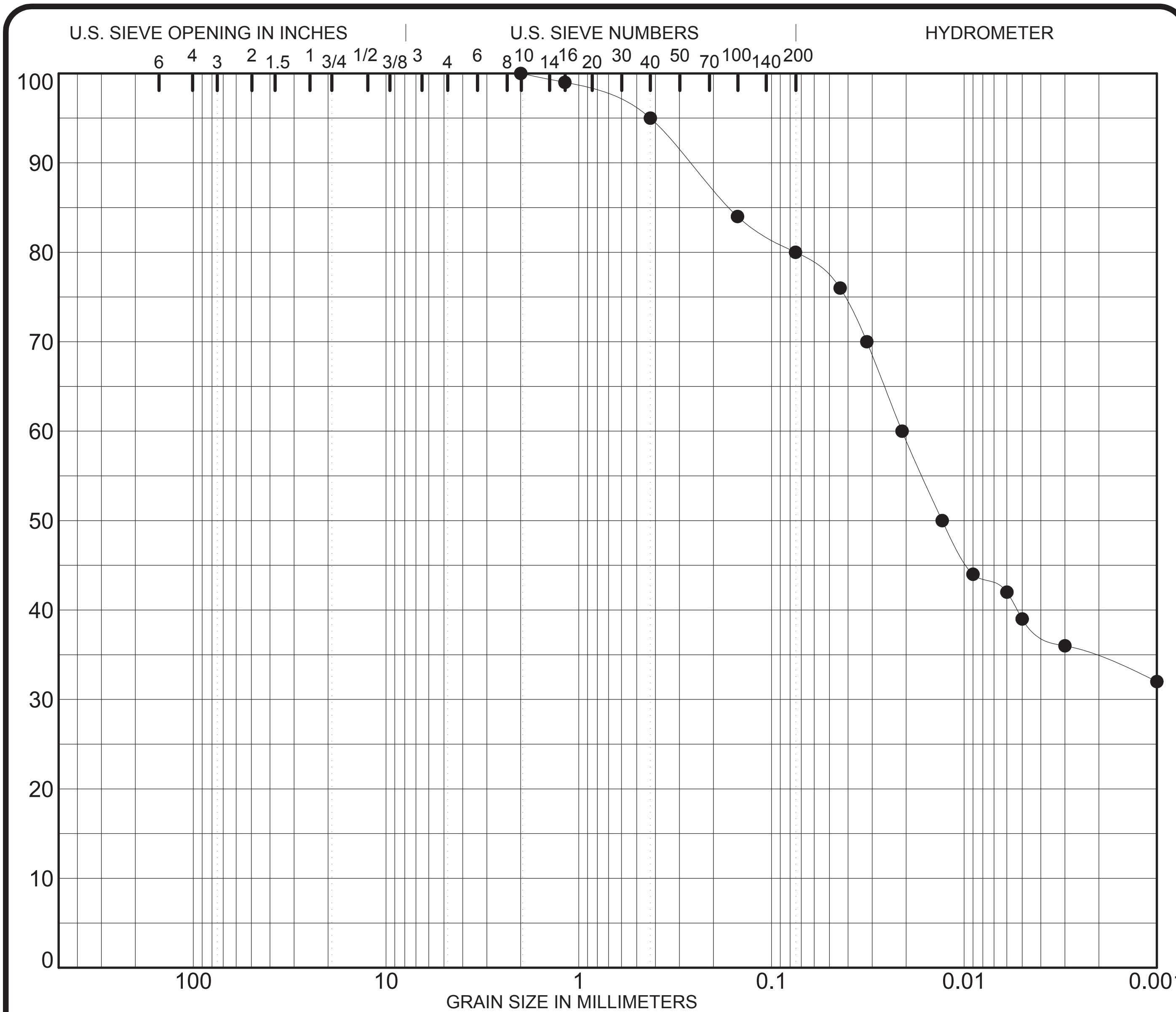
WELL CONSTRUCTION MATERIALS
(Choose one type of material for each area)

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:

Well Completion Form (revised 02/06/02)

APPENDIX D
GEOTECHNICAL LABORATORY REPORTS

RAMSEY GEOTECHNICAL REPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION			
G282D/Comp1	3/8	100.0	Lean Clay, with sand			
Identified as G206D	#4	100.0				
	#8	100.0				
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY
NOTES:	# 16	99.0	0	20	46	34
Specific Gravity - 2.60	# 30					
	# 40	95.0	MC%	γdry (pcf)	LL	PL	PI
	# 50		20.5	105.3	42	18	24
	# 80					
	# 100	84.0	Density/Moisture Relationship: Standard			
	# 200	80.0	Max PCF		Opt. WC%	

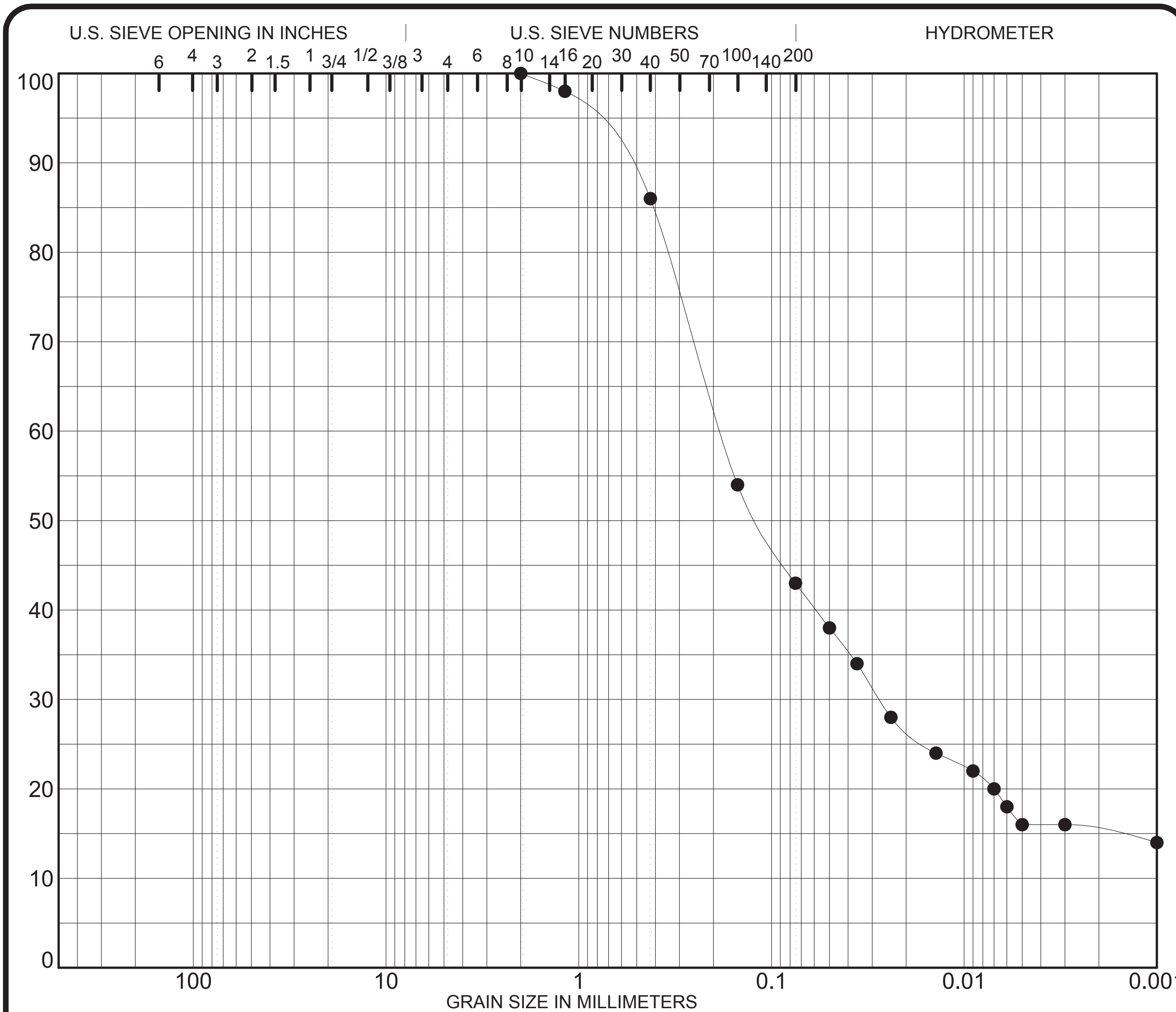
PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**
DATE March 18, 2021

G282D/Comp1

SOIL DATA SHEET

Ramsey Geotechnical Engineering
Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G282D/Comp2	3/8	100.0	Clayey Fine to Medium Sand				
Identified as G206D	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
NOTES:	# 16	98.0	0	57	28	15	
Specific Gravity - 2.56	# 30						
	# 40	86.0	MC%	γdry (pcf)	LL	PL	PI
	# 50		10.1	117.4	22	15	7
	# 80						
	# 100	54.0	Density/Moisture Relationship: Standard				
	# 200	43.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

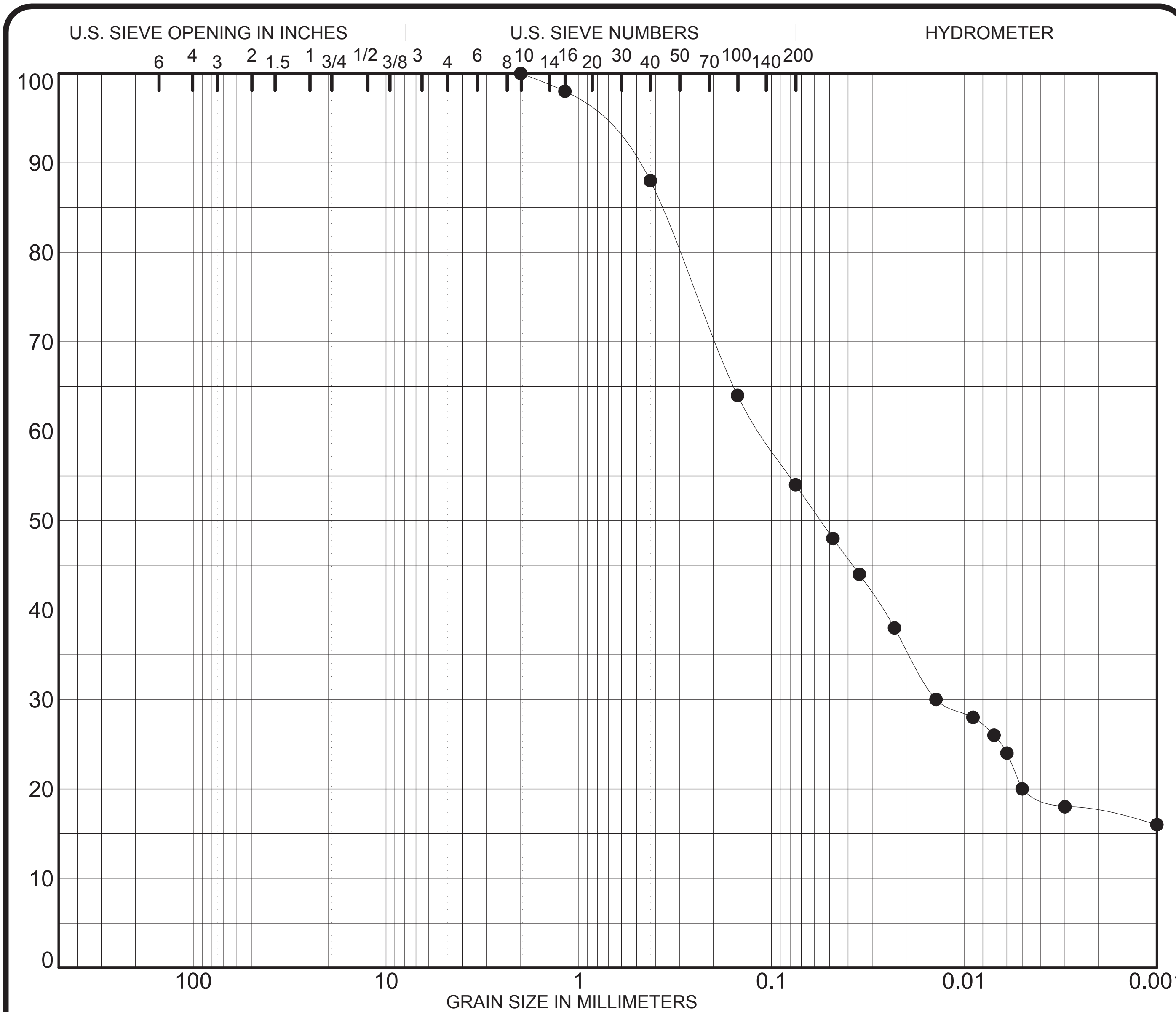
DATE March 18, 2021

G282D/Comp2

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION			
G282D/Comp3	3/8	100.0	Sandy Lean Clay			
Identified as G206D	#4	100.0				
	#8	100.0				
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY
NOTES:	# 16	98.0	0	46	37	17
Specific Gravity - 2.56	# 30					

	SIEVE	% PASS	MC%	γdry (pcf)	LL	PL	PI
	# 40	88.0	8.3	131.4	21	13	8
	# 50						
	# 80						
	# 100	64.0	Density/Moisture Relationship: Standard				
	# 200	54.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

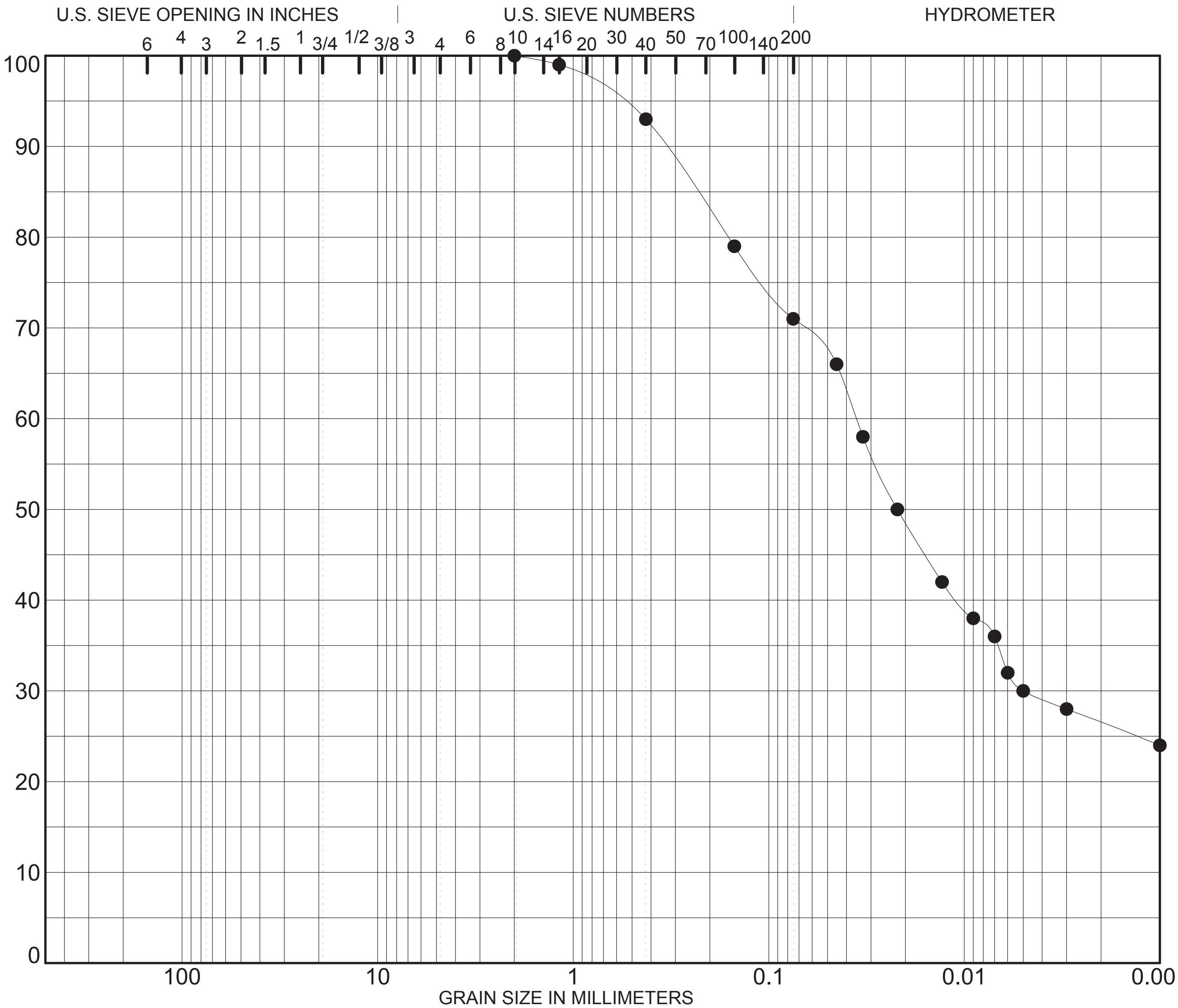
DATE March 18, 2021

G282D/Comp3

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G282D/Comp4	3/8	100.0	Lean Clay, with sand				
Identified as G206D	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
NOTES:	# 16	99.0	0	29	46	26	
Specific Gravity - 2.62	# 30						
	# 40	93.0	MC%	γdry (pcf)	LL	PL	PI
	# 50		13.4	120.6	29	14	15
	# 80						
	# 100	79.0	Density/Moisture Relationship: Standard				
	# 200	71.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

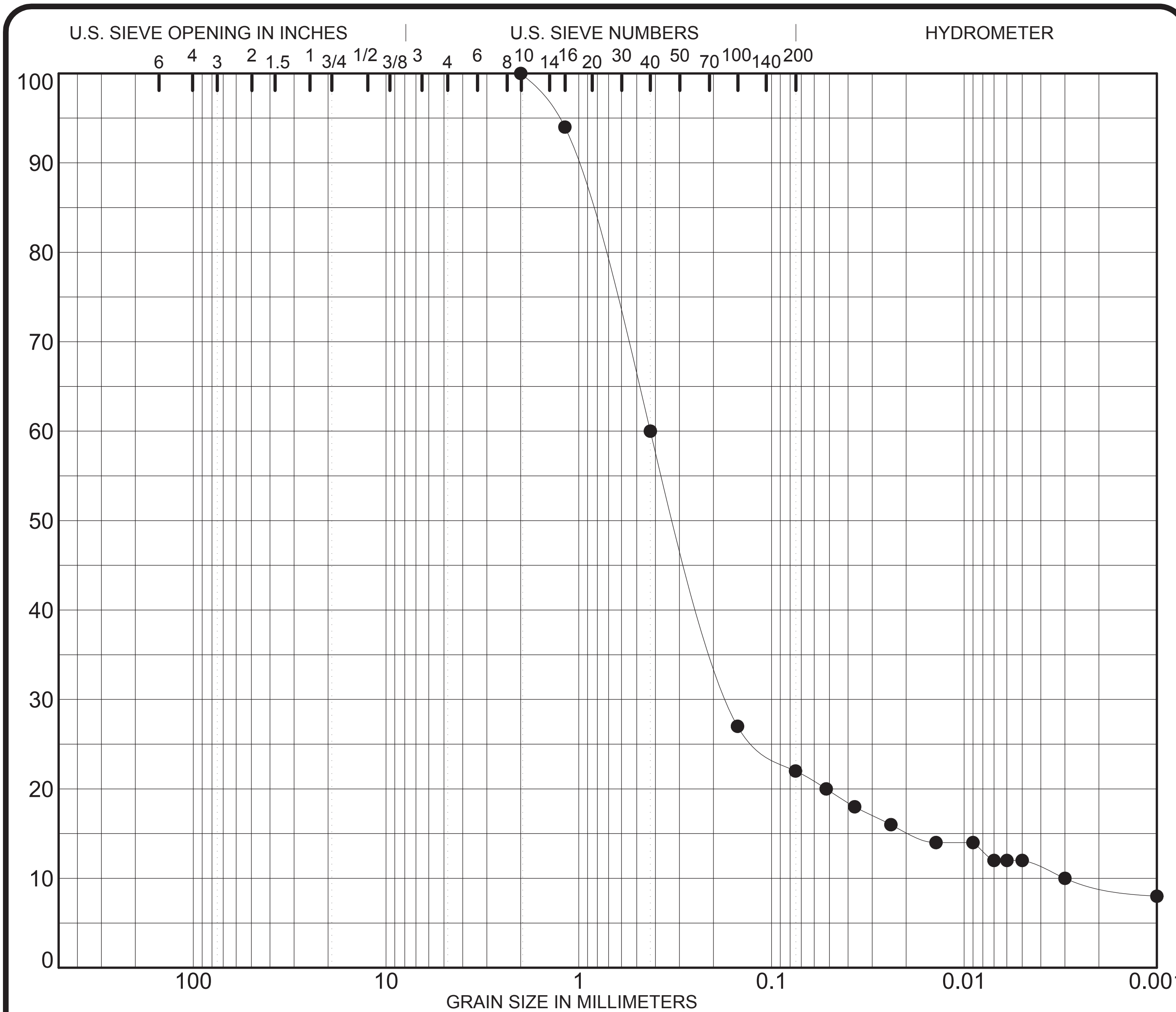
DATE March 18, 2021

G282D/Comp4

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION			
G282D/Comp5	3/8	100.0	Silty Fine to Medium Sand			
Identified as G206D	#4	100.0				
	#8	100.0				
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY
NOTES:	# 16	94.0	0	78	13	9
Specific Gravity - 2.75	# 30					

SIEVE	% PASS	MC%	γdry (pcf)	LL	PL	PI
# 40	60.0	14.9		18	12	6
# 50						
# 80						
# 100	27.0	Density/Moisture Relationship: Standard				
# 200	22.0	Max PCF		Opt. WC%		

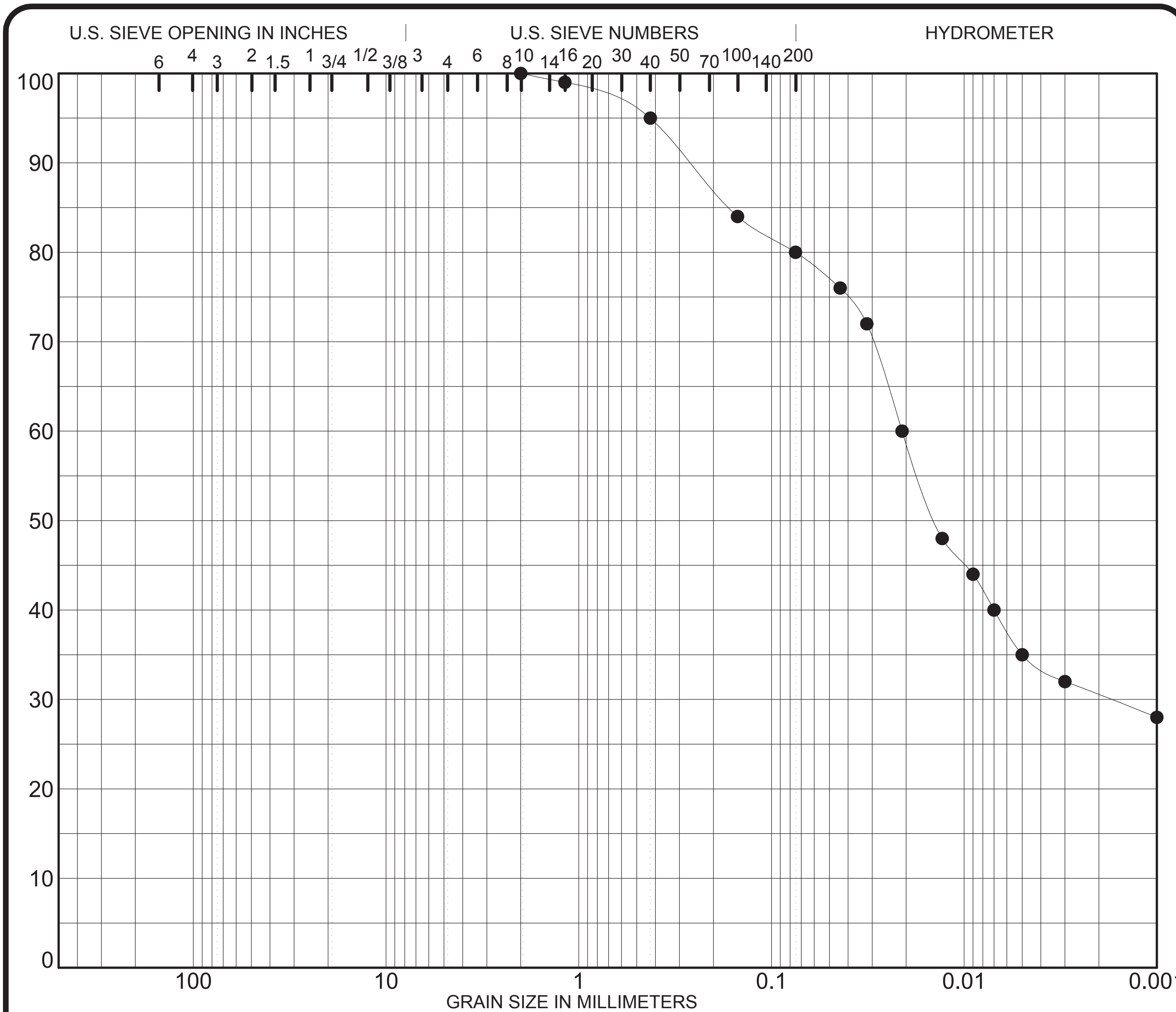
PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**
DATE March 18, 2021

G282D/Comp5

SOIL DATA SHEET

Ramsey Geotechnical Engineering
Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION
G289D/Comp1	3/8	100.0	Lean Clay, with sand
Identified as SB289	#4	100.0	
	#8	100.0	
	#10	100.0	%GRAVEL: 0, %SAND: 20, %SILT: 50, %CLAY: 30
NOTES:	# 16	99.0	
Specific Gravity - 2.56	# 30		
	# 40	95.0	MC%: 21.2, γdry (pcf): 103.4, LL: 40, PL: 18, PI: 22
	# 50		
	# 80		
	# 100	84.0	Density/Moisture Relationship: Standard
	# 200	80.0	Max PCF / Opt. WC%

%GRAVEL	%SAND	%SILT	%CLAY
0	20	50	30

MC%	γdry (pcf)	LL	PL	PI
21.2	103.4	40	18	22

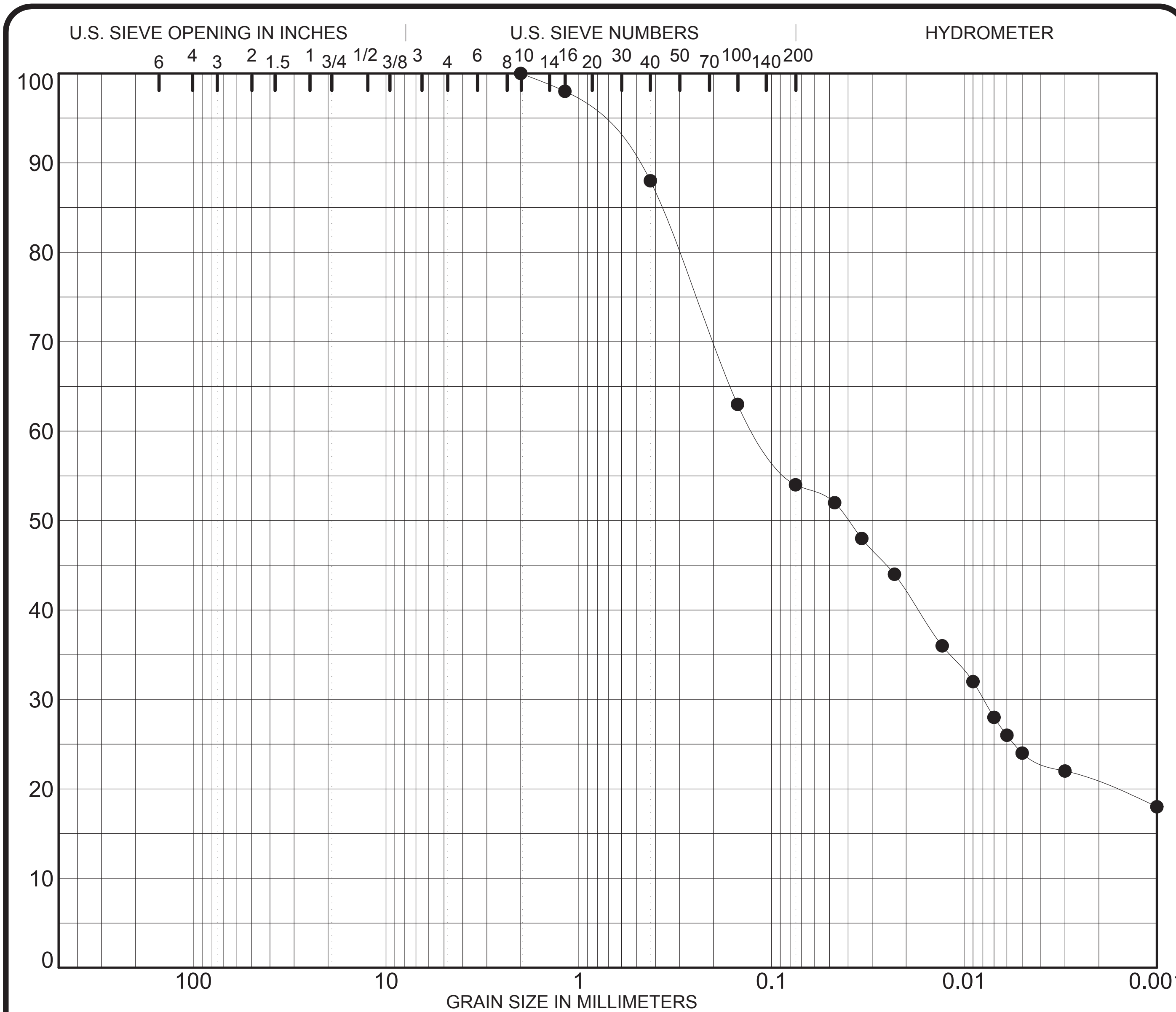
PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**
DATE March 22, 2021

G289D/Comp1

SOIL DATA SHEET

Ramsey Geotechnical Engineering
Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION
G289D/Comp2	3/8	100.0	Sandy Lean Clay
Identified as SB289	#4	100.0	
	#8	100.0	
	#10	100.0	%GRAVEL 0 / %SAND 46 / %SILT 34 / %CLAY 20
NOTES:	# 16	98.0	
Specific Gravity - 2.60	# 30		
	# 40	88.0	MC% 16.6 / γdry (pcf) 112.6 / LL 23 / PL 14 / PI 9
	# 50		
	# 80		
	# 100	63.0	Density/Moisture Relationship: Standard
	# 200	54.0	Max PCF / Opt. WC%

%GRAVEL	%SAND	%SILT	%CLAY
0	46	34	20

MC%	γdry (pcf)	LL	PL	PI
16.6	112.6	23	14	9

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

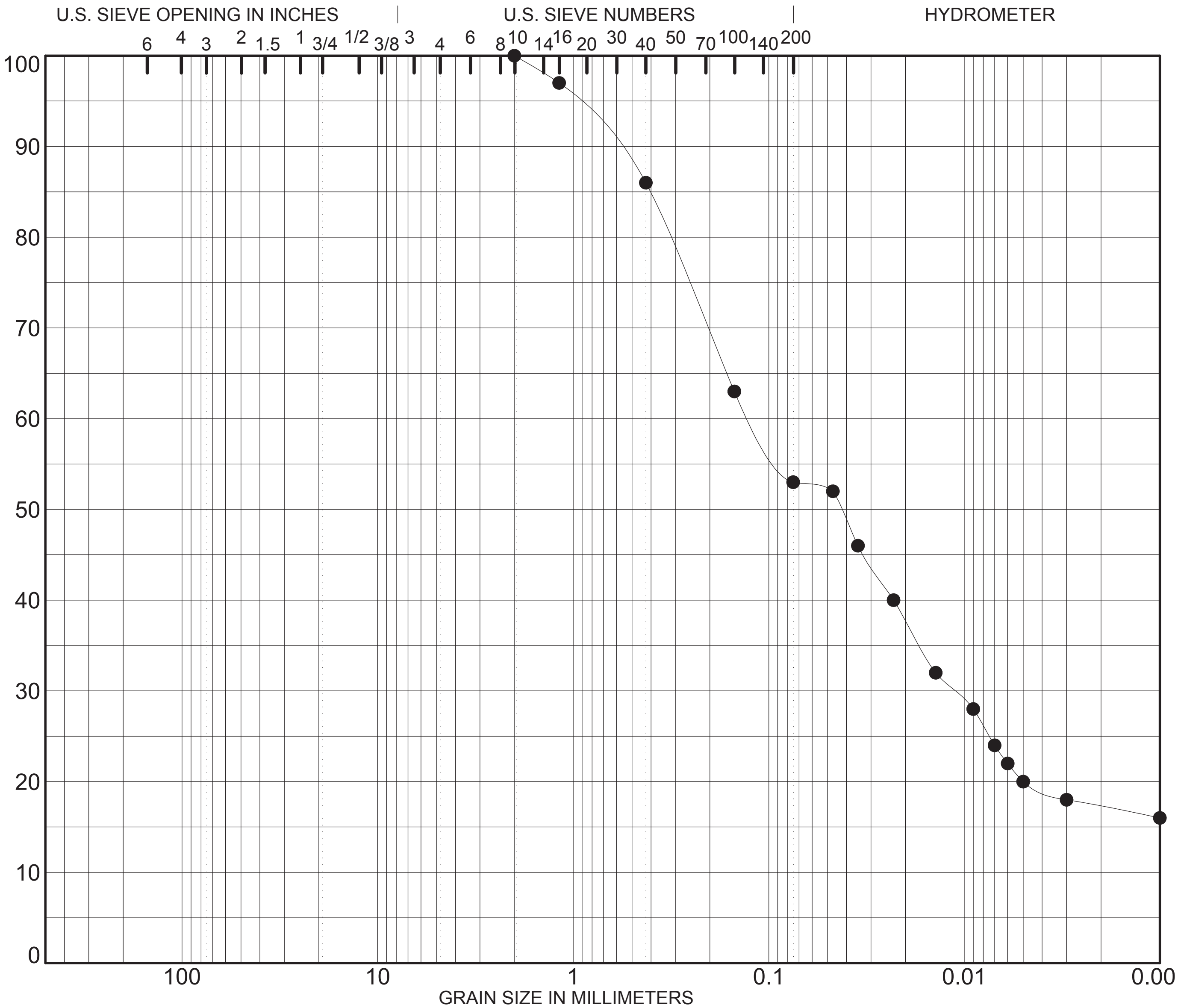
DATE March 22, 2021

G289D/Comp2

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION				
G289D/Comp3	3/8	100.0	Sandy Silt				
Identified as SB289	#4	100.0					
	#8	100.0					
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY	
NOTES:	# 16	97.0	0	47	36	17	
Specific Gravity - 2.64	# 30						
	# 40	86.0	MC%	γdry (pcf)	LL	PL	PI
	# 50		8.9	132.7	19	12	7
	# 80						
	# 100	63.0	Density/Moisture Relationship: Standard				
	# 200	53.0	Max PCF		Opt. WC%		

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

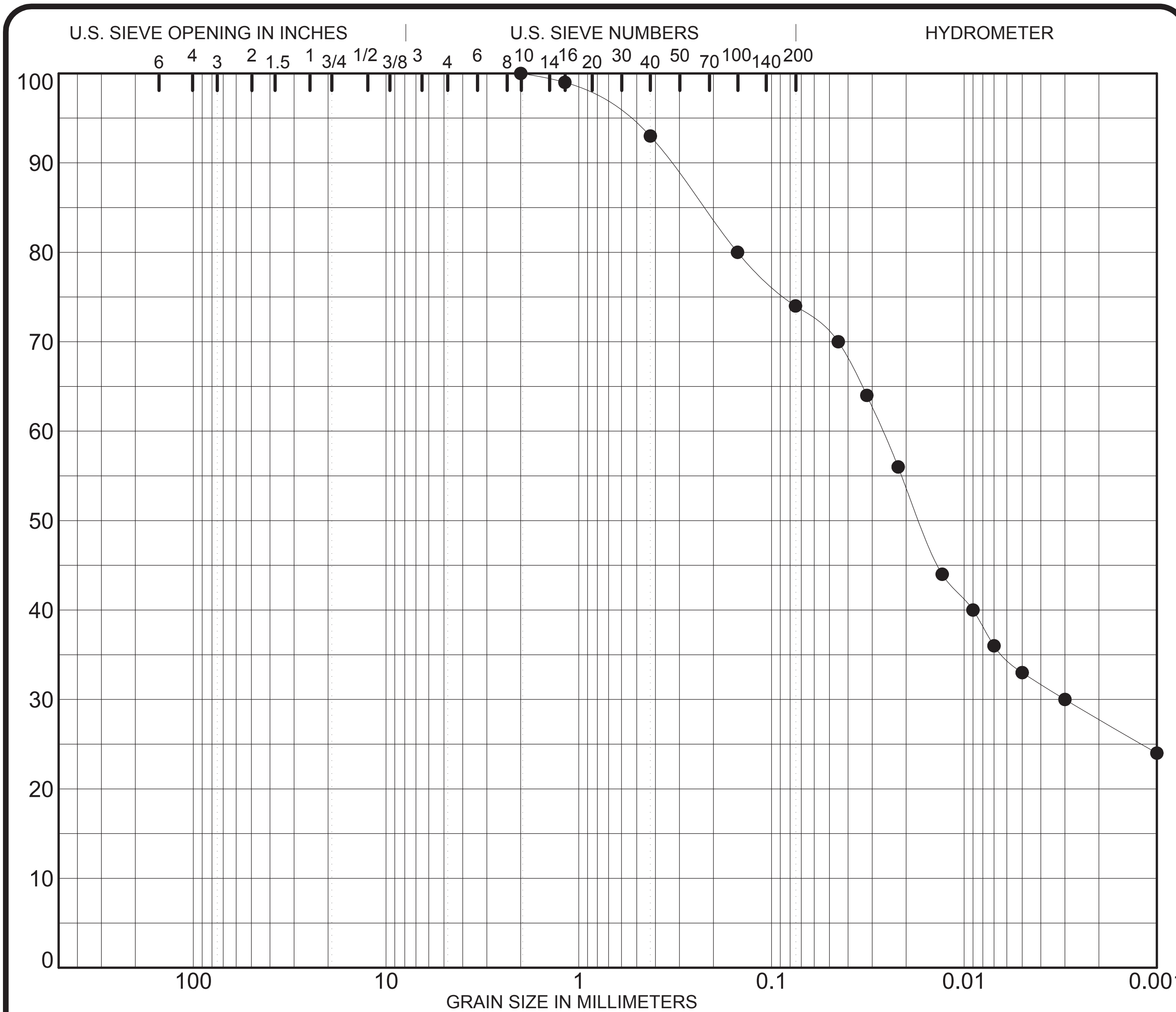
DATE March 22, 2021

G289D/Comp3

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION
G289D/Comp4	3/8	100.0	Lean Clay, with sand
Identified as SB289	#4	100.0	
	#8	100.0	
	#10	100.0	%GRAVEL: 0 / %SAND: 26 / %SILT: 47 / %CLAY: 27
NOTES:	# 16	99.0	
Specific Gravity - 2.61	# 30		
	# 40	93.0	MC%: 14.9 / γdry (pcf): 116.6 / LL: 31 / PL: 15 / PI: 16
	# 50		
	# 80		
	# 100	80.0	Density/Moisture Relationship: Standard
	# 200	74.0	Max PCF / Opt. WC%

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

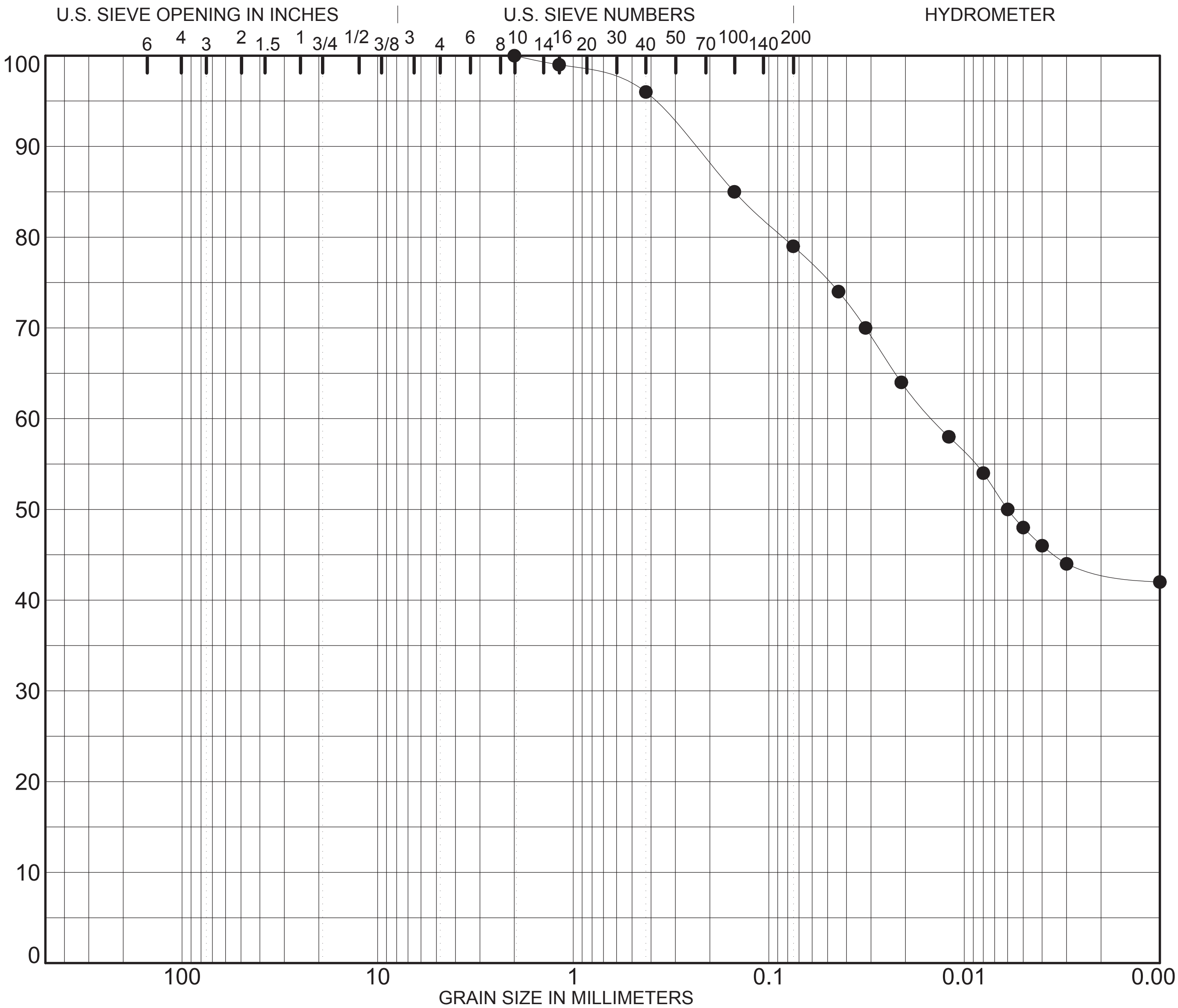
DATE March 22, 2021

G289D/Comp4

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	CLASSIFICATION			
G289D/Comp5	3/8	100.0	Lean Clay, with sand			
Identified as SB289	#4	100.0				
	#8	100.0				
	#10	100.0	%GRAVEL	%SAND	%SILT	%CLAY
NOTES:	# 16	99.0	0	21	36	43
Specific Gravity - 2.63	# 30					
	# 40	96.0				
	# 50					
	# 80					
	# 100	85.0	Density/Moisture Relationship: Standard			
	# 200	79.0	Max PCF		Opt. WC%	

MC%	γdry (pcf)	LL	PL	PI
25.0	98.4	48	18	30

PROJECT **Coffeen Gypsum Management Facility - Montgomery County, Illinois**

JOB NO. **21-055**

DATE March 22, 2021

G289D/Comp5

SOIL DATA SHEET

Ramsey Geotechnical Engineering

Bloomington, IL 61701

GEOTECHNOLOGY GEOTECHNICAL REPORT

Via email: **dramsey@ramgeoeng.com**

April 5, 2021 J037264.01.6002

Mr. Douglas P. Ramsey, P.E.
Ramsey Geotechnical Engineering
1701 W. Market Street
Bloomington, Illinois 61701

Re: Coffeen Gypsum Management
Montgomery County, Illinois

Dear Mr. Ramsey:

Included in this report are the test results from two Shelby tubes and one bulk sample of gypsum received in our laboratory on March 15, 2021. The samples were tested in general accordance with the test method listed below.

Test to Determine	Method of Test
Water (Moisture) Content of Soils	ASTM D2216
Description and Identification of Soils (Visual-Manual)	ASTM D2488
Hydraulic Conductivity of Soil Using Flexible Wall Permeameter	ASTM D5084
Density (Unit Weight) of Soil Specimens	ASTM D7263

We trust this is the information you require. Please contact the undersigned if you have any questions regarding this report.

Respectfully submitted,

GEOTECHNOLOGY, INC.

Janet M. May
Illinois Laboratory Manager

JMM/LPH:jmm

Attachment: Test Result Summary
Hydraulic Conductivity Test Data Sheets
Proctor Curve (Provided by Ramsey)
Shelby Tube Logs
Testing Assignment Sheets

TEST RESULT SUMMARY

Coffeen Power Station
Gypsum Management Facility
Montgomery County, Illinois

			ASTM D2216	ASTM D7263	ASTM D5084	
Boring Number	Sample Number	Depth, feet	Moisture Content, %	Dry Unit Weight, pcf	Hydraulic Conductivity, cm/sec	Range of Hydraulic Gradient
G275D	ST-7	12.0-14.0	15.8	115.9	1.6×10^{-4}	0 - 1.5
G289D	ST-5	8.0-10.0	20.2	105.9	1.1×10^{-8}	11.1 - 19.3

Sample Number/ Material	Optimum Moisture Content, %	Maximum Dry Unit Weight, pcf	Percent Compact	Moisture Content, %	Dry Unit Weight, pcf	Hydraulic Conductivity, cm/sec	Range of Hydraulic Gradient
LSN-3783 Gypsum	24.1	85.8	90.9	25.3	78.0	8.9×10^{-4}	0.2 - 2.0

			ASTM D2488
Boring Number	Sample Number	Depth, feet	Material Description
G275D	ST-7	12.0-14.0	Brown CLAYEY SAND, some gravel – SC
G289D	ST-5	8.0-10.0	Dark to very dark olive-brown, LEAN to FAT CLAY – CL/CH

Notes and abbreviations:
% - Percent
cm/sec - Centimeters per second
pcf - Pounds per cubic foot

Subcontract Agreement: RGE2014
Task Order No. 20E0111A/2000B

SCHEDULE OF LABORATORY TESTING

	QC: KLT 7/21/21	QC: KLT 7/21/21	Routine Testing [1]											Complex Testing [1]																Analytical Testing [1]						
Sample ID	Top Depth (Info taken from boring logs by Ramboll)	Bottom Depth (Info taken from boring logs by Ramboll)	Rimac Comp Strength	Visual-Manual Classification	Unified Classification	Moisture Content	Liquid / Plastic Limits	Particle Size < #200	Particle Size - Sieves	Particle Size - Sieves + Hyd	Standard Compaction	Modified Compaction	Bulk Density	Unconfined Comp Strength	Consolidation Test	Specific Gravity	UU Triaxial Comp Strength	CU Traxail Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkafe Factor	Soil Resistivity	IBR and IBV of Soils	CBR Test	Elastic Moduli - Rock	Uniaxial Comp Str - Rock	Corrosivity	pH	Chloride	Sulfate	Total Organic Content	Moisture, Ash & Organ Matte	
G282D																																				
3A	4	6																																		
4A	6	8																																		
5A	8	10																																		
6A	10	12																																		
7A	12	14																																		
8A	14	16																																		
Comp1	4	16				x	x			x			x			x																				
G282D																																				
10B	18.8	20																																		
Comp2	18.8	20				x	x			x			x			x																				
11A	20	22																																		
12A	22	24																																		
13A	24	26																																		
14A	26	28																																		
15A	28	30																																		
16A	30	31.8																																		
Comp3	20	31.8				x	x			x			x			x																				
18A	34	36																																		
19A	36	38																																		
20A	38	40																																		
21A	40	42																																		
22A	42	44																																		
23A	44	46																																		
24A	46	48																																		
25A	48	50																																		
26A	50	52																																		
Comp4	34	52				x	x			x			x			x																				
28A	54	54.9																																		
29A	56	58																																		
Comp5	54	58				x	x			x			x			x																				
G289D																																				
3A	4	6																																		
4A	6	8																																		
5A	8	10																																		
7A	12	14																																		
8A	14	16																																		
Comp1	4	16				x	x			x			x			x																				
ST5	8	10																				x														

SCHEDULE OF LABORATORY TESTING

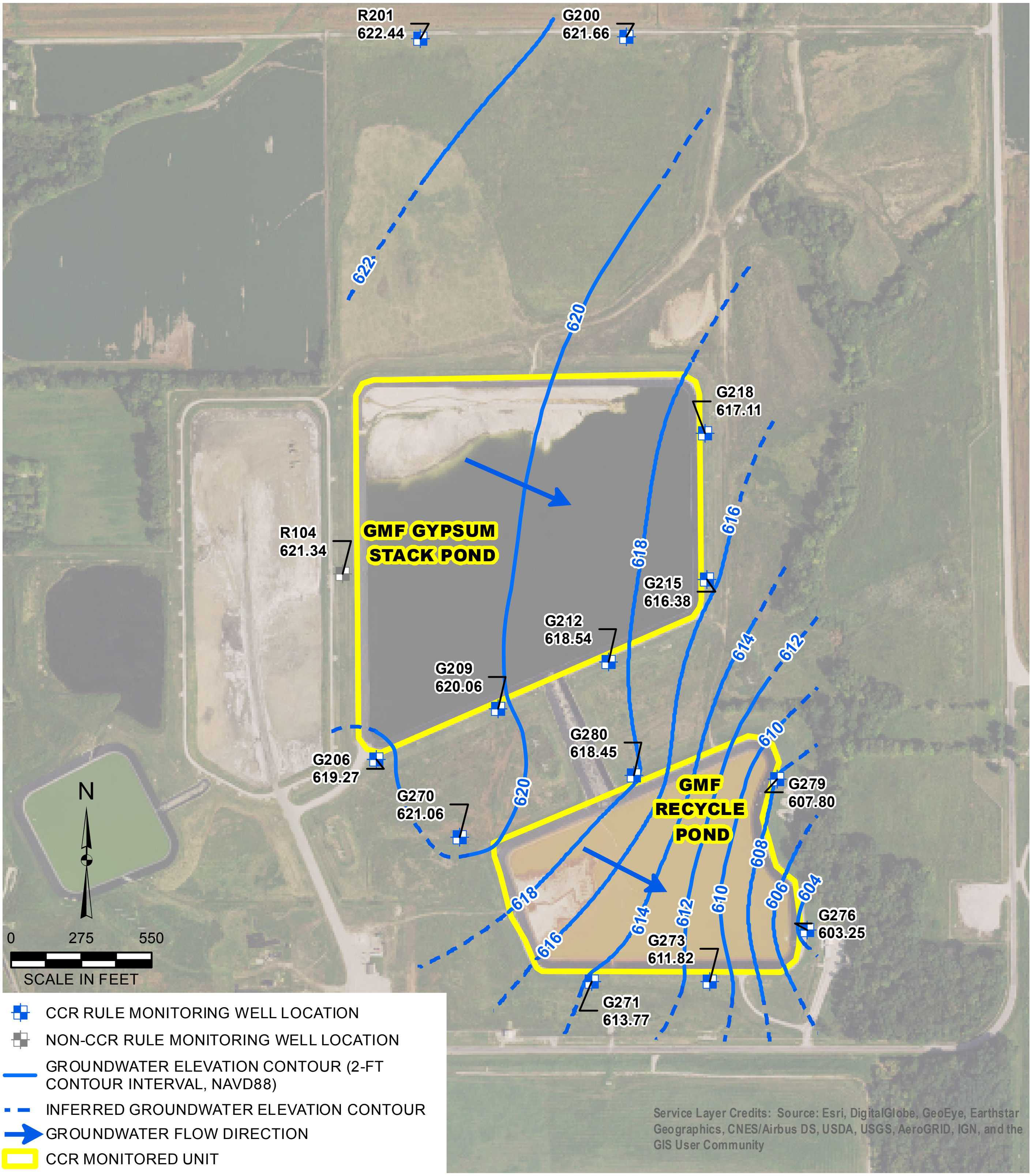
	QC: KLT 7/21/21	QC: KLT 7/21/21	Routine Testing											Complex Testing																Analytical Testing						
Sample ID	Top Depth (Info taken from boring logs by Ramboll)	Bottom Depth (Info taken from boring logs by Ramboll)	Rimac Comp Strength	Visual-Manual Classification	Unified Classification	Moisture Content	Liquid / Plastic Limits	Particle Size < #200	Particle Size - Sieves	Particle Size - Sieves + Hyd	Standard Compaction	Modified Compaction	Bulk Density	Unconfined Comp Strength	Consolidation Test	Specific Gravity	UU Triaxial Comp Strength	CU Traxail Comp Strength	CD Direct Shear Strength	Swell Test for Soil	Collapse Test for Soil	Permeability Granular Soil	Hyd Conduct Cohesive Soil	Shrinkafe Factor	Soil Resistivity	IBR and IBV of Soils	CBR Test	Elastic Moduli - Rock	Uniaxial Comp Str - Rock	Corrosivity	pH	Chloride	Sulfate	Total Organic Content	Moisture, Ash & Organ Matte	
G289D																																				
10A	18	18.6																																		
11A	20	22																																		
Comp2	18	22				x	x			x			x			x																				
12A	*22*	*24*																																		
13A	24	24.7																																		
14A	26	28																																		
15A	28	29.9																																		
16A	30	31.4																																		
17A	32	32.9																																		
Comp3	22	32.9				x	x			x			x			x																				
18A	34	36																																		
19A	36	38																																		
20A	*38*	*40*																																		
21A	*40*	*42*																																		
22A	*42*	*44*																																		
23A	*44*	*46*																																		
24A	*46*	*48*																																		
25A	48	50																																		
26A	50	52																																		
Comp4	34	52				x	x			x			x			x																				
28A	*54*	*56*																																		
29A	56	58																																		
30A	58	60																																		
Comp5	54	60				x	x			x			x			x																				
Gypsum	grab	grab				x	x			x	x		x			x							x*	*Remolded permeability*												
Gypsum	grab	grab																																		

Note 1: All testing to be in accordance with *Laboratory Testing Specifications* .

See Task Order or Attachment for any special instructions regarding scheduled testing.

APPENDIX E
GROUNDWATER CONTOUR MAPS, ELEVATIONS, AND VERTICAL GRADIENTS

GROUNDWATER CONTOUR MAPS



DRAWN BY/DATE: SDS 1/23/17 REVIEWED BY/DATE: TBN 1/25/17 APPROVED BY/DATE: JJW 2/7/17	**COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103) AND COFFEEN GMF RECYCLE POND (UNIT ID: 104) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 1: NOVEMBER 16, 2015** DYNEGY CCR RULE GROUNDWATER MONITORING COFFEEN POWER STATION COFFEEN, ILLINOIS	PROJECT NO: 2285 FIGURE NO: 1 Natural Resource Technology AN OBG COMPANY

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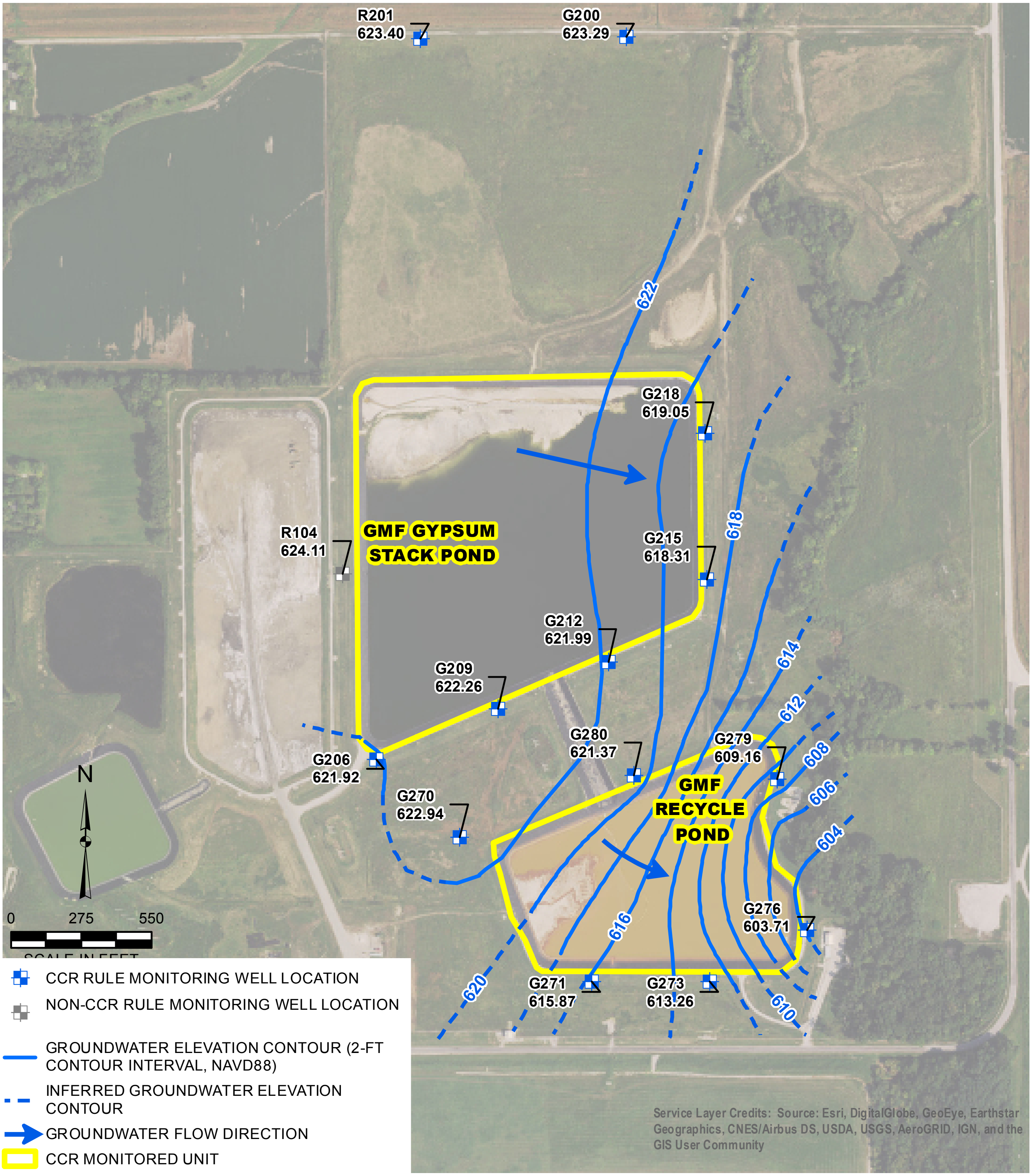

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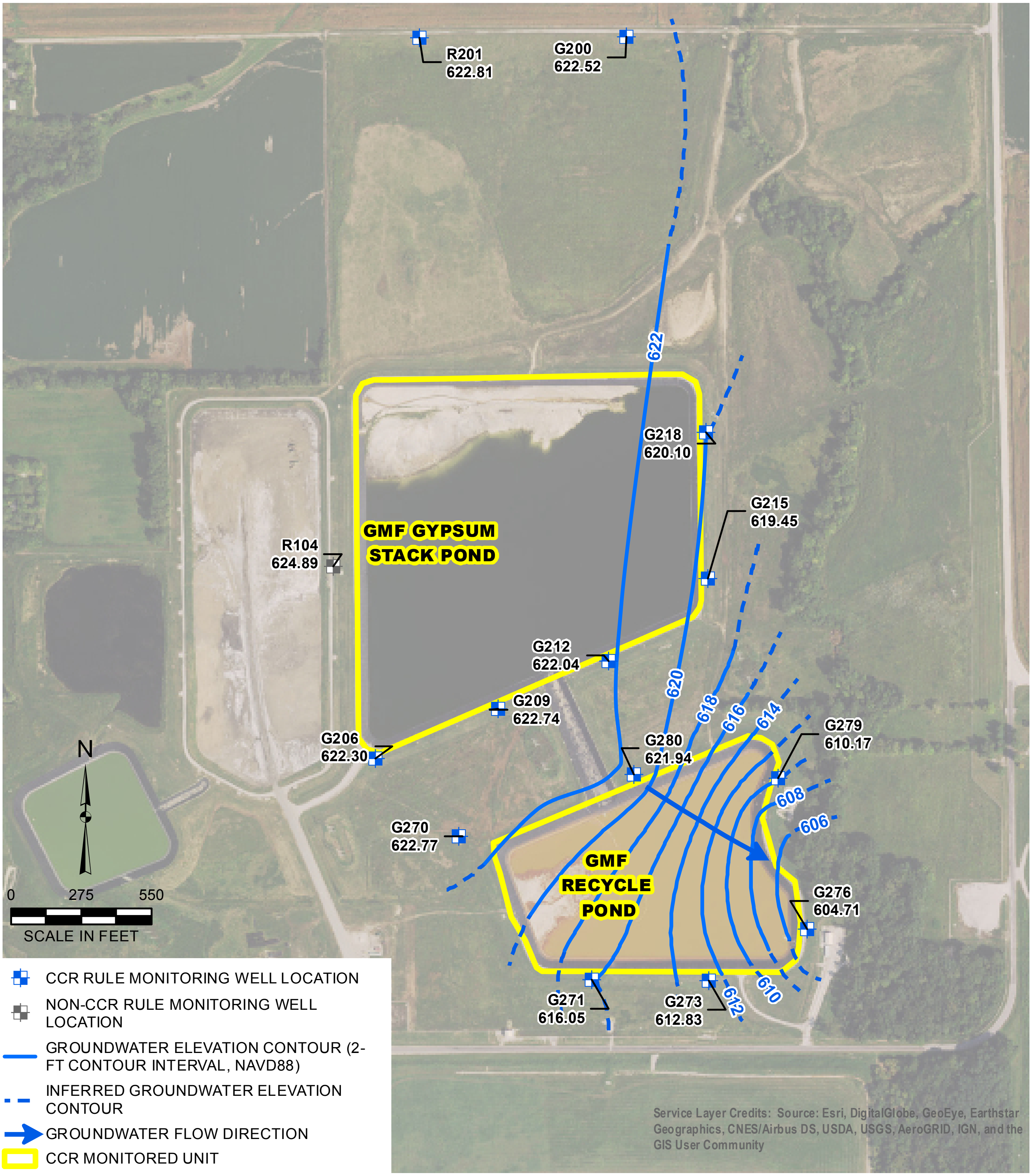

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REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

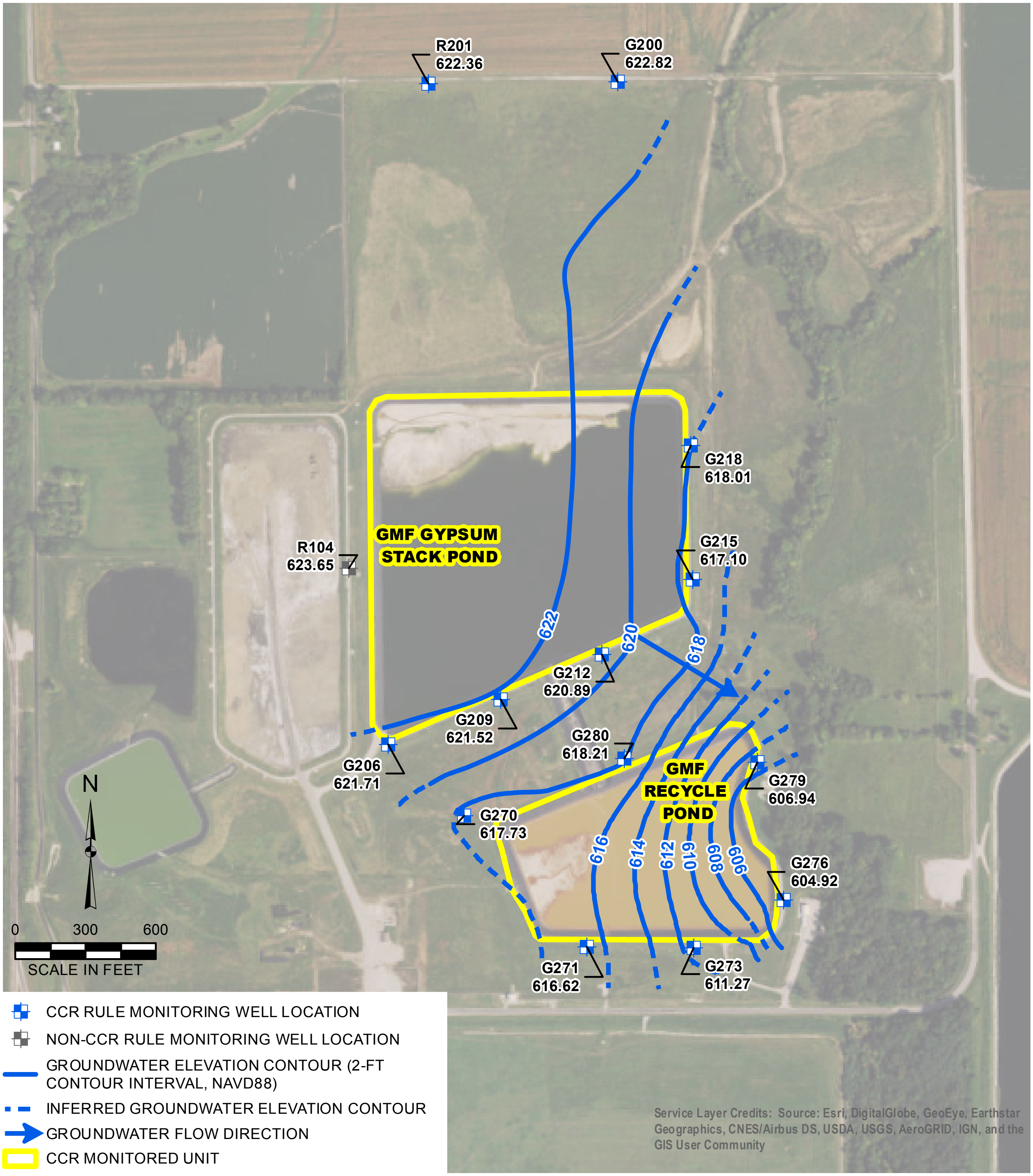
COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103) AND COFFEEN GMF RECYCLE POND (UNIT ID: 104) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 3: MAY 9, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103) AND COFFEEN GMF RECYCLE POND (UNIT ID: 104) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 4: JULY 25, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

DRAWN BY/DATE:
SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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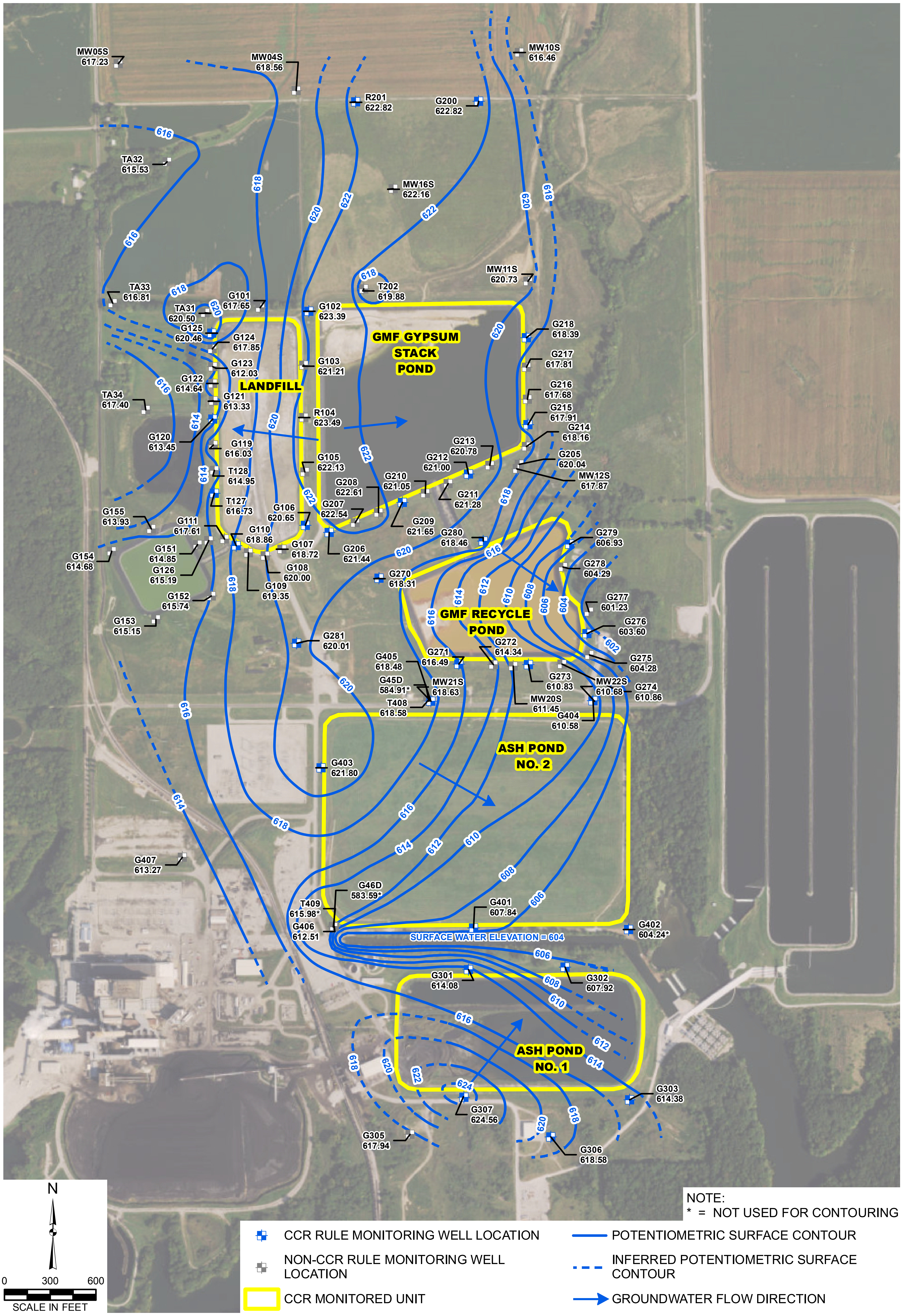

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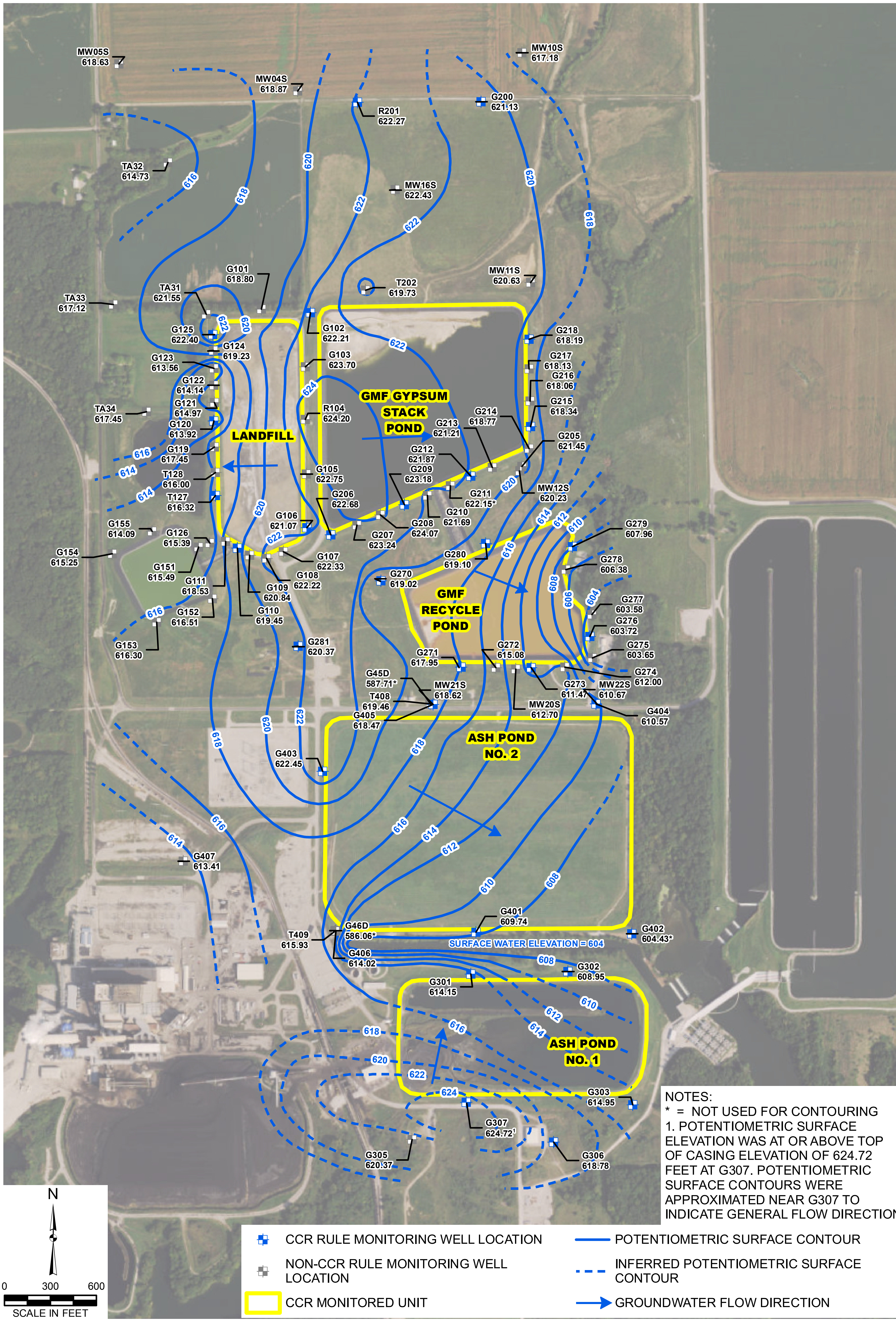

NOTES:
* = NOT USED FOR CONTOURING
1. POTENTIOMETRIC SURFACE ELEVATION WAS AT OR ABOVE TOP OF CASING ELEVATION OF 624.72 FEET AT G307. POTENTIOMETRIC SURFACE CONTOURS WERE APPROXIMATED NEAR G307 TO INDICATE GENERAL FLOW DIRECTION.

CCR RULE MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL LOCATION
CCR MONITORED UNIT
POTENTIOMETRIC SURFACE CONTOUR
INFERRED POTENTIOMETRIC SURFACE CONTOUR
GROUNDWATER FLOW DIRECTION

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REVIEWED BY/DATE: TBN 4/14/17
APPROVED BY/DATE: JJW 8/30/17

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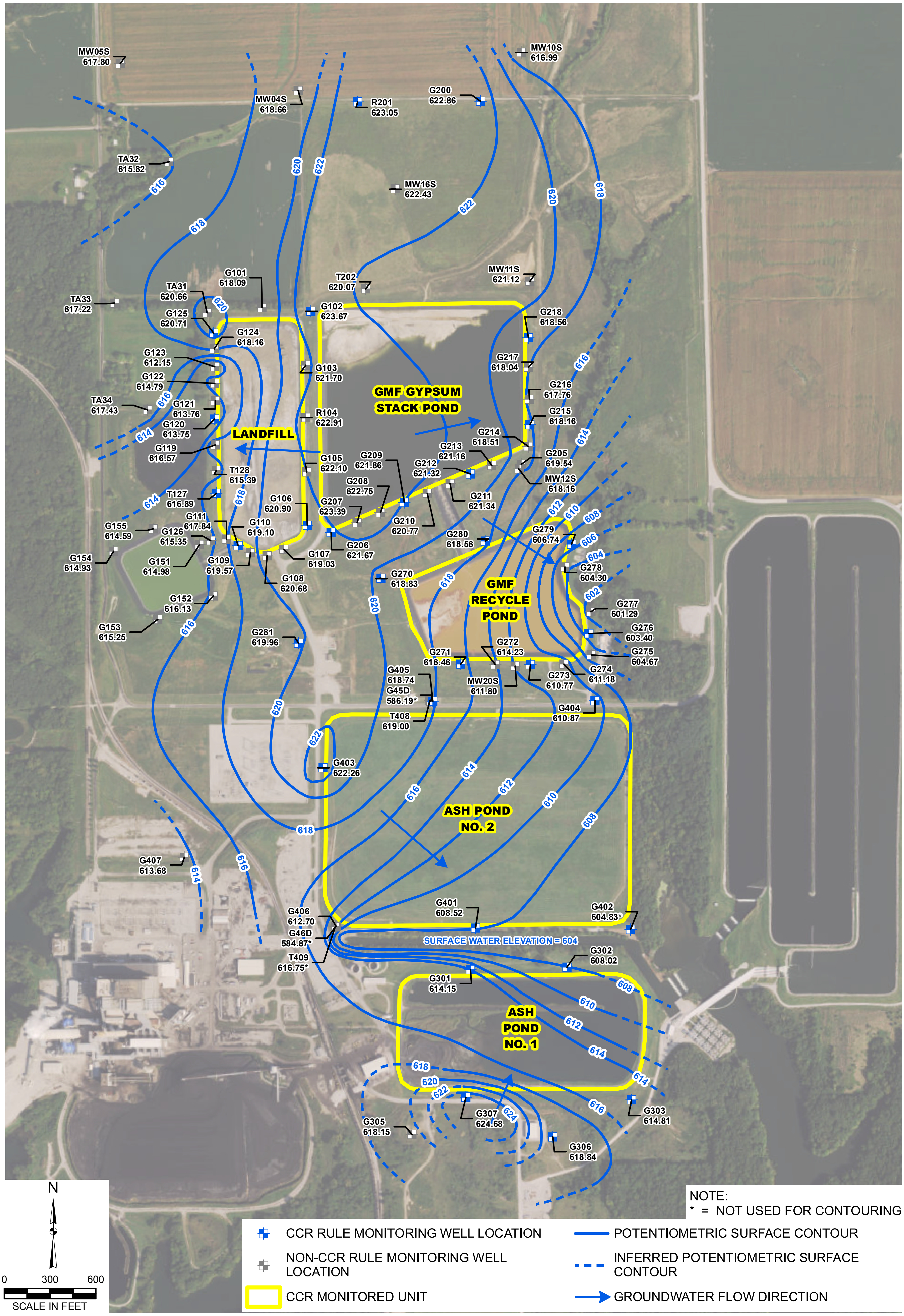
ROUND 6: FEBRUARY 4, 2017
DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 2285
FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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REVIEWED BY/DATE: TBN 7/12/17
APPROVED BY/DATE: JJW 8/30/17

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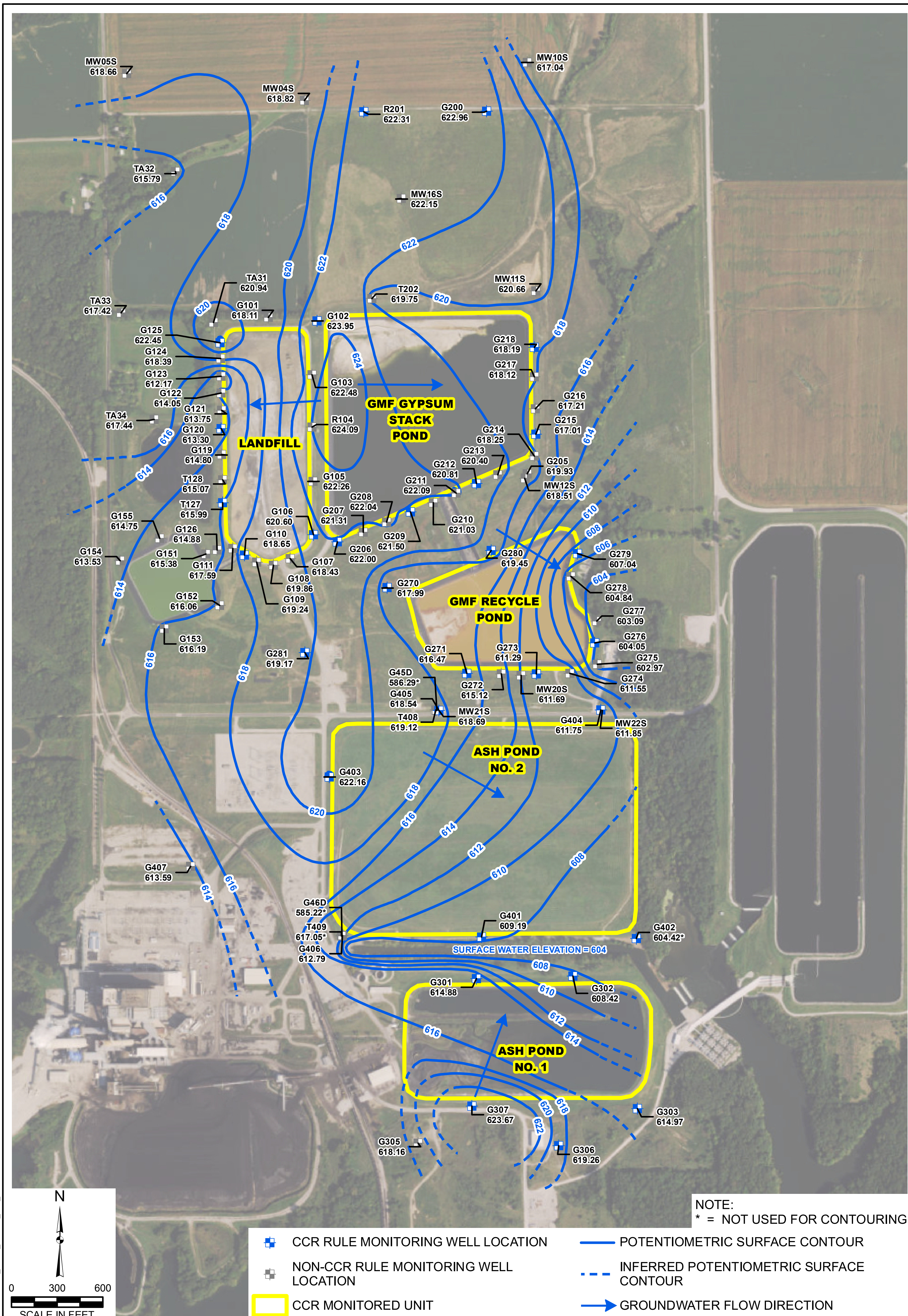
ROUND 7: MAY 13, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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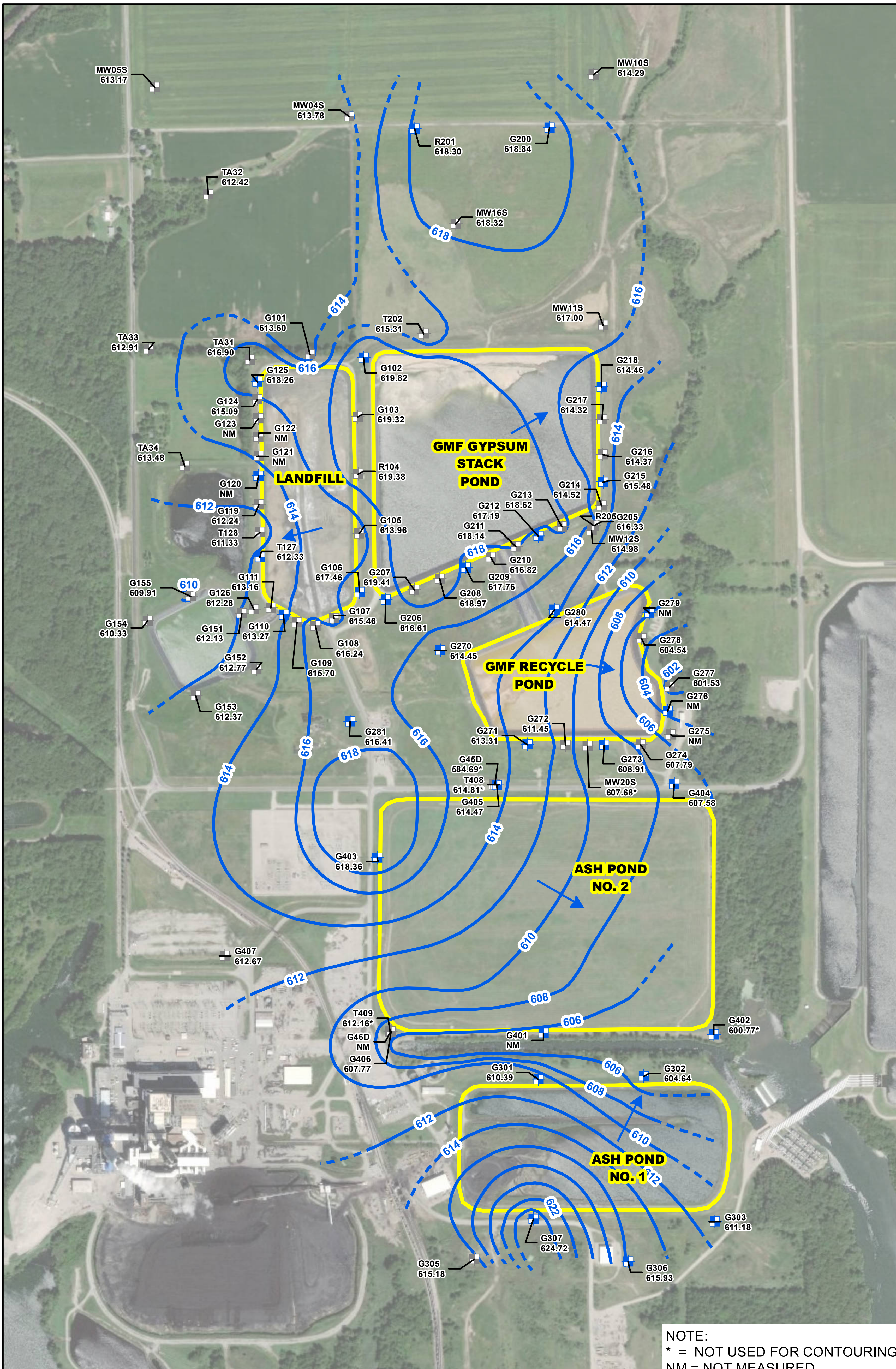

LEGEND

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
OCTOBER 21, 2017

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

FILE_NO. 70099
DATE 8/1/2018

O'BRIEN & GERE ENGINEERS, INC.

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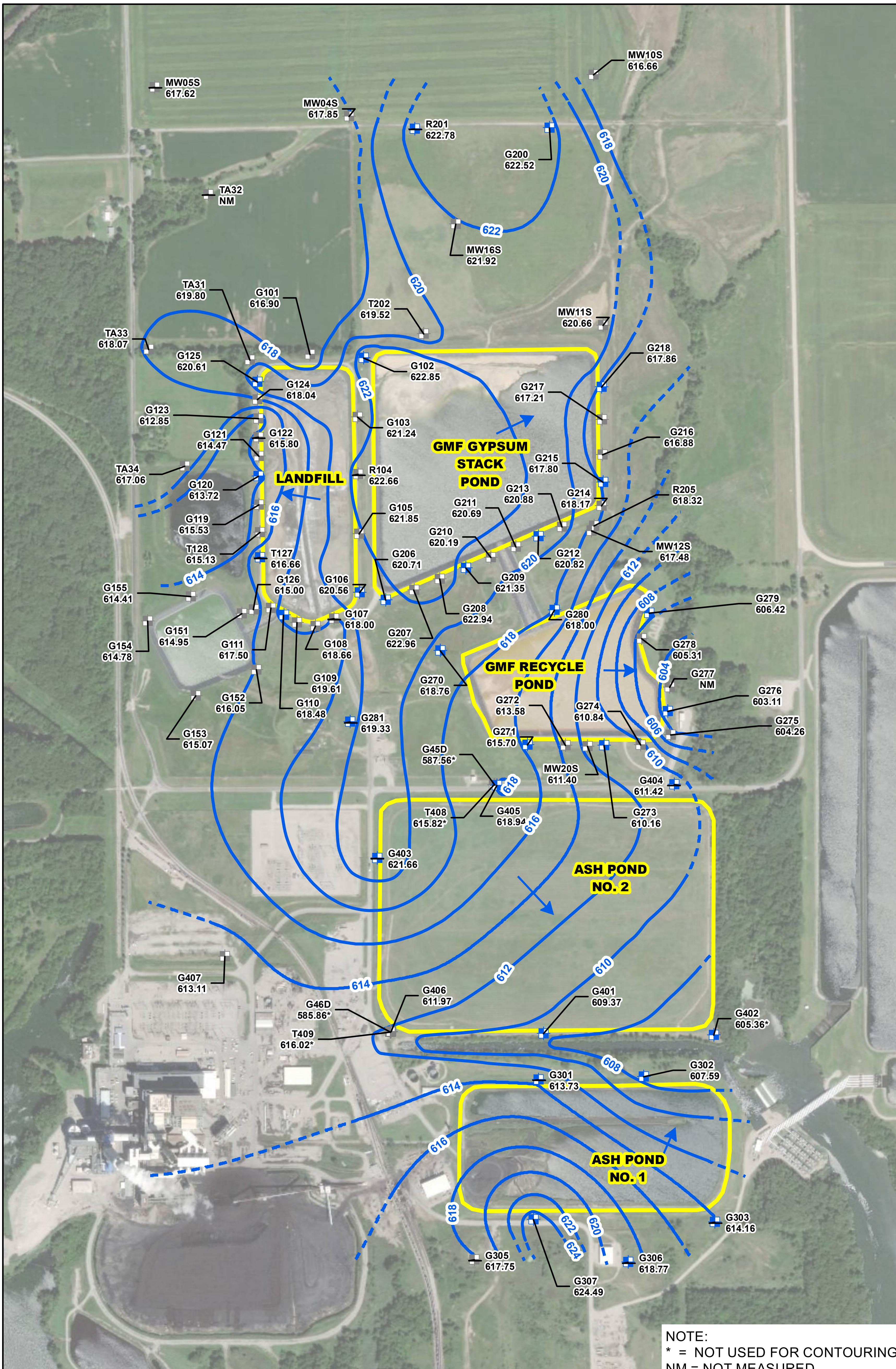

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LEGEND

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
MAY 8, 2018

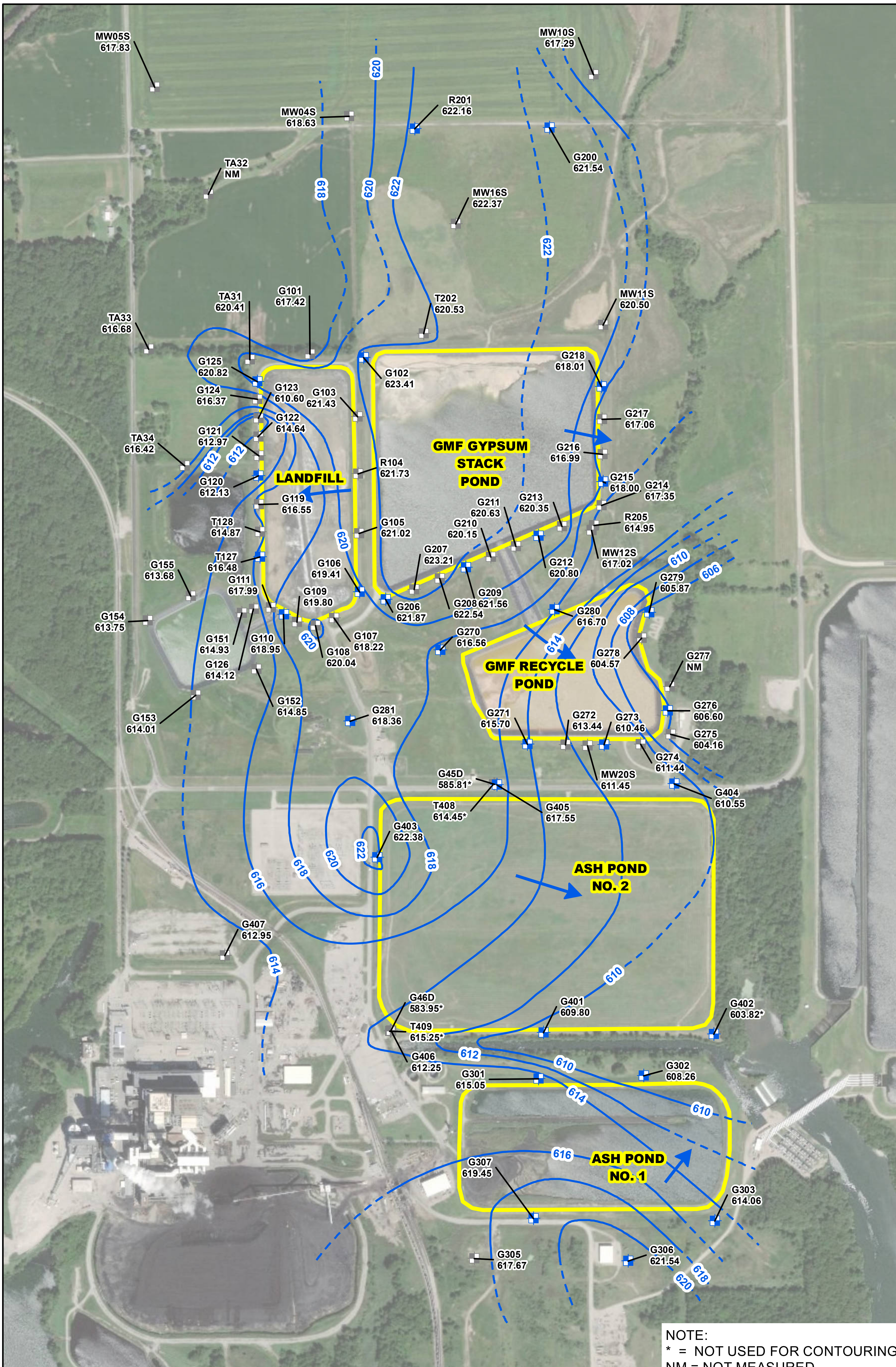
CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

FILE_NO. 70099
DATE 8/1/2018

O'BRIEN & GERE ENGINEERS, INC.



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CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

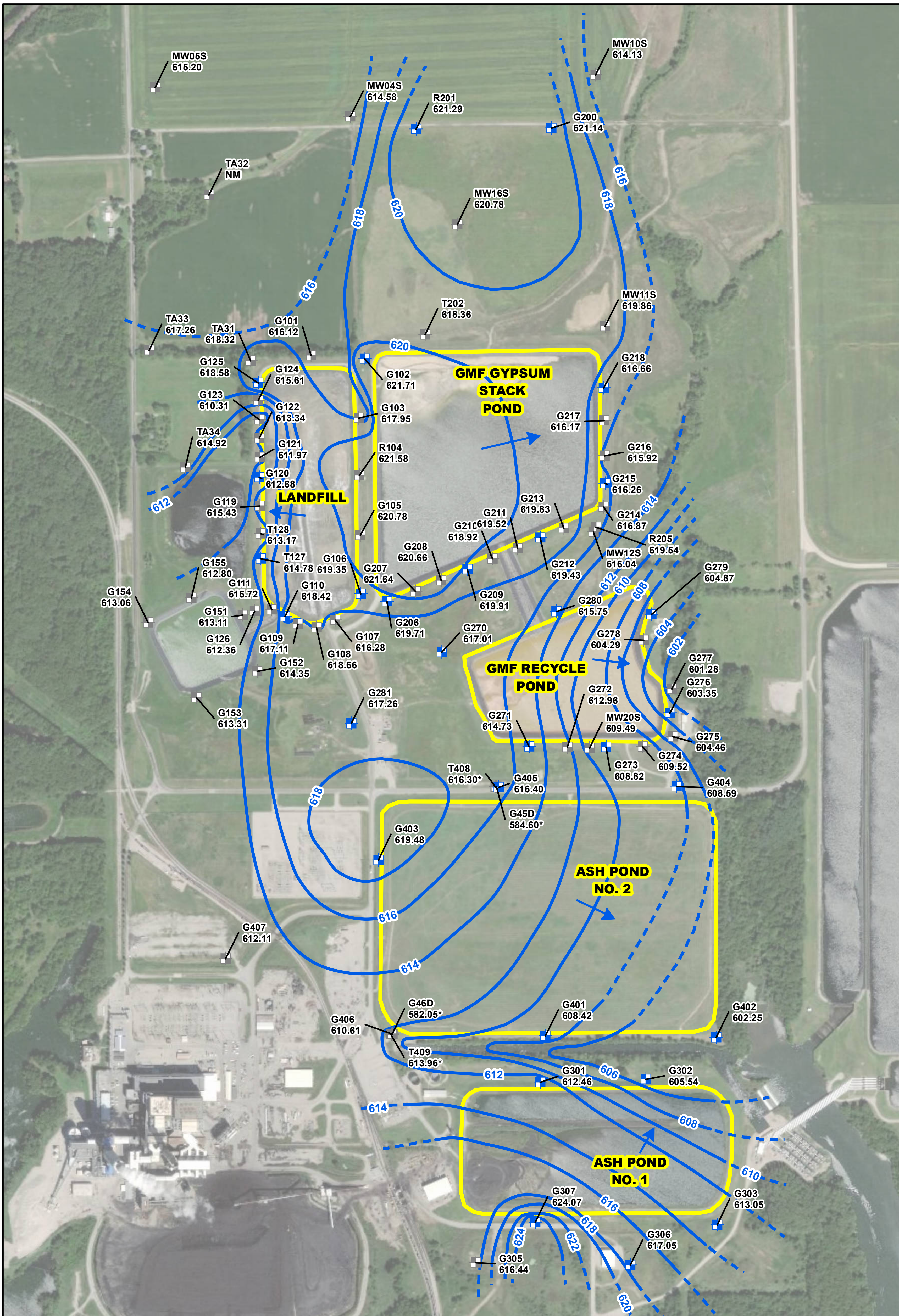
COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 2, 2018

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



NOTE:
* = NOT USED FOR CONTOURING
NM = NOT MEASURED

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LEGEND

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
OCTOBER 23, 2018

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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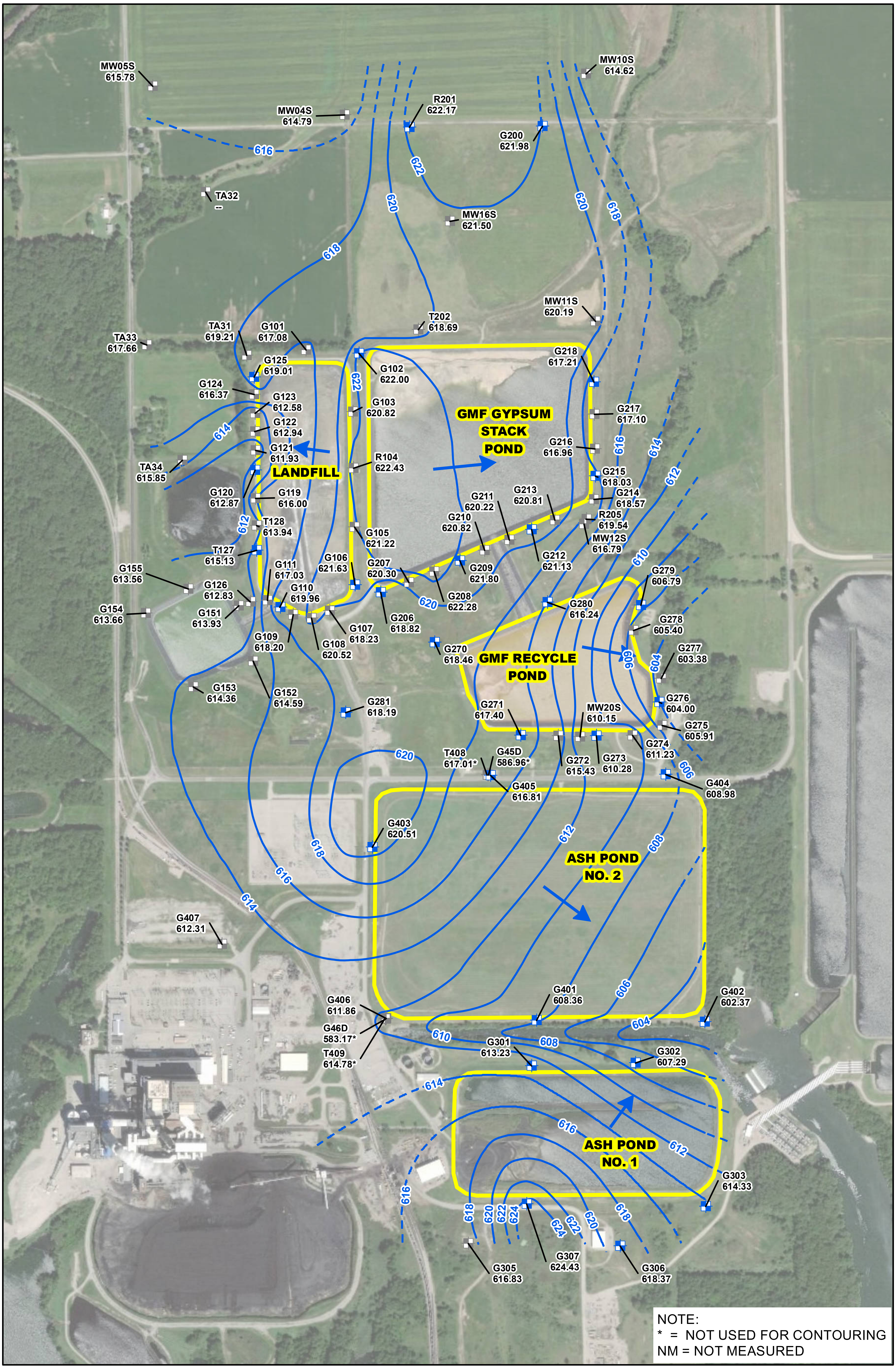

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
JANUARY 15, 2019

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

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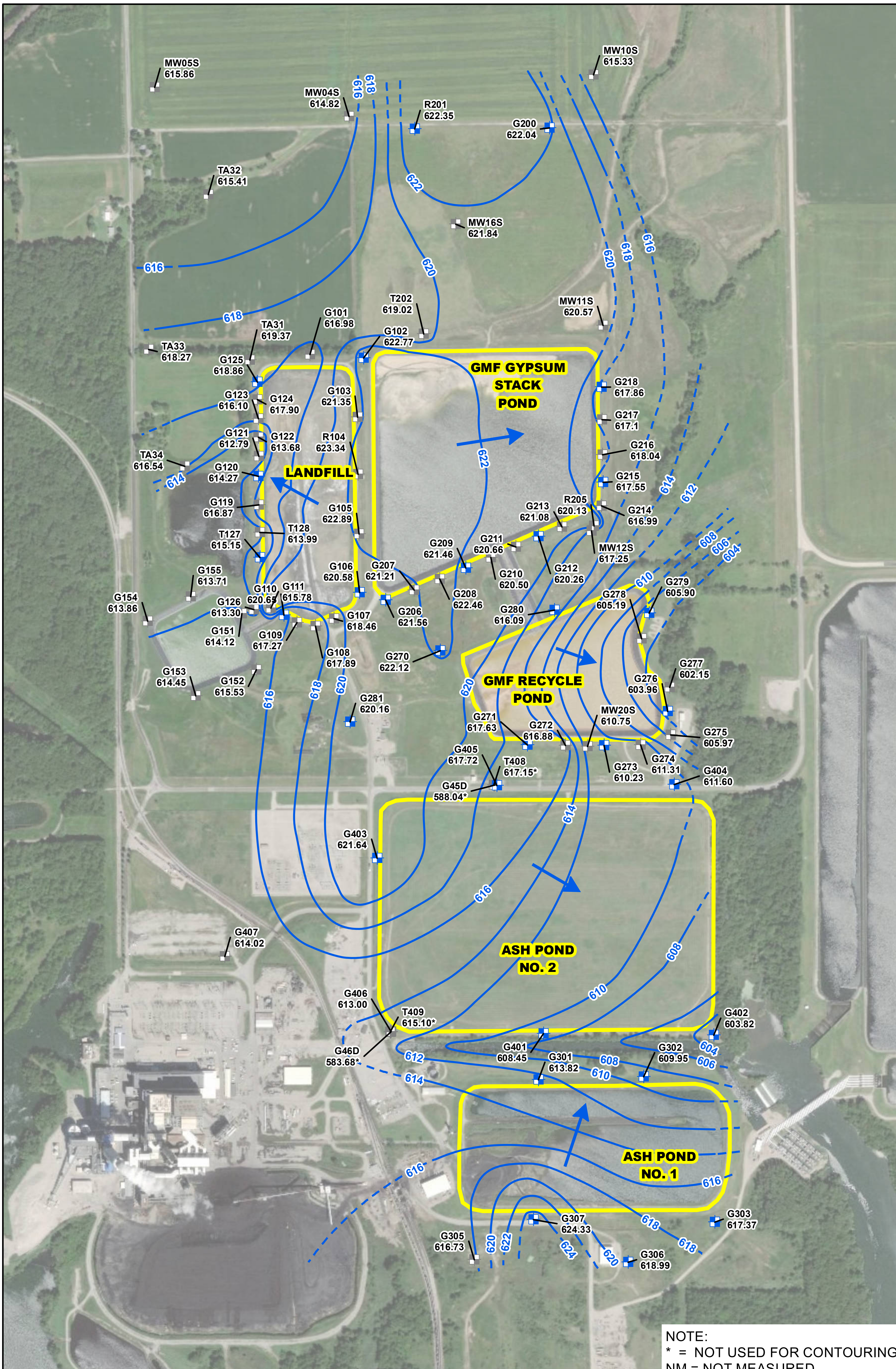

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

COFFEEN ASH POND NO. 1 (UNIT ID: 101), COFFEEN ASH POND NO. 2 (UNIT ID: 102), COFFEEN GMF GYPSUM STACK POND (UNIT ID: 103), COFFEEN GMF RECYCLE POND (UNIT ID: 104) AND COFFEEN LANDFILL (UNIT ID: 105)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 5, 2019

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

0 150 300 600
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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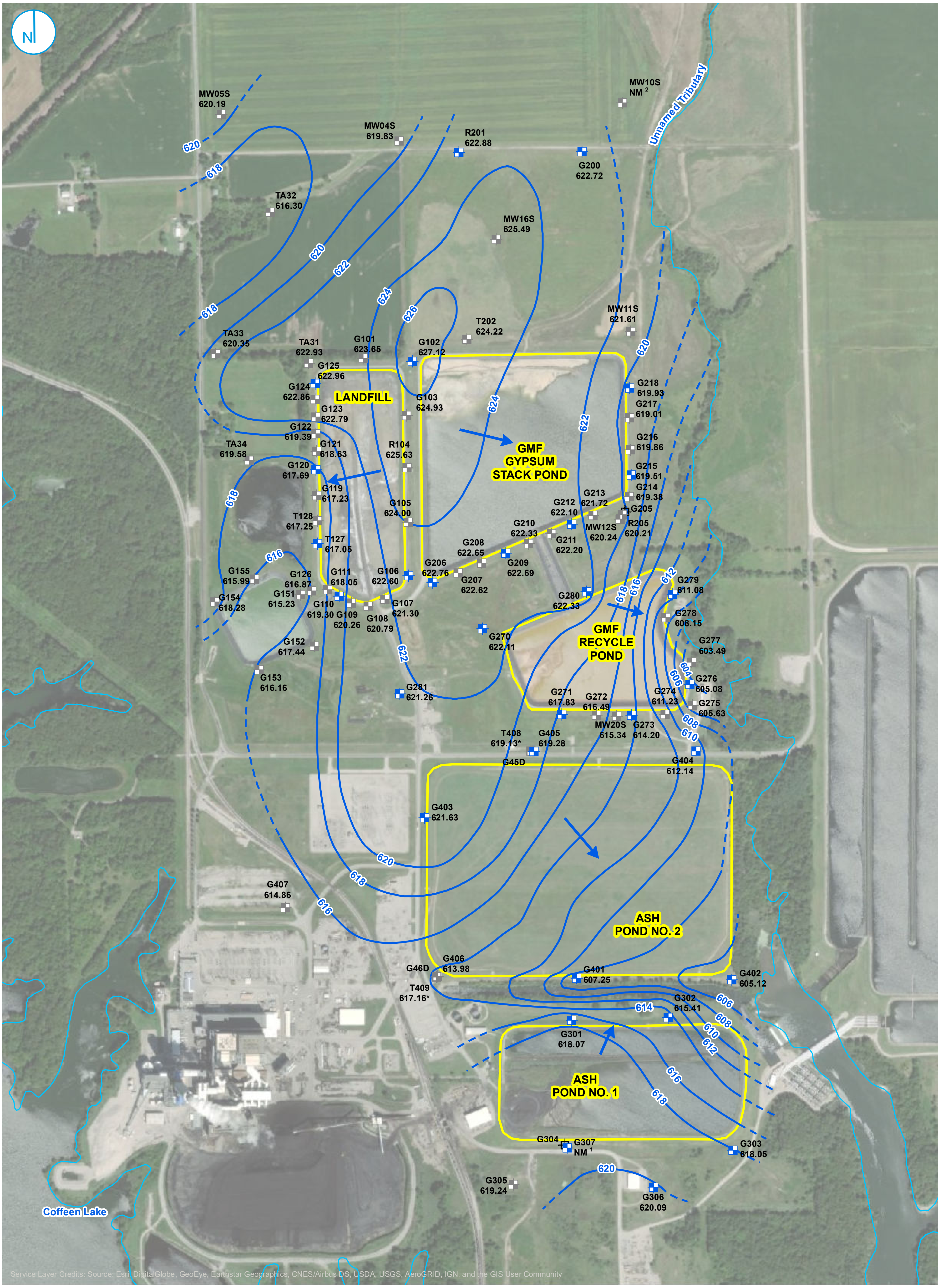

CCR RULE MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL LOCATION
ABANDONED MONITORING WELL
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

CCR UNIT BOUNDARY
SURFACE WATER FEATURE

NOTE:
* = NOT USED FOR CONTOURING
NM = NOT MEASURED
[1] G307 WAS FROZEN DURING THE JANUARY 20, 2020 SAMPLING EVENT AND WATER LEVEL COULD NOT BE COLLECTED.
[2] MW10S WAS DAMAGED PRIOR TO THE JANUARY 20, 2020 SAMPLING EVENT AND WATER LEVEL COULD NOT BE COLLECTED.

0 300 600
Feet

GROUNDWATER ELEVATION CONTOUR MAP
JANUARY 20, 2020

CCR RULE GROUNDWATER MONITORING
COFFEEN POWER STATION
COFFEEN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

TABLE E-1. GROUNDWATER ELEVATIONS

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G045D	11/12/2016	584.91
G045D	02/04/2017	587.71
G045D	05/13/2017	586.19
G045D	07/08/2017	586.29
G045D	10/21/2017	584.69
G045D	05/08/2018	587.56
G045D	08/02/2018	585.81
G045D	10/23/2018	584.60
G045D	01/15/2019	586.96
G045D	08/05/2019	588.04
G045D	08/10/2020	614.21
G045D	01/20/2021	614.60
G045D	04/20/2021	614.32
G045D	07/26/2021	613.58
G045D	08/16/2021	613.83
G046D	11/12/2016	583.59
G046D	02/04/2017	586.06
G046D	05/13/2017	584.87
G046D	07/08/2017	585.22
G046D	05/08/2018	585.86
G046D	08/02/2018	583.95
G046D	10/23/2018	582.05
G046D	01/15/2019	583.17
G046D	08/05/2019	583.68
G046D	08/10/2020	609.00
G046D	01/20/2021	610.49
G046D	04/20/2021	611.06
G046D	07/26/2021	607.21
G046D	08/16/2021	608.17
G101	01/20/2015	614.48
G101	04/08/2015	618.87
G101	07/23/2015	618.53
G101	10/06/2015	617.15
G101	11/16/2015	612.95
G101	02/08/2016	618.46
G101	05/09/2016	618.89
G101	07/25/2016	618.44
G101	11/12/2016	617.65
G101	02/04/2017	618.80
G101	05/13/2017	618.09
G101	07/08/2017	618.11
G101	10/21/2017	613.60
G101	05/08/2018	616.90
G101	08/02/2018	617.42
G101	10/23/2018	616.12
G101	01/15/2019	617.08

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G101	08/05/2019	616.98
G101	01/20/2020	623.65
G101	08/10/2020	616.70
G101	10/15/2020	613.61
G101	01/20/2021	617.20
G101	01/28/2021	617.80
G101	04/20/2021	622.85
G101	07/26/2021	619.94
G101	08/16/2021	619.95
G102	01/20/2015	619.18
G102	04/08/2015	622.06
G102	10/06/2015	622.02
G102	11/16/2015	618.96
G102	02/08/2016	624.04
G102	05/09/2016	625.34
G102	07/25/2016	623.92
G102	11/12/2016	623.39
G102	02/04/2017	622.21
G102	05/13/2017	623.67
G102	07/08/2017	623.95
G102	10/21/2017	619.82
G102	01/26/2018	621.79
G102	05/08/2018	622.85
G102	08/02/2018	623.41
G102	10/23/2018	621.71
G102	01/15/2019	622.00
G102	08/05/2019	622.77
G102	01/20/2020	627.12
G102	08/10/2020	621.72
G102	10/15/2020	618.94
G102	01/20/2021	619.79
G102	01/26/2021	621.71
G102	04/20/2021	623.86
G102	05/03/2021	624.28
G102	05/17/2021	623.83
G102	06/09/2021	623.09
G102	06/23/2021	621.22
G102	07/12/2021	622.92
G102	07/26/2021	622.97
G102	08/16/2021	622.69
G103	01/20/2015	620.82
G103	04/08/2015	622.58
G103	07/23/2015	621.70
G103	10/06/2015	620.69
G103	02/08/2016	621.68
G103	05/09/2016	623.26

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G103	07/25/2016	622.88
G103	11/12/2016	621.21
G103	02/04/2017	623.70
G103	05/13/2017	621.70
G103	07/08/2017	622.48
G103	10/21/2017	619.32
G103	05/08/2018	621.24
G103	08/02/2018	621.43
G103	10/23/2018	617.95
G103	01/15/2019	620.82
G103	08/05/2019	621.35
G103	01/20/2020	624.93
G103	08/10/2020	622.45
G103	10/15/2020	618.91
G103	01/20/2021	621.01
G103	01/28/2021	621.38
G103	04/20/2021	623.84
G103	07/26/2021	624.14
G103	08/16/2021	624.29
G105	01/20/2015	621.95
G105	04/08/2015	623.73
G105	07/23/2015	622.72
G105	10/06/2015	621.65
G105	02/08/2016	623.03
G105	05/09/2016	623.60
G105	07/25/2016	622.08
G105	11/12/2016	622.13
G105	02/04/2017	622.75
G105	05/13/2017	622.10
G105	07/08/2017	622.26
G105	10/21/2017	613.96
G105	05/08/2018	621.85
G105	08/02/2018	621.02
G105	10/23/2018	620.78
G105	01/15/2019	621.22
G105	08/05/2019	622.89
G105	01/20/2020	624.00
G105	08/10/2020	623.11
G105	10/15/2020	620.10
G105	01/20/2021	622.21
G105	01/28/2021	622.33
G105	04/20/2021	623.23
G105	07/26/2021	623.76
G105	08/16/2021	623.70
G106	01/20/2015	620.45
G106	04/08/2015	622.19

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TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G106	07/23/2015	621.43
G106	10/06/2015	620.50
G106	11/16/2015	619.32
G106	02/08/2016	621.55
G106	05/09/2016	622.11
G106	07/25/2016	620.62
G106	11/12/2016	620.65
G106	02/04/2017	621.07
G106	05/13/2017	620.90
G106	07/08/2017	620.60
G106	10/21/2017	617.46
G106	05/08/2018	620.56
G106	08/02/2018	619.41
G106	10/23/2018	619.35
G106	01/15/2019	621.63
G106	08/05/2019	620.58
G106	01/20/2020	622.60
G106	08/10/2020	620.48
G106	10/14/2020	618.19
G106	01/20/2021	620.90
G106	01/26/2021	620.90
G106	04/20/2021	621.69
G106	06/29/2021	621.95
G106	07/26/2021	621.88
G106	08/16/2021	621.90
G107	01/20/2015	619.23
G107	04/08/2015	620.85
G107	07/23/2015	620.15
G107	10/06/2015	619.10
G107	02/08/2016	620.26
G107	05/09/2016	620.78
G107	07/25/2016	618.37
G107	11/12/2016	618.72
G107	02/04/2017	622.33
G107	05/13/2017	619.03
G107	07/08/2017	618.43
G107	10/21/2017	615.46
G107	05/08/2018	618.00
G107	08/02/2018	618.22
G107	10/23/2018	616.28
G107	01/15/2019	618.23
G107	08/05/2019	618.46
G107	01/20/2020	621.30
G107	08/10/2020	618.68
G107	10/14/2020	616.56
G107	01/20/2021	619.58

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TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G107	01/28/2021	619.74
G107	04/20/2021	620.19
G107	07/26/2021	620.26
G107	08/16/2021	620.39
G108	01/19/2015	618.42
G108	04/08/2015	620.31
G108	07/24/2015	621.22
G108	10/07/2015	618.92
G108	02/08/2016	619.53
G108	05/09/2016	620.15
G108	07/25/2016	619.78
G108	11/12/2016	620.46
G108	02/04/2017	622.22
G108	05/13/2017	620.68
G108	07/08/2017	619.86
G108	10/21/2017	616.24
G108	05/08/2018	618.66
G108	08/02/2018	620.04
G108	10/23/2018	618.66
G108	01/15/2019	620.52
G108	08/05/2019	617.89
G108	01/20/2020	620.79
G108	08/10/2020	617.86
G108	10/14/2020	616.02
G108	01/20/2021	618.72
G108	01/28/2021	618.82
G108	04/20/2021	619.37
G108	07/26/2021	619.40
G108	08/16/2021	619.66
G109	01/19/2015	617.78
G109	04/08/2015	619.71
G109	07/24/2015	620.41
G109	10/06/2015	618.12
G109	02/08/2016	618.94
G109	05/09/2016	619.56
G109	07/25/2016	619.11
G109	11/12/2016	619.35
G109	02/04/2017	620.84
G109	05/13/2017	619.57
G109	07/08/2017	619.24
G109	10/21/2017	615.70
G109	05/08/2018	619.61
G109	08/02/2018	619.80
G109	10/23/2018	617.11
G109	01/15/2019	618.20
G109	08/05/2019	617.27

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G109	01/20/2020	620.26
G109	08/10/2020	617.16
G109	10/14/2020	615.52
G109	01/20/2021	617.91
G109	01/28/2021	618.58
G109	04/20/2021	618.59
G109	07/26/2021	618.68
G109	08/16/2021	618.96
G110	01/19/2015	616.76
G110	04/08/2015	618.60
G110	07/24/2015	619.55
G110	10/07/2015	617.70
G110	11/16/2015	616.55
G110	02/08/2016	617.88
G110	05/09/2016	618.53
G110	07/25/2016	617.64
G110	11/12/2016	618.86
G110	02/04/2017	619.45
G110	05/13/2017	619.10
G110	07/08/2017	618.65
G110	10/21/2017	613.27
G110	01/26/2018	616.74
G110	05/08/2018	618.48
G110	08/02/2018	618.95
G110	10/23/2018	618.42
G110	01/15/2019	619.96
G110	08/05/2019	620.65
G110	01/20/2020	619.30
G110	08/10/2020	616.14
G110	10/14/2020	614.90
G110	01/20/2021	616.81
G110	01/28/2021	616.81
G110	04/20/2021	617.71
G110	07/26/2021	617.76
G110	08/16/2021	617.97
G111	01/19/2015	615.93
G111	04/08/2015	617.48
G111	07/24/2015	618.03
G111	10/07/2015	616.79
G111	02/08/2016	616.92
G111	05/09/2016	617.52
G111	07/25/2016	617.35
G111	11/12/2016	617.61
G111	02/04/2017	618.53
G111	05/13/2017	617.84
G111	07/08/2017	617.59

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G111	10/21/2017	613.16
G111	05/08/2018	617.50
G111	08/02/2018	617.99
G111	10/23/2018	615.72
G111	01/15/2019	617.03
G111	08/05/2019	615.78
G111	01/20/2020	618.05
G111	08/10/2020	615.59
G111	10/14/2020	614.40
G111	01/20/2021	615.84
G111	01/28/2021	616.67
G111	04/20/2021	616.73
G111	07/26/2021	616.84
G111	08/16/2021	618.10
G119	01/19/2015	615.64
G119	04/08/2015	615.86
G119	07/23/2015	616.55
G119	10/06/2015	615.31
G119	02/08/2016	615.83
G119	05/09/2016	615.87
G119	07/25/2016	614.73
G119	11/12/2016	616.03
G119	02/04/2017	617.45
G119	05/13/2017	616.57
G119	07/08/2017	614.80
G119	10/21/2017	612.24
G119	05/08/2018	615.53
G119	08/02/2018	616.55
G119	10/23/2018	615.43
G119	01/15/2019	616.00
G119	08/05/2019	616.87
G119	01/20/2020	617.23
G119	08/10/2020	616.02
G119	10/13/2020	615.16
G119	01/20/2021	616.09
G119	01/28/2021	616.14
G119	04/20/2021	616.80
G119	07/26/2021	616.62
G119	08/16/2021	616.75
G120	01/19/2015	612.75
G120	04/08/2015	613.43
G120	07/23/2015	613.47
G120	10/06/2015	612.94
G120	11/16/2015	612.37
G120	02/08/2016	613.06
G120	05/09/2016	613.37

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TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G120	07/25/2016	612.87
G120	11/12/2016	613.45
G120	02/04/2017	613.92
G120	05/13/2017	613.75
G120	07/08/2017	613.30
G120	01/26/2018	612.69
G120	05/08/2018	613.72
G120	08/02/2018	612.13
G120	10/23/2018	612.68
G120	01/15/2019	612.87
G120	05/03/2019	618.15
G120	08/05/2019	614.27
G120	01/20/2020	617.69
G120	05/05/2020	618.23
G120	08/10/2020	615.22
G120	10/13/2020	614.39
G120	01/20/2021	615.80
G120	01/27/2021	615.80
G120	04/20/2021	617.55
G120	07/26/2021	616.95
G120	08/16/2021	617.19
G121	01/19/2015	613.63
G121	04/08/2015	614.63
G121	07/23/2015	614.09
G121	10/06/2015	613.31
G121	02/08/2016	614.10
G121	05/09/2016	614.81
G121	07/25/2016	613.62
G121	11/12/2016	613.33
G121	02/04/2017	614.97
G121	05/13/2017	613.76
G121	07/08/2017	613.75
G121	05/08/2018	614.47
G121	08/02/2018	612.97
G121	10/23/2018	611.97
G121	01/15/2019	611.93
G121	08/05/2019	612.79
G121	01/20/2020	618.63
G121	08/10/2020	615.02
G121	10/13/2020	613.69
G121	01/20/2021	615.44
G121	01/27/2021	616.14
G121	04/20/2021	618.73
G121	07/26/2021	616.79
G121	08/16/2021	617.27
G122	01/19/2015	610.79

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G122	04/08/2015	615.94
G122	07/23/2015	615.26
G122	10/06/2015	614.39
G122	02/08/2016	615.52
G122	05/09/2016	616.84
G122	07/25/2016	614.06
G122	11/12/2016	614.64
G122	02/04/2017	614.14
G122	05/13/2017	614.79
G122	07/08/2017	614.05
G122	05/08/2018	615.80
G122	08/02/2018	614.64
G122	10/23/2018	613.34
G122	01/15/2019	612.94
G122	08/05/2019	613.68
G122	01/20/2020	619.39
G122	08/10/2020	613.48
G122	10/13/2020	611.41
G122	01/20/2021	613.99
G122	01/27/2021	614.08
G122	04/20/2021	620.41
G122	07/26/2021	616.92
G122	08/16/2021	617.28
G123	01/19/2015	610.84
G123	04/08/2015	612.41
G123	07/23/2015	612.76
G123	10/06/2015	611.89
G123	02/08/2016	611.74
G123	05/09/2016	611.73
G123	07/25/2016	611.91
G123	11/12/2016	612.03
G123	02/04/2017	613.56
G123	05/13/2017	612.15
G123	07/08/2017	612.17
G123	05/08/2018	612.85
G123	08/02/2018	610.60
G123	10/23/2018	610.31
G123	01/15/2019	612.58
G123	08/05/2019	616.10
G123	01/20/2020	622.79
G123	08/10/2020	615.96
G123	10/14/2020	613.01
G123	01/20/2021	615.92
G123	01/27/2021	616.24
G123	04/20/2021	622.41
G123	07/26/2021	619.35

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G123	08/16/2021	617.73
G124	01/19/2015	615.27
G124	04/08/2015	617.85
G124	07/23/2015	618.25
G124	10/06/2015	617.27
G124	02/08/2016	616.47
G124	05/09/2016	616.81
G124	07/25/2016	618.27
G124	11/12/2016	617.85
G124	02/04/2017	619.23
G124	05/13/2017	618.16
G124	07/08/2017	618.39
G124	10/21/2017	615.09
G124	05/08/2018	618.04
G124	08/02/2018	616.37
G124	10/23/2018	615.61
G124	01/15/2019	616.37
G124	08/05/2019	617.90
G124	01/20/2020	622.86
G124	08/10/2020	615.53
G124	10/14/2020	612.59
G124	01/20/2021	615.96
G124	01/27/2021	616.10
G124	04/20/2021	622.44
G124	07/26/2021	619.05
G124	08/16/2021	619.43
G125	01/19/2015	617.83
G125	04/08/2015	620.45
G125	07/23/2015	620.71
G125	10/06/2015	619.66
G125	11/16/2015	614.60
G125	02/08/2016	619.95
G125	05/09/2016	620.22
G125	07/25/2016	621.53
G125	11/12/2016	620.46
G125	02/04/2017	622.40
G125	05/13/2017	620.71
G125	07/08/2017	622.45
G125	10/21/2017	618.26
G125	01/26/2018	613.88
G125	05/08/2018	620.61
G125	08/02/2018	620.82
G125	10/23/2018	618.58
G125	01/15/2019	619.01
G125	08/05/2019	618.86
G125	01/20/2020	622.96

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G125	05/05/2020	623.39
G125	08/10/2020	615.38
G125	10/14/2020	612.46
G125	01/20/2021	615.66
G125	01/27/2021	615.66
G125	04/20/2021	622.46
G125	07/26/2021	619.11
G125	08/16/2021	619.49
G126	01/20/2015	615.22
G126	04/08/2015	616.45
G126	07/23/2015	616.34
G126	10/07/2015	614.13
G126	02/08/2016	616.12
G126	05/09/2016	616.58
G126	07/25/2016	614.82
G126	11/12/2016	615.19
G126	02/04/2017	615.39
G126	05/13/2017	615.35
G126	07/08/2017	614.88
G126	10/21/2017	612.28
G126	05/08/2018	615.00
G126	08/02/2018	614.12
G126	10/23/2018	612.36
G126	01/15/2019	612.83
G126	08/05/2019	613.30
G126	01/20/2020	616.87
G126	08/10/2020	614.91
G126	10/14/2020	613.97
G126	01/20/2021	614.95
G126	01/29/2021	615.98
G126	04/20/2021	615.68
G126	07/26/2021	615.85
G126	08/16/2021	616.05
G151	07/23/2015	615.43
G151	10/06/2015	614.86
G151	11/12/2016	614.85
G151	02/04/2017	615.49
G151	05/13/2017	614.98
G151	07/08/2017	615.38
G151	10/21/2017	612.13
G151	05/08/2018	614.95
G151	08/02/2018	614.93
G151	10/23/2018	613.11
G151	01/15/2019	613.93
G151	08/05/2019	614.12
G151	01/20/2020	615.23

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G151	08/10/2020	614.11
G151	10/13/2020	613.39
G151	01/20/2021	613.86
G151	02/01/2021	615.07
G151	04/20/2021	614.53
G151	07/26/2021	614.83
G151	08/16/2021	615.06
G152	07/23/2015	616.47
G152	10/06/2015	614.06
G152	11/12/2016	615.74
G152	02/04/2017	616.51
G152	05/13/2017	616.13
G152	07/08/2017	616.06
G152	10/21/2017	612.77
G152	05/08/2018	616.05
G152	08/02/2018	614.85
G152	10/23/2018	614.35
G152	01/15/2019	614.59
G152	08/05/2019	615.53
G152	01/20/2020	617.44
G152	08/10/2020	614.46
G152	10/13/2020	613.13
G152	01/20/2021	614.87
G152	02/01/2021	613.13
G152	04/20/2021	615.34
G152	07/26/2021	616.76
G152	08/16/2021	615.30
G153	07/23/2015	615.93
G153	10/06/2015	614.45
G153	11/12/2016	615.15
G153	02/04/2017	616.30
G153	05/13/2017	615.25
G153	07/08/2017	616.19
G153	10/21/2017	612.37
G153	05/08/2018	615.07
G153	08/02/2018	614.01
G153	10/23/2018	613.31
G153	01/15/2019	614.36
G153	08/05/2019	614.45
G153	01/20/2020	616.16
G153	08/10/2020	613.72
G153	10/13/2020	612.16
G153	01/20/2021	612.66
G153	02/01/2021	613.18
G153	04/20/2021	615.52
G153	07/26/2021	613.97

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G153	08/16/2021	614.19
G154	07/23/2015	614.85
G154	10/06/2015	612.24
G154	11/12/2016	614.68
G154	02/04/2017	615.25
G154	05/13/2017	614.93
G154	07/08/2017	613.53
G154	10/21/2017	610.33
G154	05/08/2018	614.78
G154	08/02/2018	613.75
G154	10/23/2018	613.06
G154	01/15/2019	613.66
G154	08/05/2019	613.86
G154	01/20/2020	618.28
G154	08/10/2020	612.57
G154	10/13/2020	610.84
G154	01/20/2021	612.41
G154	02/01/2021	617.01
G154	04/20/2021	614.81
G154	07/26/2021	615.21
G154	08/16/2021	615.45
G155	07/23/2015	614.45
G155	10/06/2015	613.51
G155	11/12/2016	613.93
G155	02/04/2017	614.09
G155	05/13/2017	614.59
G155	07/08/2017	614.75
G155	10/21/2017	609.91
G155	05/08/2018	614.41
G155	08/02/2018	613.68
G155	10/23/2018	612.80
G155	01/15/2019	613.56
G155	08/05/2019	613.71
G155	01/20/2020	615.99
G155	08/10/2020	613.09
G155	10/13/2020	612.10
G155	01/20/2021	612.72
G155	02/01/2021	614.59
G155	04/20/2021	613.94
G155	07/26/2021	613.81
G155	08/16/2021	614.01
G200	10/05/2015	621.05
G200	11/16/2015	621.66
G200	02/08/2016	623.29
G200	05/09/2016	622.52
G200	07/25/2016	622.82

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G200	11/12/2016	622.82
G200	02/04/2017	621.13
G200	05/13/2017	622.86
G200	07/08/2017	622.96
G200	10/21/2017	618.84
G200	01/25/2018	620.39
G200	05/08/2018	622.52
G200	08/02/2018	621.54
G200	10/23/2018	621.14
G200	01/15/2019	621.98
G200	08/05/2019	622.04
G200	01/20/2020	622.72
G200	08/10/2020	618.16
G200	10/13/2020	615.63
G200	01/20/2021	619.63
G200	01/29/2021	619.63
G200	03/29/2021	623.27
G200	04/20/2021	621.86
G200	04/21/2021	622.19
G200	05/03/2021	622.69
G200	05/06/2021	623.36
G200	05/17/2021	622.10
G200	06/09/2021	620.84
G200	06/23/2021	619.38
G200	07/12/2021	620.52
G200	07/26/2021	619.74
G200	07/28/2021	619.56
G200	08/16/2021	619.88
G205	02/08/2016	620.10
G205	05/09/2016	620.48
G205	07/25/2016	619.81
G205	11/12/2016	620.04
G205	02/04/2017	621.45
G205	05/13/2017	619.54
G205	07/08/2017	619.93
G205	10/21/2017	616.33
G206	10/07/2015	620.69
G206	11/16/2015	619.27
G206	02/08/2016	621.92
G206	05/09/2016	622.30
G206	06/27/2016	620.51
G206	07/25/2016	621.71
G206	11/12/2016	621.44
G206	02/04/2017	622.68
G206	05/13/2017	621.67
G206	07/08/2017	622.00

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G206	10/21/2017	616.61
G206	05/08/2018	620.71
G206	08/02/2018	621.87
G206	10/23/2018	619.71
G206	01/15/2019	618.82
G206	08/05/2019	621.56
G206	01/20/2020	622.76
G206	05/05/2020	623.02
G206	08/10/2020	619.92
G206	10/13/2020	617.84
G206	01/20/2021	621.50
G206	01/27/2021	621.50
G206	04/20/2021	622.07
G206	05/03/2021	622.60
G206	05/17/2021	622.31
G206	06/09/2021	621.71
G206	06/23/2021	620.54
G206	07/12/2021	622.39
G206	07/26/2021	622.00
G206	08/16/2021	622.08
G206D	03/29/2021	583.94
G206D	03/30/2021	584.34
G206D	04/20/2021	585.96
G206D	04/22/2021	584.64
G206D	05/03/2021	587.42
G206D	05/05/2021	586.96
G206D	05/17/2021	587.81
G206D	05/18/2021	587.82
G206D	06/09/2021	584.19
G206D	06/23/2021	589.66
G206D	07/12/2021	590.72
G206D	07/26/2021	591.14
G206D	07/27/2021	591.15
G206D	08/16/2021	592.00
G207	10/07/2015	620.72
G207	02/08/2016	622.18
G207	05/09/2016	622.56
G207	07/25/2016	622.06
G207	11/12/2016	622.54
G207	02/04/2017	623.24
G207	05/13/2017	623.39
G207	07/08/2017	621.31
G207	10/21/2017	619.41
G207	05/08/2018	622.96
G207	08/02/2018	623.21
G207	10/23/2018	621.64

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G207	01/15/2019	620.30
G207	08/05/2019	621.21
G207	01/20/2020	622.62
G207	08/10/2020	619.71
G207	10/13/2020	617.71
G207	01/20/2021	621.85
G207	01/28/2021	621.86
G207	04/20/2021	622.30
G207	07/26/2021	622.25
G207	08/16/2021	622.36
G208	10/07/2015	620.62
G208	02/08/2016	622.19
G208	05/09/2016	622.63
G208	07/25/2016	622.20
G208	11/12/2016	622.61
G208	02/04/2017	624.07
G208	05/13/2017	622.75
G208	07/08/2017	622.04
G208	10/21/2017	618.97
G208	05/08/2018	622.94
G208	08/02/2018	622.54
G208	10/23/2018	620.66
G208	01/15/2019	622.28
G208	08/05/2019	622.46
G208	01/20/2020	622.65
G208	08/10/2020	619.56
G208	10/13/2020	617.65
G208	01/20/2021	622.09
G208	01/27/2021	622.13
G208	04/20/2021	622.37
G208	07/26/2021	622.37
G208	08/16/2021	622.50
G209	10/07/2015	620.56
G209	11/16/2015	620.06
G209	02/08/2016	622.26
G209	05/09/2016	622.74
G209	07/25/2016	621.52
G209	11/12/2016	621.65
G209	02/04/2017	623.18
G209	05/13/2017	621.86
G209	07/08/2017	621.50
G209	10/21/2017	617.76
G209	01/25/2018	619.95
G209	05/08/2018	621.35
G209	08/02/2018	621.56
G209	10/23/2018	619.91

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G209	01/15/2019	621.80
G209	05/03/2019	623.09
G209	08/05/2019	621.46
G209	01/20/2020	622.69
G209	05/05/2020	622.96
G209	08/10/2020	619.59
G209	10/13/2020	617.69
G209	01/20/2021	621.94
G209	01/27/2021	621.94
G209	04/20/2021	622.40
G209	05/03/2021	622.82
G209	05/17/2021	622.51
G209	06/09/2021	622.03
G209	06/23/2021	620.89
G209	07/12/2021	622.08
G209	07/26/2021	622.41
G209	08/16/2021	622.56
G210	10/07/2015	619.83
G210	02/08/2016	621.72
G210	05/09/2016	622.50
G210	07/25/2016	620.94
G210	11/12/2016	621.05
G210	02/04/2017	621.69
G210	05/13/2017	620.77
G210	07/08/2017	621.03
G210	10/21/2017	616.82
G210	05/08/2018	620.19
G210	08/02/2018	620.15
G210	10/23/2018	618.92
G210	01/15/2019	620.82
G210	08/05/2019	620.50
G210	01/20/2020	622.33
G210	08/10/2020	619.97
G210	10/13/2020	618.00
G210	01/20/2021	620.58
G210	01/27/2021	620.40
G210	04/20/2021	622.18
G210	07/26/2021	622.18
G210	08/16/2021	622.28
G211	10/07/2015	619.00
G211	02/08/2016	622.08
G211	05/09/2016	622.45
G211	07/25/2016	621.81
G211	11/12/2016	621.28
G211	02/04/2017	622.15
G211	05/13/2017	621.34

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G211	07/08/2017	622.09
G211	10/21/2017	618.14
G211	05/08/2018	620.69
G211	08/02/2018	620.63
G211	10/23/2018	619.52
G211	01/15/2019	620.22
G211	08/05/2019	620.66
G211	01/20/2020	622.20
G211	08/10/2020	619.83
G211	10/13/2020	617.77
G211	01/20/2021	620.22
G211	01/27/2021	620.50
G211	04/20/2021	622.04
G211	07/26/2021	621.82
G211	08/16/2021	621.91
G212	10/07/2015	620.76
G212	11/16/2015	618.54
G212	02/08/2016	621.99
G212	05/09/2016	622.04
G212	07/25/2016	620.89
G212	11/12/2016	621.00
G212	02/04/2017	621.87
G212	05/13/2017	621.32
G212	07/08/2017	620.81
G212	10/21/2017	617.19
G212	05/08/2018	620.82
G212	08/02/2018	620.80
G212	10/23/2018	619.43
G212	01/15/2019	621.13
G212	08/05/2019	620.26
G212	01/20/2020	622.10
G212	08/10/2020	619.14
G212	10/13/2020	616.90
G212	01/20/2021	620.08
G212	01/26/2021	620.08
G212	04/20/2021	621.60
G212	05/03/2021	622.12
G212	05/17/2021	621.74
G212	06/09/2021	621.19
G212	06/23/2021	619.96
G212	06/29/2021	620.08
G212	07/12/2021	620.55
G212	07/26/2021	621.13
G212	08/16/2021	621.41
G213	10/07/2015	620.21
G213	02/08/2016	621.20

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G213	05/09/2016	621.69
G213	07/25/2016	620.36
G213	11/12/2016	620.78
G213	02/04/2017	621.21
G213	05/13/2017	621.16
G213	07/08/2017	620.40
G213	10/21/2017	618.62
G213	05/08/2018	620.88
G213	08/02/2018	620.35
G213	10/23/2018	619.83
G213	01/15/2019	620.81
G213	08/05/2019	621.08
G213	01/20/2020	621.72
G213	08/10/2020	618.66
G213	10/13/2020	616.56
G213	01/20/2021	619.61
G213	01/27/2021	619.97
G213	04/20/2021	621.28
G213	07/26/2021	620.96
G213	08/16/2021	621.20
G214	10/07/2015	617.56
G214	02/08/2016	618.11
G214	05/09/2016	619.39
G214	07/25/2016	617.75
G214	11/12/2016	618.16
G214	02/04/2017	618.77
G214	05/13/2017	618.51
G214	07/08/2017	618.25
G214	10/21/2017	614.52
G214	05/08/2018	618.17
G214	08/02/2018	617.35
G214	10/23/2018	616.87
G214	01/15/2019	618.57
G214	08/05/2019	616.99
G214	01/20/2020	619.38
G214	08/10/2020	616.32
G214	10/13/2020	614.47
G214	01/20/2021	616.45
G214	01/27/2021	616.64
G214	04/20/2021	618.60
G214	07/26/2021	618.39
G214	08/16/2021	618.55
G215	10/07/2015	616.56
G215	11/16/2015	616.38
G215	02/08/2016	618.31
G215	05/09/2016	619.45

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G215	07/25/2016	617.10
G215	11/12/2016	617.91
G215	02/04/2017	618.34
G215	05/13/2017	618.16
G215	07/08/2017	617.01
G215	10/21/2017	615.48
G215	05/08/2018	617.80
G215	08/02/2018	618.00
G215	10/23/2018	616.26
G215	01/15/2019	618.03
G215	08/05/2019	617.55
G215	01/20/2020	619.51
G215	08/10/2020	617.11
G215	10/14/2020	618.58
G215	01/20/2021	617.19
G215	01/26/2021	617.19
G215	04/20/2021	618.83
G215	05/03/2021	619.20
G215	05/17/2021	619.10
G215	06/09/2021	618.65
G215	06/23/2021	617.45
G215	06/29/2021	617.72
G215	07/12/2021	618.24
G215	07/26/2021	618.79
G215	08/16/2021	618.91
G216	10/07/2015	616.66
G216	02/08/2016	618.74
G216	05/09/2016	619.81
G216	07/25/2016	617.68
G216	11/12/2016	617.68
G216	02/04/2017	618.06
G216	05/13/2017	617.76
G216	07/08/2017	617.21
G216	10/21/2017	614.37
G216	05/08/2018	616.88
G216	08/02/2018	616.99
G216	10/23/2018	615.92
G216	01/15/2019	616.96
G216	08/05/2019	618.04
G216	01/20/2020	619.86
G216	08/10/2020	617.54
G216	10/14/2020	615.85
G216	01/20/2021	617.65
G216	01/28/2021	617.48
G216	04/20/2021	619.25
G216	07/26/2021	619.20

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G216	08/16/2021	619.30
G217	10/07/2015	616.71
G217	02/08/2016	618.25
G217	05/09/2016	619.13
G217	07/25/2016	617.81
G217	11/12/2016	617.81
G217	02/04/2017	618.13
G217	05/13/2017	618.04
G217	07/08/2017	618.12
G217	10/21/2017	614.32
G217	05/08/2018	617.21
G217	08/02/2018	617.06
G217	10/23/2018	616.17
G217	01/15/2019	617.10
G217	08/05/2019	617.10
G217	01/20/2020	619.01
G217	08/10/2020	616.20
G217	10/14/2020	614.57
G217	01/20/2021	616.74
G217	01/28/2021	616.84
G217	04/20/2021	618.45
G217	07/26/2021	617.93
G217	08/16/2021	618.04
G218	10/07/2015	616.93
G218	11/16/2015	617.11
G218	02/08/2016	619.05
G218	05/09/2016	620.10
G218	07/25/2016	618.01
G218	11/12/2016	618.39
G218	02/04/2017	618.19
G218	05/13/2017	618.56
G218	07/08/2017	618.19
G218	10/21/2017	614.46
G218	01/26/2018	616.46
G218	05/08/2018	617.87
G218	08/02/2018	618.01
G218	10/23/2018	616.66
G218	01/15/2019	617.21
G218	08/05/2019	617.86
G218	01/20/2020	619.93
G218	08/10/2020	617.42
G218	10/14/2020	615.65
G218	01/20/2021	617.53
G218	01/26/2021	617.53
G218	04/20/2021	619.53
G218	05/03/2021	619.90

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G218	05/17/2021	619.72
G218	06/09/2021	619.32
G218	06/23/2021	617.87
G218	07/12/2021	618.60
G218	07/26/2021	619.11
G218	08/16/2021	619.33
G270	10/05/2015	616.07
G270	11/16/2015	621.06
G270	02/08/2016	622.94
G270	05/09/2016	622.77
G270	07/25/2016	617.73
G270	11/12/2016	618.31
G270	02/04/2017	619.02
G270	05/13/2017	618.83
G270	07/08/2017	617.99
G270	10/21/2017	614.45
G270	05/08/2018	618.76
G270	08/02/2018	616.56
G270	10/23/2018	617.01
G270	01/15/2019	618.46
G270	08/05/2019	622.12
G270	01/20/2020	622.11
G270	08/10/2020	618.11
G270	10/14/2020	616.17
G270	01/20/2021	622.51
G270	01/21/2021	622.57
G270	03/29/2021	623.38
G270	03/30/2021	623.44
G270	04/20/2021	622.74
G270	04/21/2021	622.85
G270	05/03/2021	623.08
G270	05/06/2021	623.27
G270	05/17/2021	622.87
G270	05/19/2021	623.30
G270	06/09/2021	621.75
G270	06/15/2021	620.09
G270	06/23/2021	619.06
G270	06/29/2021	621.69
G270	07/12/2021	622.56
G270	07/26/2021	622.39
G270	07/27/2021	622.30
G270	08/16/2021	622.54
G271	10/08/2015	614.12
G271	11/16/2015	613.77
G271	02/08/2016	615.87
G271	05/09/2016	616.05

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G271	07/25/2016	616.62
G271	11/12/2016	616.49
G271	02/04/2017	617.95
G271	05/13/2017	616.46
G271	07/08/2017	616.47
G271	07/17/2017	616.47
G271	10/21/2017	613.31
G271	05/08/2018	615.70
G271	08/02/2018	615.70
G271	10/23/2018	614.73
G271	01/15/2019	617.40
G271	08/05/2019	617.63
G271	01/20/2020	617.83
G271	08/10/2020	614.18
G271	08/13/2020	614.18
G271	10/14/2020	612.90
G271	01/20/2021	613.91
G271	02/01/2021	613.91
G271	04/20/2021	615.51
G271	05/03/2021	615.96
G271	05/17/2021	615.78
G271	06/09/2021	615.52
G271	06/23/2021	615.02
G271	07/12/2021	615.57
G271	07/26/2021	615.67
G271	08/16/2021	615.78
G272	10/08/2015	612.56
G272	02/08/2016	614.93
G272	05/09/2016	614.96
G272	07/25/2016	614.79
G272	11/12/2016	614.34
G272	02/04/2017	615.08
G272	05/13/2017	614.23
G272	07/08/2017	615.12
G272	10/21/2017	611.45
G272	05/08/2018	613.58
G272	08/02/2018	613.44
G272	10/23/2018	612.96
G272	01/15/2019	615.43
G272	08/05/2019	616.88
G272	01/20/2020	616.49
G272	08/10/2020	613.19
G272	10/14/2020	611.89
G272	01/20/2021	613.01
G272	02/01/2021	616.48
G272	04/20/2021	614.50

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G272	07/26/2021	614.44
G272	08/16/2021	614.47
G273	10/08/2015	610.41
G273	11/16/2015	611.82
G273	02/08/2016	613.26
G273	05/09/2016	612.83
G273	07/25/2016	611.27
G273	11/12/2016	610.83
G273	02/04/2017	611.47
G273	05/13/2017	610.77
G273	07/08/2017	611.29
G273	07/17/2017	611.29
G273	10/21/2017	608.91
G273	05/08/2018	610.16
G273	08/02/2018	610.46
G273	10/23/2018	608.82
G273	01/15/2019	610.28
G273	08/05/2019	610.23
G273	01/20/2020	614.20
G273	08/10/2020	611.52
G273	08/13/2020	611.52
G273	10/14/2020	610.31
G273	01/20/2021	611.52
G273	02/01/2021	611.52
G273	04/20/2021	612.42
G273	05/03/2021	612.90
G273	05/17/2021	612.63
G273	06/09/2021	612.24
G273	06/23/2021	611.79
G273	07/12/2021	612.22
G273	07/26/2021	612.35
G273	08/16/2021	613.52
G274	10/08/2015	610.06
G274	02/08/2016	610.22
G274	05/09/2016	609.97
G274	07/25/2016	611.06
G274	11/12/2016	610.86
G274	02/04/2017	612.00
G274	05/13/2017	611.18
G274	07/08/2017	611.55
G274	10/21/2017	607.79
G274	05/08/2018	610.84
G274	08/02/2018	611.44
G274	10/23/2018	609.52
G274	01/15/2019	611.23
G274	08/05/2019	611.31

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G274	01/20/2020	611.23
G274	08/10/2020	609.29
G274	10/14/2020	608.49
G274	01/20/2021	610.36
G274	02/01/2021	611.18
G274	04/20/2021	609.89
G274	07/26/2021	609.82
G274	08/16/2021	609.88
G275	02/08/2016	604.71
G275	05/09/2016	604.76
G275	07/25/2016	603.17
G275	11/12/2016	604.28
G275	02/04/2017	603.65
G275	05/13/2017	604.67
G275	07/08/2017	602.97
G275	05/08/2018	604.26
G275	08/02/2018	604.16
G275	10/23/2018	604.46
G275	01/15/2019	605.91
G275	08/05/2019	605.97
G275	01/20/2020	605.63
G275	08/10/2020	604.95
G275	01/20/2021	605.02
G275	04/20/2021	605.00
G275	07/13/2021	605.63
G275	07/26/2021	605.05
G275	08/16/2021	605.09
G275D	03/30/2021	570.32
G275D	04/20/2021	570.98
G275D	04/22/2021	568.33
G275D	05/03/2021	569.75
G275D	05/05/2021	570.26
G275D	05/17/2021	568.67
G275D	05/18/2021	569.00
G275D	06/09/2021	570.31
G275D	06/23/2021	569.71
G275D	07/12/2021	570.43
G275D	07/26/2021	570.35
G275D	07/28/2021	570.68
G275D	08/16/2021	571.48
G276	11/16/2015	603.25
G276	02/08/2016	603.71
G276	05/09/2016	604.71
G276	07/25/2016	604.92
G276	11/12/2016	603.60
G276	02/04/2017	603.72

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G276	05/13/2017	603.40
G276	07/08/2017	604.05
G276	07/18/2017	604.05
G276	05/08/2018	603.11
G276	08/02/2018	606.60
G276	10/23/2018	603.35
G276	01/15/2019	604.00
G276	08/05/2019	603.96
G276	01/20/2020	605.08
G276	08/10/2020	604.63
G276	08/12/2020	604.63
G276	10/14/2020	603.59
G276	01/20/2021	603.71
G276	04/20/2021	604.65
G276	05/03/2021	604.71
G276	05/17/2021	604.88
G276	06/09/2021	604.93
G276	06/23/2021	604.53
G276	06/28/2021	604.58
G276	07/12/2021	604.55
G276	07/26/2021	604.68
G276	08/16/2021	604.73
G277	02/08/2016	602.98
G277	05/09/2016	603.79
G277	07/25/2016	602.08
G277	11/12/2016	601.23
G277	02/04/2017	603.58
G277	05/13/2017	601.29
G277	07/08/2017	603.09
G277	10/21/2017	601.53
G277	10/23/2018	601.28
G277	01/15/2019	603.38
G277	08/05/2019	602.15
G277	01/20/2020	603.49
G277	08/10/2020	603.29
G277	04/20/2021	603.33
G277	07/26/2021	603.33
G278	02/08/2016	606.56
G278	05/09/2016	607.00
G278	07/25/2016	604.57
G278	11/12/2016	604.29
G278	02/04/2017	606.38
G278	05/13/2017	604.30
G278	07/08/2017	604.84
G278	10/21/2017	604.54
G278	05/08/2018	605.31

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G278	08/02/2018	604.57
G278	10/23/2018	604.29
G278	01/15/2019	605.40
G278	08/05/2019	605.19
G278	01/20/2020	608.15
G278	08/10/2020	606.83
G278	10/14/2020	605.55
G278	01/20/2021	605.18
G278	04/20/2021	606.47
G278	07/26/2021	607.49
G278	08/16/2021	607.62
G279	10/08/2015	608.14
G279	11/16/2015	607.80
G279	02/08/2016	609.16
G279	05/09/2016	610.17
G279	07/25/2016	606.94
G279	11/12/2016	606.93
G279	02/04/2017	607.96
G279	05/13/2017	606.74
G279	07/08/2017	607.04
G279	07/18/2017	607.04
G279	05/08/2018	606.42
G279	08/02/2018	605.87
G279	10/23/2018	604.87
G279	01/15/2019	606.79
G279	08/05/2019	605.90
G279	01/20/2020	611.08
G279	08/10/2020	607.17
G279	08/12/2020	607.17
G279	10/14/2020	605.54
G279	01/20/2021	607.07
G279	01/28/2021	607.07
G279	04/20/2021	608.97
G279	05/03/2021	609.38
G279	05/17/2021	609.22
G279	06/09/2021	599.69
G279	06/23/2021	607.74
G279	07/12/2021	608.18
G279	07/26/2021	608.57
G279	08/16/2021	608.95
G280	10/08/2015	614.54
G280	11/16/2015	618.45
G280	02/08/2016	621.37
G280	05/09/2016	621.94
G280	07/25/2016	618.21
G280	11/12/2016	618.46

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G280	02/04/2017	619.10
G280	05/13/2017	618.56
G280	07/08/2017	619.45
G280	07/18/2017	619.45
G280	10/21/2017	614.47
G280	05/08/2018	618.00
G280	08/02/2018	616.70
G280	10/23/2018	615.75
G280	01/15/2019	616.24
G280	08/05/2019	616.09
G280	01/20/2020	622.33
G280	08/10/2020	619.50
G280	08/11/2020	619.50
G280	10/14/2020	617.45
G280	01/20/2021	618.20
G280	01/28/2021	618.70
G280	03/29/2021	620.61
G280	03/30/2021	621.22
G280	04/20/2021	619.76
G280	04/22/2021	620.13
G280	05/03/2021	620.21
G280	05/06/2021	620.89
G280	05/17/2021	619.98
G280	05/19/2021	620.72
G280	06/09/2021	619.75
G280	06/23/2021	618.93
G280	06/28/2021	619.02
G280	07/12/2021	619.26
G280	07/13/2021	619.50
G280	07/26/2021	619.75
G280	07/27/2021	619.66
G280	08/16/2021	620.00
G281	11/16/2015	619.56
G281	02/08/2016	621.21
G281	05/09/2016	620.93
G281	07/25/2016	620.30
G281	11/12/2016	620.01
G281	02/04/2017	620.37
G281	05/13/2017	619.96
G281	07/08/2017	619.17
G281	10/21/2017	616.41
G281	05/08/2018	619.33
G281	08/02/2018	618.36
G281	10/23/2018	617.26
G281	01/15/2019	618.19
G281	08/05/2019	620.16

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G281	01/20/2020	621.26
G281	08/10/2020	619.26
G281	01/20/2021	619.36
G281	01/29/2021	619.36
G281	03/29/2021	621.68
G281	03/31/2021	621.29
G281	04/20/2021	619.62
G281	04/21/2021	619.77
G281	05/03/2021	620.60
G281	05/05/2021	620.85
G281	05/17/2021	620.13
G281	06/09/2021	619.65
G281	06/14/2021	619.46
G281	06/23/2021	618.71
G281	06/28/2021	619.77
G281	07/12/2021	620.23
G281	07/26/2021	620.02
G281	07/27/2021	619.92
G281	08/16/2021	619.81
G283	03/29/2021	607.80
G283	03/31/2021	607.34
G283	04/20/2021	606.34
G283	04/22/2021	606.09
G283	05/03/2021	606.81
G283	05/06/2021	606.79
G283	05/17/2021	606.30
G283	05/18/2021	606.54
G283	06/09/2021	605.13
G283	06/15/2021	604.95
G283	06/23/2021	604.56
G283	06/29/2021	605.29
G283	07/12/2021	605.50
G283	07/13/2021	605.82
G283	07/26/2021	605.18
G283	07/27/2021	605.08
G283	08/16/2021	605.12
G284	03/29/2021	611.14
G284	03/30/2021	610.95
G284	04/20/2021	608.16
G284	04/21/2021	607.65
G284	05/03/2021	609.33
G284	05/06/2021	610.72
G284	05/17/2021	608.16
G284	05/18/2021	609.49
G284	06/09/2021	607.07
G284	06/14/2021	606.95

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G284	06/23/2021	606.17
G284	06/28/2021	608.02
G284	07/12/2021	607.68
G284	07/13/2021	607.69
G284	07/26/2021	607.11
G284	07/27/2021	606.95
G284	08/16/2021	606.98
G285	03/29/2021	608.62
G285	03/30/2021	608.81
G285	04/20/2021	608.13
G285	04/22/2021	603.79
G285	05/03/2021	606.99
G285	05/06/2021	607.57
G285	05/17/2021	607.47
G285	05/18/2021	607.51
G285	06/09/2021	607.39
G285	06/15/2021	607.08
G285	06/23/2021	604.33
G285	06/28/2021	604.93
G285	07/12/2021	604.80
G285	07/13/2021	604.92
G285	07/26/2021	605.27
G285	07/27/2021	605.37
G285	08/16/2021	606.28
G286	03/29/2021	609.08
G286	03/31/2021	608.22
G286	04/20/2021	606.63
G286	04/22/2021	606.15
G286	05/03/2021	606.97
G286	05/06/2021	608.56
G286	05/17/2021	606.44
G286	05/18/2021	606.57
G286	06/09/2021	604.68
G286	06/15/2021	602.98
G286	07/12/2021	605.90
G286	07/13/2021	606.00
G287	03/29/2021	610.22
G287	04/20/2021	608.67
G287	04/22/2021	608.03
G287	05/03/2021	609.28
G287	05/06/2021	610.29
G287	05/17/2021	608.41
G287	05/18/2021	609.32
G287	06/09/2021	607.59
G287	06/14/2021	617.45
G287	07/12/2021	610.83

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G287	07/13/2021	607.78
G287	08/16/2021	607.76
G288	03/29/2021	616.32
G288	03/30/2021	615.89
G288	04/20/2021	613.90
G288	04/21/2021	613.56
G288	05/03/2021	614.51
G288	05/06/2021	616.00
G288	05/17/2021	613.87
G288	05/18/2021	616.15
G288	06/09/2021	612.90
G288	06/15/2021	612.47
G288	06/23/2021	611.90
G288	06/28/2021	612.91
G288	07/12/2021	613.59
G288	07/13/2021	615.11
G288	07/26/2021	612.85
G288	07/27/2021	612.75
G288	08/16/2021	612.98
G301	11/16/2015	616.51
G301	02/08/2016	617.21
G301	05/09/2016	616.75
G301	07/25/2016	614.65
G301	11/12/2016	614.08
G301	02/04/2017	614.15
G301	05/13/2017	614.15
G301	07/08/2017	614.88
G301	10/21/2017	610.39
G301	05/08/2018	613.73
G301	08/02/2018	615.05
G301	10/23/2018	612.46
G301	01/15/2019	613.23
G301	08/05/2019	613.82
G301	01/20/2020	618.07
G301	08/10/2020	615.16
G301	01/20/2021	616.03
G301	01/27/2021	616.03
G301	04/20/2021	616.05
G301	05/03/2021	616.12
G301	05/17/2021	615.99
G301	06/09/2021	615.63
G301	06/23/2021	615.02
G301	07/12/2021	615.79
G301	07/26/2021	615.31
G301	08/16/2021	615.45
G302	11/16/2015	610.74

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G302	02/08/2016	613.14
G302	05/09/2016	614.60
G302	07/25/2016	608.16
G302	11/12/2016	607.92
G302	02/04/2017	608.95
G302	05/13/2017	608.02
G302	07/08/2017	608.42
G302	10/21/2017	604.64
G302	05/08/2018	607.59
G302	08/02/2018	608.26
G302	10/23/2018	605.54
G302	01/15/2019	607.29
G302	08/05/2019	609.95
G302	01/20/2020	615.41
G302	08/10/2020	608.05
G302	01/20/2021	609.99
G302	01/27/2021	609.99
G302	04/20/2021	611.85
G302	05/03/2021	612.07
G302	05/17/2021	612.06
G302	06/09/2021	610.29
G302	06/23/2021	608.79
G302	07/12/2021	611.79
G302	07/26/2021	610.98
G302	08/16/2021	611.77
G303	11/16/2015	616.70
G303	02/08/2016	617.87
G303	05/09/2016	617.97
G303	07/25/2016	614.92
G303	11/12/2016	614.38
G303	02/04/2017	614.95
G303	05/13/2017	614.81
G303	07/08/2017	614.97
G303	10/21/2017	611.18
G303	05/08/2018	614.16
G303	08/02/2018	614.06
G303	10/23/2018	613.05
G303	01/15/2019	614.33
G303	08/05/2019	617.37
G303	01/20/2020	618.05
G303	08/10/2020	615.16
G303	01/20/2021	616.17
G303	01/26/2021	616.17
G303	04/20/2021	617.27
G303	05/03/2021	618.02
G303	05/17/2021	617.37

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G303	06/09/2021	616.52
G303	06/23/2021	614.92
G303	07/12/2021	617.15
G303	07/26/2021	616.44
G303	08/16/2021	616.58
G304	11/16/2015	623.78
G304	02/08/2016	624.07
G304	05/09/2016	623.91
G304	07/25/2016	626.72
G305	05/09/2016	618.48
G305	07/01/2016	616.28
G305	07/25/2016	618.24
G305	09/29/2016	617.33
G305	11/12/2016	618.06
G305	02/04/2017	620.49
G305	05/13/2017	618.27
G305	07/08/2017	618.28
G305	10/21/2017	615.30
G305	05/08/2018	617.87
G305	08/02/2018	617.79
G305	10/23/2018	616.56
G305	01/15/2019	616.95
G305	08/05/2019	616.85
G305	01/20/2020	619.36
G305	08/10/2020	617.02
G305	01/20/2021	618.63
G305	04/20/2021	618.77
G305	05/03/2021	619.11
G305	05/17/2021	618.90
G305	06/09/2021	618.04
G305	06/23/2021	616.94
G305	07/12/2021	618.55
G305	07/26/2021	618.18
G305	08/16/2021	618.31
G306	05/09/2016	619.74
G306	07/01/2016	615.11
G306	07/25/2016	619.26
G306	09/29/2016	617.64
G306	11/12/2016	618.77
G306	02/04/2017	618.97
G306	05/13/2017	619.03
G306	07/08/2017	619.45
G306	10/21/2017	616.12
G306	05/08/2018	618.96
G306	08/02/2018	621.73
G306	10/23/2018	617.24

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G306	01/15/2019	618.56
G306	08/05/2019	619.18
G306	01/20/2020	620.28
G306	08/10/2020	617.26
G306	01/20/2021	619.17
G306	01/26/2021	618.98
G306	03/29/2021	620.42
G306	04/20/2021	619.30
G306	04/21/2021	619.53
G306	05/03/2021	619.96
G306	05/05/2021	620.27
G306	05/17/2021	619.44
G306	05/18/2021	619.56
G306	06/09/2021	618.04
G306	06/15/2021	617.29
G306	06/23/2021	616.32
G306	06/28/2021	618.31
G306	07/12/2021	620.59
G306	07/14/2021	620.17
G306	07/26/2021	618.84
G306	07/27/2021	618.70
G306	08/16/2021	618.92
G307	07/25/2016	624.30
G307	09/29/2016	623.85
G307	11/12/2016	624.44
G307	02/04/2017	624.60
G307	05/13/2017	624.56
G307	07/08/2017	623.55
G307	10/21/2017	624.60
G307	05/08/2018	624.37
G307	08/02/2018	619.33
G307	10/23/2018	623.95
G307	01/15/2019	624.31
G307	08/05/2019	624.21
G307	05/06/2020	624.72
G307	08/10/2020	624.36
G307	01/20/2021	624.10
G307	01/27/2021	624.10
G307	04/20/2021	624.50
G307	05/17/2021	624.45
G307	07/12/2021	624.45
G307	08/16/2021	624.46
G307D	03/29/2021	622.43
G307D	04/20/2021	622.48
G307D	04/21/2021	622.46
G307D	05/03/2021	622.47

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G307D	05/04/2021	622.44
G307D	05/17/2021	622.44
G307D	05/18/2021	622.46
G307D	06/09/2021	622.43
G307D	06/15/2021	622.42
G307D	06/23/2021	622.42
G307D	07/12/2021	622.59
G307D	07/26/2021	622.26
G307D	07/27/2021	622.51
G307D	08/16/2021	621.49
G308	03/29/2021	621.03
G308	04/20/2021	619.67
G308	04/21/2021	620.15
G308	05/03/2021	620.04
G308	05/05/2021	621.01
G308	05/17/2021	619.93
G308	06/09/2021	619.17
G308	06/14/2021	619.06
G308	06/23/2021	618.54
G308	06/28/2021	620.44
G308	07/12/2021	620.22
G308	07/14/2021	620.67
G308	07/26/2021	619.68
G308	07/27/2021	619.44
G308	08/16/2021	619.45
G309	03/29/2021	621.09
G309	04/20/2021	618.88
G309	04/21/2021	618.88
G309	04/22/2021	618.88
G309	05/03/2021	619.04
G309	05/05/2021	619.84
G309	05/17/2021	618.83
G309	06/09/2021	618.43
G309	06/14/2021	618.25
G309	06/23/2021	617.89
G309	06/28/2021	618.95
G309	07/12/2021	619.31
G309	07/13/2021	620.17
G309	07/26/2021	618.88
G309	07/27/2021	618.78
G309	08/16/2021	618.91
G310	03/29/2021	617.27
G310	04/20/2021	614.41
G310	04/22/2021	614.40
G310	05/03/2021	614.61
G310	05/04/2021	615.01

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G310	05/17/2021	614.47
G310	05/19/2021	616.01
G310	06/09/2021	613.83
G310	06/15/2021	613.54
G310	06/23/2021	613.20
G310	06/28/2021	614.15
G310	07/12/2021	614.81
G310	07/13/2021	615.88
G310	07/26/2021	614.13
G310	07/28/2021	614.00
G310	08/16/2021	614.29
G311	03/29/2021	616.54
G311	03/30/2021	616.21
G311	04/20/2021	613.75
G311	04/22/2021	613.68
G311	05/03/2021	614.01
G311	05/04/2021	615.13
G311	05/17/2021	613.86
G311	05/19/2021	615.78
G311	06/09/2021	613.13
G311	06/15/2021	612.78
G311	06/23/2021	612.45
G311	06/29/2021	613.31
G311	07/12/2021	613.75
G311	07/14/2021	615.37
G311	07/26/2021	613.05
G311	07/27/2021	612.94
G311	08/16/2021	613.30
G311D	03/29/2021	575.42
G311D	03/30/2021	575.73
G311D	04/20/2021	575.29
G311D	04/22/2021	575.74
G311D	05/03/2021	573.09
G311D	05/04/2021	573.23
G311D	05/17/2021	572.40
G311D	05/19/2021	572.91
G311D	06/09/2021	573.85
G311D	06/15/2021	575.25
G311D	06/23/2021	571.74
G311D	07/12/2021	571.63
G311D	07/26/2021	569.74
G311D	07/28/2021	569.98
G311D	08/16/2021	570.34
G312	03/29/2021	612.19
G312	03/30/2021	611.97
G312	04/20/2021	609.11

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G312	04/22/2021	608.97
G312	05/03/2021	609.47
G312	05/04/2021	610.07
G312	05/17/2021	609.27
G312	05/19/2021	610.89
G312	06/09/2021	608.31
G312	06/15/2021	607.64
G312	06/23/2021	606.99
G312	06/29/2021	608.07
G312	07/12/2021	608.70
G312	07/13/2021	610.23
G312	07/26/2021	608.56
G312	07/27/2021	608.47
G312	08/16/2021	609.09
G313	03/29/2021	611.78
G313	03/30/2021	611.75
G313	04/20/2021	611.46
G313	04/22/2021	611.41
G313	05/03/2021	611.68
G313	05/04/2021	611.66
G313	05/17/2021	611.62
G313	05/18/2021	611.66
G313	06/09/2021	611.57
G313	06/14/2021	611.55
G313	06/23/2021	611.29
G313	06/28/2021	611.58
G313	07/12/2021	611.70
G313	07/13/2021	611.81
G313	07/26/2021	611.71
G313	07/27/2021	611.73
G313	08/16/2021	611.90
G314	03/29/2021	596.40
G314	03/30/2021	597.11
G314	04/20/2021	603.16
G314	04/21/2021	603.48
G314	05/03/2021	604.66
G314	05/04/2021	604.64
G314	05/17/2021	605.61
G314	06/09/2021	607.54
G314	06/14/2021	608.16
G314	06/23/2021	605.19
G314	06/28/2021	606.45
G314	07/12/2021	605.32
G314	07/13/2021	605.60
G314	07/26/2021	606.66
G314	07/27/2021	606.84

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G314	08/16/2021	608.60
G314D	03/29/2021	572.75
G314D	03/30/2021	573.05
G314D	04/20/2021	571.76
G314D	04/21/2021	571.95
G314D	05/03/2021	568.77
G314D	05/04/2021	568.95
G314D	05/17/2021	566.84
G314D	05/19/2021	566.84
G314D	06/09/2021	567.45
G314D	06/14/2021	568.60
G314D	06/23/2021	566.77
G314D	07/12/2021	566.88
G314D	07/26/2021	566.65
G314D	07/28/2021	566.75
G314D	08/16/2021	567.28
G315	03/29/2021	621.24
G315	03/30/2021	621.20
G315	04/20/2021	621.05
G315	04/22/2021	621.12
G315	05/03/2021	621.13
G315	05/05/2021	621.25
G315	05/17/2021	621.14
G315	05/18/2021	621.34
G315	06/09/2021	620.24
G315	06/15/2021	619.70
G315	06/23/2021	619.17
G315	06/29/2021	621.04
G315	07/12/2021	620.91
G315	07/14/2021	621.13
G315	07/26/2021	620.42
G315	07/28/2021	620.44
G315	08/16/2021	620.29
G316	03/29/2021	591.63
G316	03/30/2021	591.55
G316	04/20/2021	591.23
G316	04/22/2021	591.31
G316	05/03/2021	591.39
G316	05/05/2021	591.63
G316	05/17/2021	591.28
G316	06/09/2021	581.54
G316	06/14/2021	590.61
G316	06/23/2021	590.06
G316	06/28/2021	591.40
G316	07/12/2021	591.16
G316	07/13/2021	591.50

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G316	07/26/2021	590.73
G316	07/27/2021	590.68
G316	08/16/2021	590.59
G317	03/29/2021	610.40
G317	03/30/2021	610.89
G317	04/20/2021	610.94
G317	04/22/2021	610.84
G317	05/03/2021	611.75
G317	05/05/2021	611.15
G317	05/17/2021	611.65
G317	05/18/2021	611.57
G317	06/09/2021	610.59
G317	06/15/2021	609.63
G317	06/23/2021	606.57
G317	06/28/2021	608.25
G317	07/12/2021	607.93
G317	07/13/2021	607.92
G317	07/26/2021	608.27
G317	07/28/2021	608.11
G317	08/16/2021	608.46
G401	11/16/2015	607.82
G401	02/08/2016	608.14
G401	05/09/2016	608.00
G401	07/25/2016	608.47
G401	11/12/2016	607.84
G401	02/04/2017	609.74
G401	05/13/2017	608.52
G401	07/08/2017	609.19
G401	05/08/2018	609.37
G401	08/02/2018	609.80
G401	10/23/2018	608.42
G401	01/15/2019	608.36
G401	08/05/2019	608.45
G401	01/20/2020	607.25
G401	05/06/2020	607.02
G401	08/10/2020	606.77
G401	01/29/2021	604.22
G401	04/20/2021	604.14
G401	07/26/2021	603.94
G401	08/16/2021	604.04
G402	11/16/2015	604.02
G402	02/08/2016	604.90
G402	05/09/2016	605.18
G402	07/25/2016	604.33
G402	11/12/2016	604.24
G402	02/04/2017	604.43

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G402	05/13/2017	604.83
G402	07/08/2017	604.42
G402	10/21/2017	600.77
G402	05/08/2018	605.36
G402	08/02/2018	603.82
G402	10/23/2018	602.25
G402	01/15/2019	602.37
G402	08/05/2019	603.82
G402	01/20/2020	605.12
G402	08/10/2020	602.09
G402	01/20/2021	603.01
G402	01/28/2021	603.01
G402	04/20/2021	603.78
G402	07/26/2021	602.83
G402	08/16/2021	603.29
G403	11/16/2015	621.81
G403	02/08/2016	621.78
G403	05/09/2016	621.76
G403	07/25/2016	622.16
G403	11/12/2016	621.80
G403	02/04/2017	622.45
G403	05/13/2017	622.26
G403	07/08/2017	622.16
G403	10/21/2017	618.36
G403	05/08/2018	621.66
G403	08/02/2018	622.38
G403	10/23/2018	619.48
G403	01/15/2019	620.51
G403	08/05/2019	621.64
G403	01/20/2020	621.63
G403	08/10/2020	621.14
G403	01/20/2021	619.88
G403	01/21/2021	619.88
G403	04/20/2021	619.41
G403	07/26/2021	619.56
G403	08/16/2021	619.27
G404	11/16/2015	611.67
G404	02/08/2016	611.58
G404	05/09/2016	611.46
G404	07/25/2016	611.67
G404	11/12/2016	610.58
G404	02/04/2017	610.57
G404	05/13/2017	610.87
G404	07/08/2017	611.75
G404	10/21/2017	607.58
G404	05/08/2018	611.42

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G404	08/02/2018	610.55
G404	10/23/2018	608.59
G404	01/15/2019	608.98
G404	08/05/2019	611.60
G404	01/20/2020	612.14
G404	08/10/2020	610.37
G404	01/20/2021	611.63
G404	01/21/2021	611.63
G404	04/20/2021	611.51
G404	07/26/2021	611.29
G404	08/16/2021	610.95
G405	11/16/2015	618.85
G405	02/08/2016	618.90
G405	05/09/2016	618.99
G405	07/25/2016	618.51
G405	11/12/2016	618.48
G405	02/04/2017	618.47
G405	05/13/2017	618.74
G405	07/08/2017	618.54
G405	10/21/2017	614.47
G405	05/08/2018	618.94
G405	08/02/2018	617.55
G405	10/23/2018	616.40
G405	01/15/2019	616.81
G405	08/05/2019	617.72
G405	01/20/2020	619.28
G405	08/10/2020	617.62
G405	01/20/2021	617.12
G405	01/21/2021	617.12
G405	04/20/2021	617.13
G405	07/26/2021	617.37
G405	08/16/2021	617.28
G406	11/12/2016	616.01
G406	02/04/2017	617.52
G406	05/13/2017	616.20
G406	07/08/2017	616.29
G406	10/21/2017	611.27
G406	05/08/2018	615.47
G406	08/02/2018	615.75
G406	10/23/2018	614.11
G406	01/15/2019	615.36
G406	08/05/2019	616.50
G406	01/20/2020	617.48
G406	08/10/2020	615.54
G406	01/20/2021	612.97
G406	04/20/2021	613.78

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G406	07/26/2021	614.20
G406	08/16/2021	613.82
G407	11/12/2016	613.27
G407	02/04/2017	613.41
G407	05/13/2017	613.68
G407	07/08/2017	613.59
G407	10/21/2017	612.67
G407	05/08/2018	613.11
G407	08/02/2018	612.95
G407	10/23/2018	612.11
G407	01/15/2019	612.31
G407	08/05/2019	614.02
G407	01/20/2020	614.86
G407	08/10/2020	613.74
G407	01/20/2021	614.70
G407	04/20/2021	614.49
G407	07/26/2021	614.38
G407	08/16/2021	614.41
G410	10/23/2018	610.41
G410	01/15/2019	610.91
G410	08/05/2019	611.75
G410	01/20/2020	612.70
G410	08/10/2020	610.88
G410	01/20/2021	610.91
G410	04/20/2021	611.38
G410	07/26/2021	611.51
G410	08/16/2021	611.29
G411	10/23/2018	613.20
G411	01/15/2019	613.82
G411	08/05/2019	614.25
G411	01/20/2020	617.53
G411	08/10/2020	615.51
G411	01/20/2021	615.91
G411	04/20/2021	616.12
G411	07/26/2021	616.20
G411	08/16/2021	616.03
MW03D	04/20/2021	597.90
MW03D	05/03/2021	598.18
MW03D	05/17/2021	598.06
MW03D	06/09/2021	598.13
MW03D	06/23/2021	598.09
MW03D	07/12/2021	598.12
MW03D	07/26/2021	598.09
MW03D	08/16/2021	598.10
MW04S	02/08/2016	621.62
MW04S	05/09/2016	620.45

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
MW04S	07/25/2016	618.84
MW04S	11/12/2016	618.66
MW04S	02/04/2017	618.97
MW04S	05/13/2017	618.76
MW04S	07/08/2017	618.92
MW04S	10/21/2017	613.88
MW04S	05/08/2018	617.95
MW04S	08/02/2018	618.73
MW04S	10/23/2018	614.68
MW04S	01/15/2019	614.89
MW04S	08/05/2019	614.92
MW04S	01/20/2020	619.93
MW04S	08/10/2020	617.74
MW04S	01/20/2021	620.63
MW04S	04/20/2021	619.39
MW04S	07/26/2021	618.55
MW04S	08/16/2021	618.50
MW05S	02/08/2016	620.92
MW05S	05/09/2016	620.53
MW05S	07/25/2016	618.20
MW05S	11/12/2016	617.38
MW05S	02/04/2017	618.78
MW05S	05/13/2017	617.95
MW05S	07/08/2017	618.81
MW05S	10/21/2017	613.32
MW05S	05/08/2018	617.77
MW05S	08/02/2018	617.98
MW05S	10/23/2018	615.35
MW05S	01/15/2019	615.93
MW05S	08/05/2019	616.01
MW05S	01/20/2020	620.34
MW05S	08/10/2020	617.09
MW05S	01/20/2021	618.33
MW05S	04/20/2021	619.07
MW05S	07/26/2021	618.14
MW05S	08/16/2021	617.84
MW10S	02/08/2016	620.43
MW10S	05/09/2016	619.47
MW10S	07/25/2016	617.69
MW10S	11/12/2016	616.69
MW10S	02/04/2017	617.41
MW10S	05/13/2017	617.22
MW10S	07/08/2017	617.27
MW10S	10/21/2017	614.52
MW10S	05/08/2018	616.89
MW10S	08/02/2018	617.52

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
MW10S	10/23/2018	614.36
MW10S	01/15/2019	614.85
MW10S	08/05/2019	615.56
MW10S	08/10/2020	617.11
MW10S	01/20/2021	619.48
MW10S	04/20/2021	619.03
MW10S	07/26/2021	617.74
MW10S	08/16/2021	617.35
MW11S	02/08/2016	621.30
MW11S	05/09/2016	622.19
MW11S	07/25/2016	620.99
MW11S	11/12/2016	620.92
MW11S	02/04/2017	620.82
MW11S	05/13/2017	621.31
MW11S	07/08/2017	620.85
MW11S	10/21/2017	617.19
MW11S	05/08/2018	620.85
MW11S	08/02/2018	620.69
MW11S	10/23/2018	620.05
MW11S	01/15/2019	620.38
MW11S	08/05/2019	620.76
MW11S	01/20/2020	621.80
MW11S	08/10/2020	618.12
MW11S	01/20/2021	619.64
MW11S	04/20/2021	621.76
MW11S	05/03/2021	622.01
MW11S	05/17/2021	621.94
MW11S	06/09/2021	621.45
MW11S	06/23/2021	618.83
MW11S	07/12/2021	620.54
MW11S	07/26/2021	620.97
MW11S	08/16/2021	621.49
MW11D	04/20/2021	621.13
MW11D	05/03/2021	621.36
MW11D	05/17/2021	621.27
MW11D	06/09/2021	620.96
MW11D	06/23/2021	618.72
MW11D	07/12/2021	619.88
MW11D	07/26/2021	620.57
MW11D	08/16/2021	621.01
MW12S	02/08/2016	620.37
MW12S	05/09/2016	620.48
MW12S	07/25/2016	618.53
MW12S	11/12/2016	617.97
MW12S	02/04/2017	620.33
MW12S	05/13/2017	618.26

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
MW12S	07/08/2017	618.61
MW12S	10/21/2017	615.08
MW12S	05/08/2018	617.58
MW12S	08/02/2018	617.12
MW12S	10/23/2018	616.14
MW12S	01/15/2019	616.89
MW12S	08/05/2019	617.35
MW12S	01/20/2020	620.34
MW12S	08/10/2020	615.69
MW12S	01/20/2021	611.42
MW12S	04/20/2021	618.96
MW12S	05/03/2021	619.66
MW12S	05/17/2021	619.23
MW12S	06/09/2021	618.20
MW12S	06/23/2021	616.52
MW12S	07/12/2021	619.35
MW12S	07/26/2021	618.43
MW12S	08/16/2021	618.79
MW12D	04/20/2021	611.97
MW12D	05/03/2021	611.87
MW12D	05/17/2021	611.95
MW12D	06/09/2021	611.87
MW12D	06/23/2021	611.79
MW12D	07/12/2021	611.55
MW12D	07/26/2021	611.50
MW12D	08/16/2021	611.51
MW16S	02/08/2016	625.29
MW16S	05/09/2016	624.54
MW16S	07/25/2016	622.13
MW16S	11/12/2016	622.26
MW16S	02/04/2017	622.53
MW16S	05/13/2017	622.53
MW16S	07/08/2017	622.25
MW16S	10/21/2017	618.42
MW16S	05/08/2018	622.02
MW16S	08/02/2018	622.47
MW16S	10/23/2018	620.88
MW16S	01/15/2019	621.60
MW16S	08/05/2019	621.94
MW16S	01/20/2020	625.59
MW16S	08/10/2020	618.52
MW16S	01/20/2021	618.34
MW16S	04/20/2021	623.78
MW16S	05/03/2021	624.58
MW16S	05/17/2021	623.87
MW16S	06/09/2021	622.57

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
MW16S	06/23/2021	620.48
MW16S	07/12/2021	620.58
MW16S	07/26/2021	620.68
MW16S	08/16/2021	620.65
MW16D	04/20/2021	615.42
MW16D	05/03/2021	615.92
MW16D	05/17/2021	616.36
MW16D	06/09/2021	616.87
MW16D	06/23/2021	616.90
MW16D	07/12/2021	616.76
MW16D	07/26/2021	616.63
MW16D	08/16/2021	616.35
MW20S	02/08/2016	614.36
MW20S	05/09/2016	614.09
MW20S	07/25/2016	611.61
MW20S	11/12/2016	611.51
MW20S	02/04/2017	612.76
MW20S	05/13/2017	611.86
MW20S	07/08/2017	611.75
MW20S	10/21/2017	607.74
MW20S	05/08/2018	611.46
MW20S	08/02/2018	611.51
MW20S	10/23/2018	609.55
MW20S	01/15/2019	610.21
MW20S	08/05/2019	610.81
MW20S	01/20/2020	615.40
MW20S	08/10/2020	612.37
MW20S	01/20/2021	612.27
MW20S	04/20/2021	613.45
MW20S	07/26/2021	613.35
MW20S	08/16/2021	612.31
R104	01/20/2015	623.03
R104	04/08/2015	624.77
R104	10/06/2015	621.69
R104	11/16/2015	621.34
R104	02/08/2016	624.11
R104	05/09/2016	624.89
R104	07/25/2016	623.65
R104	11/12/2016	623.49
R104	02/04/2017	624.20
R104	05/13/2017	622.91
R104	07/08/2017	624.09
R104	10/21/2017	619.38
R104	05/08/2018	622.66
R104	08/02/2018	621.73
R104	10/23/2018	621.58

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
R104	01/15/2019	622.43
R104	08/05/2019	623.34
R104	01/20/2020	625.63
R104	08/10/2020	624.56
R104	10/15/2020	621.10
R104	01/20/2021	623.31
R104	01/28/2021	620.57
R104	04/20/2021	624.95
R104	07/26/2021	625.41
R104	08/16/2021	625.92
R201	10/05/2015	619.94
R201	11/16/2015	622.44
R201	02/08/2016	623.40
R201	05/09/2016	622.81
R201	07/25/2016	622.36
R201	11/12/2016	622.82
R201	02/04/2017	622.27
R201	05/13/2017	623.05
R201	07/08/2017	622.31
R201	10/21/2017	618.30
R201	01/25/2018	622.00
R201	05/08/2018	622.78
R201	08/02/2018	622.16
R201	10/23/2018	621.29
R201	01/15/2019	622.17
R201	08/05/2019	622.35
R201	01/20/2020	622.88
R201	08/10/2020	618.89
R201	10/13/2020	616.57
R201	01/20/2021	620.52
R201	01/29/2021	620.52
R201	03/29/2021	623.52
R201	04/20/2021	622.16
R201	04/21/2021	622.59
R201	05/03/2021	622.91
R201	05/06/2021	623.40
R201	05/17/2021	622.68
R201	06/09/2021	621.12
R201	06/14/2021	620.63
R201	06/23/2021	619.92
R201	06/29/2021	621.16
R201	07/12/2021	621.34
R201	07/13/2021	621.36
R201	07/26/2021	620.37
R201	07/28/2021	620.16
R201	08/16/2021	620.61

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
R205	05/08/2018	618.32
R205	08/02/2018	614.95
R205	10/23/2018	618.85
R205	01/15/2019	619.54
R205	08/05/2019	620.13
R205	01/20/2020	620.21
R205	08/10/2020	615.92
R205	10/14/2020	613.87
R205	01/20/2021	617.80
R205	01/28/2021	618.45
R205	04/20/2021	619.12
R205	07/26/2021	618.66
R205	08/16/2021	618.99
T127	01/19/2015	615.65
T127	04/08/2015	616.04
T127	07/23/2015	616.04
T127	10/06/2015	615.66
T127	11/16/2015	615.91
T127	02/08/2016	616.04
T127	05/09/2016	616.15
T127	07/25/2016	615.96
T127	11/12/2016	616.73
T127	02/04/2017	616.32
T127	05/13/2017	616.89
T127	07/08/2017	615.99
T127	10/21/2017	612.33
T127	01/27/2018	611.06
T127	05/08/2018	616.66
T127	08/02/2018	616.48
T127	10/23/2018	614.78
T127	01/15/2019	615.13
T127	05/03/2019	617.26
T127	08/05/2019	615.15
T127	01/20/2020	617.05
T127	05/05/2020	617.02
T127	08/10/2020	615.90
T127	10/14/2020	615.08
T127	01/20/2021	615.89
T127	01/29/2021	615.89
T127	04/20/2021	616.54
T127	06/29/2021	616.72
T127	07/26/2021	616.53
T127	08/16/2021	616.65
T128	01/19/2015	614.73
T128	04/08/2015	614.89
T128	07/23/2015	615.40

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
T128	10/06/2015	614.67
T128	02/08/2016	614.90
T128	05/09/2016	615.01
T128	07/25/2016	614.75
T128	11/12/2016	614.95
T128	02/04/2017	616.00
T128	05/13/2017	615.39
T128	07/08/2017	615.07
T128	10/21/2017	611.33
T128	05/08/2018	615.13
T128	08/02/2018	614.87
T128	10/23/2018	613.17
T128	01/15/2019	613.94
T128	08/05/2019	613.99
T128	01/20/2020	617.25
T128	08/10/2020	616.15
T128	10/14/2020	615.36
T128	01/20/2021	616.20
T128	01/28/2021	616.33
T128	04/20/2021	616.94
T128	07/26/2021	616.81
T128	08/16/2021	616.93
T202	02/08/2016	622.82
T202	05/09/2016	623.66
T202	07/25/2016	619.49
T202	11/12/2016	619.88
T202	02/04/2017	619.73
T202	05/13/2017	620.07
T202	07/08/2017	619.75
T202	10/21/2017	615.31
T202	05/08/2018	619.52
T202	08/02/2018	620.53
T202	10/23/2018	618.36
T202	01/15/2019	618.69
T202	08/05/2019	619.02
T202	01/20/2020	624.22
T202	08/10/2020	620.39
T202	01/20/2021	620.08
T202	04/20/2021	623.43
T202	07/26/2021	622.64
T202	08/16/2021	622.69
T408	11/12/2016	618.58
T408	02/04/2017	619.46
T408	05/13/2017	619.00
T408	07/08/2017	619.12
T408	10/21/2017	614.81

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
T408	05/08/2018	615.82
T408	08/02/2018	614.45
T408	10/23/2018	616.30
T408	01/15/2019	617.01
T408	08/05/2019	617.15
T408	01/20/2020	619.13
T408	08/10/2020	617.38
T408	01/20/2021	616.85
T408	04/20/2021	616.65
T408	07/26/2021	617.21
T408	08/16/2021	617.22
T409	11/12/2016	615.98
T409	02/04/2017	615.93
T409	05/13/2017	616.75
T409	07/08/2017	617.05
T409	10/21/2017	612.16
T409	05/08/2018	616.02
T409	08/02/2018	615.25
T409	10/23/2018	613.96
T409	01/15/2019	614.78
T409	08/05/2019	615.10
T409	01/20/2020	617.16
T409	08/10/2020	615.43
T409	01/20/2021	614.41
T409	04/20/2021	615.33
T409	07/26/2021	615.72
T409	08/16/2021	615.42
TA31	02/08/2016	621.56
TA31	05/09/2016	621.32
TA31	07/25/2016	620.63
TA31	11/12/2016	620.50
TA31	02/04/2017	621.55
TA31	05/13/2017	620.66
TA31	07/08/2017	620.94
TA31	10/21/2017	616.90
TA31	05/08/2018	619.80
TA31	08/02/2018	620.41
TA31	10/23/2018	618.32
TA31	01/15/2019	619.21
TA31	08/05/2019	619.37
TA31	01/20/2020	622.93
TA31	08/10/2020	614.89
TA31	01/20/2021	615.79
TA31	04/20/2021	622.14
TA31	07/26/2021	618.76
TA31	08/16/2021	619.17

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
TA32	02/08/2016	615.46
TA32	05/09/2016	616.02
TA32	07/25/2016	615.61
TA32	11/12/2016	615.53
TA32	02/04/2017	614.73
TA32	05/13/2017	615.82
TA32	07/08/2017	615.79
TA32	10/21/2017	612.42
TA32	08/05/2019	615.41
TA32	01/20/2020	616.30
TA33	02/08/2016	619.67
TA33	05/09/2016	619.75
TA33	07/25/2016	616.91
TA33	11/12/2016	616.81
TA33	02/04/2017	617.12
TA33	05/13/2017	617.22
TA33	07/08/2017	617.42
TA33	10/21/2017	612.91
TA33	05/08/2018	618.07
TA33	08/02/2018	616.68
TA33	10/23/2018	617.26
TA33	01/15/2019	617.66
TA33	08/05/2019	618.27
TA33	01/20/2020	620.35
TA33	08/10/2020	614.10
TA33	01/20/2021	614.34
TA33	04/20/2021	619.07
TA33	07/26/2021	616.82
TA33	08/16/2021	616.86
TA34	02/08/2016	619.29
TA34	05/09/2016	619.35
TA34	07/25/2016	617.37
TA34	11/12/2016	617.40
TA34	02/04/2017	617.45
TA34	05/13/2017	617.43
TA34	07/08/2017	617.44
TA34	10/21/2017	613.48
TA34	05/08/2018	617.06
TA34	08/02/2018	616.42
TA34	10/23/2018	614.92
TA34	01/15/2019	615.85
TA34	08/05/2019	616.54
TA34	01/20/2020	619.58
TA34	08/10/2020	615.68
TA34	01/20/2021	616.16
TA34	04/20/2021	618.74

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
TA34	07/26/2021	617.18
TA34	08/16/2021	617.42
TR32	08/05/2019	615.67
TR32	01/20/2020	616.56
TR32	08/10/2020	614.92
TR32	01/20/2021	614.50
TR32	04/20/2021	615.59
TR32	07/26/2021	616.09
TR32	08/16/2021	616.18
SG-02	03/29/2021	598.75
SG-02	04/20/2021	598.56
SG-02	05/03/2021	598.74
SG-02	05/17/2021	598.56
SG-02	06/09/2021	598.37
SG-02	06/23/2021	598.34
SG-02	07/12/2021	598.75
SG-02	07/26/2021	598.44
SG-02	08/16/2021	598.39
SG-03	04/20/2021	589.81
SG-03	05/03/2021	589.84
SG-03	05/17/2021	589.84
SG-03	06/09/2021	589.65
SG-03	06/23/2021	589.51
SG-03	07/12/2021	589.97
SG-03	07/26/2021	589.77
SG-03	08/16/2021	589.70
SG-04	04/20/2021	592.99
SG-04	05/03/2021	592.93
SG-04	05/17/2021	593.00
SG-04	06/09/2021	592.82
SG-04	06/23/2021	592.72
SG-04	07/12/2021	591.94
SG-04	07/26/2021	592.83
SG-04	08/16/2021	593.01

Notes:
ft NAVD88 = feet relative to the North American Vertical Datum 1988, GEOID 12A

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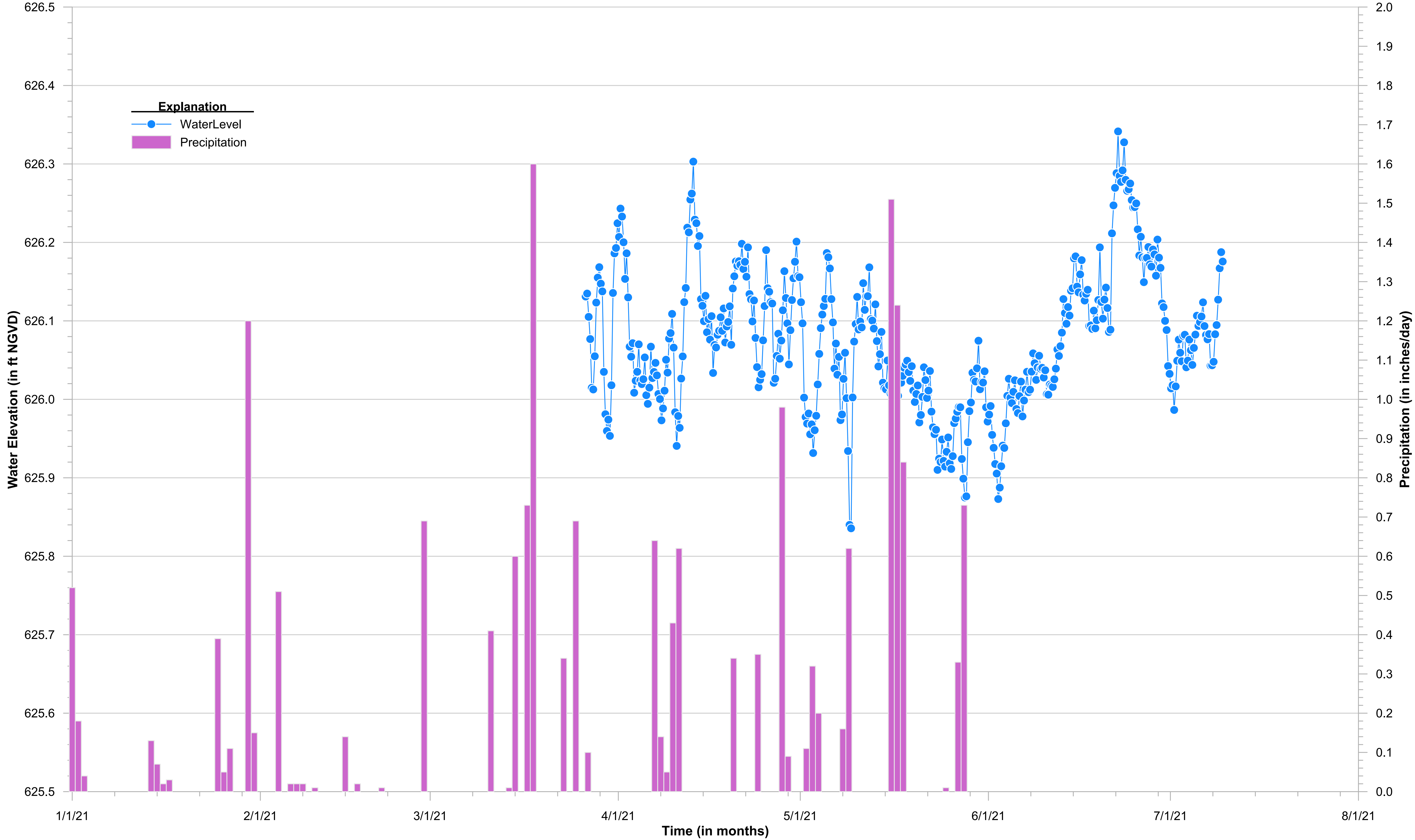
Coffeen Gypsum Pond - NE Riser Water Elevation and Precipitation versus Time



ADDITIONAL VERTICAL HYDRAULIC GRADIENTS

VERTICAL HYDRAULIC GRADIENTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
ASH POND NO. 1
COFFEEN, ILLINOIS

Date	G405 Groundwater Elevation (ft NAVD88)	T408 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	LCU (upper)				
2/4/2017	618.47	619.46	-0.99	12.00	-0.08	up
5/13/2017	618.74	619.00	-0.26	12.00	-0.02	up
7/8/2017	618.54	619.12	-0.58	12.00	-0.05	up
10/21/2017	614.47	614.81	-0.34	12.00	-0.03	up
5/8/2018	618.94	615.82	3.12	12.00	0.26	down
8/2/2018	617.55	614.45	3.10	12.00	0.26	down
10/23/2018	616.40	616.30	0.10	12.00	0.01	down
1/15/2019	616.81	617.01	-0.20	12.00	-0.02	up
8/5/2019	617.72	617.15	0.57	12.00	0.05	down
1/20/2020	619.28	619.13	0.15	12.00	0.01	down
8/10/2020	617.62	617.38	0.24	12.00	0.02	down
1/20/2021	617.12	616.85	0.27	12.00	0.02	down
4/20/2021	617.13	616.65	0.48	12.00	0.04	down
7/26/2021	617.37	617.21	0.16	12.00	0.01	down
			Middle of screen elevation G405D			610.0
			Middle of screen elevation T408			598.0

Date	G406 Groundwater Elevation (ft NAVD88)	T409 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	LCU (upper)				
2/4/2017	617.52	615.93	1.59	8.23	0.19	down
5/13/2017	616.20	616.75	-0.55	8.23	-0.07	up
7/8/2017	616.29	617.05	-0.76	8.23	-0.09	up
10/21/2017	611.27	612.16	-0.89	8.23	-0.11	up
5/8/2018	615.47	616.02	-0.55	8.23	-0.07	up
8/2/2018	615.75	615.25	0.50	8.23	0.06	down
10/23/2018	614.11	613.96	0.15	8.23	0.02	down
1/15/2019	615.36	614.78	0.58	8.23	0.07	down
8/5/2019	616.50	615.10	1.40	8.23	0.17	down
1/20/2020	617.48	617.16	0.32	8.23	0.04	down
8/10/2020	615.54	615.43	0.11	8.23	0.01	down
1/20/2021	612.97	614.41	-1.44	8.23	-0.17	up
4/20/2021	613.78	615.33	-1.55	8.23	-0.19	up
7/26/2021	614.20	615.72	-1.52	8.23	-0.18	up
			Middle of screen elevation G406			605.9
			Middle of screen elevation T409			597.7

RAMBOLL

VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

COFFEEN POWER PLANT

ASH POND NO. 1

COFFEEN, ILLINOIS

Date	T408 Groundwater Elevation (ft NAVD88)	G45D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	LCU (upper)	LCU (lower)				
2/4/2017	619.46	587.71	31.75	13.78	2.30	down
5/13/2017	619.00	586.19	32.81	13.78	2.38	down
7/8/2017	619.12	586.29	32.83	13.78	2.38	down
10/21/2017	614.81	584.69	30.12	13.78	2.19	down
5/8/2018	615.82	587.56	28.26	13.78	2.05	down
8/2/2018	614.45	585.81	28.64	13.78	2.08	down
10/23/2018	616.30	584.60	31.70	13.78	2.30	down
1/15/2019	617.01	586.96	30.05	13.78	2.18	down
8/5/2019	617.15	588.04	29.11	13.78	2.11	down
8/10/2020	617.38	614.21	3.17	13.78	0.23	down
1/20/2021	616.85	614.60	2.25	13.78	0.16	down
4/20/2021	616.65	614.32	2.33	13.78	0.17	down
7/26/2021	617.21	613.58	3.63	13.78	0.26	down
			Middle of screen elevation T408			598.0
			Middle of screen elevation G45D			584.2

Date	T409 Groundwater Elevation (ft NAVD88)	G46D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	LCU (upper)	LCU (lower)				
2/4/2017	615.93	586.06	29.87	22.19	1.35	down
5/13/2017	616.75	584.87	31.88	22.19	1.44	down
7/8/2017	617.05	585.22	31.83	22.19	1.43	down
5/8/2018	616.02	585.86	30.16	22.19	1.36	down
8/2/2018	615.25	583.95	31.30	22.19	1.41	down
10/23/2018	613.96	582.05	31.91	22.19	1.44	down
1/15/2019	614.78	583.17	31.61	22.19	1.42	down
8/5/2019	615.10	583.68	31.42	22.19	1.42	down
8/10/2020	615.43	609.00	6.43	22.19	0.29	down
1/20/2021	614.41	610.49	3.92	22.19	0.18	down
4/20/2021	615.33	611.06	4.27	22.19	0.19	down
7/26/2021	615.72	607.21	8.51	22.19	0.38	down
			Middle of screen elevation T409			597.7
			Middle of screen elevation G46D			575.5

RAMBOLL

VERTICAL HYDRAULIC GRADIENTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
ASH POND NO. 1
COFFEEN, ILLINOIS

Date	G307 Groundwater Elevation (ft NAVD88)	G307D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	LCU (lower)				
4/20/2021	624.50	622.48	2.02	38.06	0.05	down
5/17/2021	624.45	622.44	2.01	38.06	0.05	down
7/12/2021	624.45	622.59	1.86	38.06	0.05	down
			Middle of screen elevation G307			606.7
			Middle of screen elevation G307D			568.6

Date	G311 Groundwater Elevation (ft NAVD88)	G311D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	LCU (lower)				
3/29/2021	616.54	575.42	41.12	43.41	0.95	down
4/22/2021	613.68	575.74	37.94	43.41	0.87	down
5/3/2021	614.01	573.09	40.92	43.41	0.94	down
5/17/2021	613.86	572.40	41.46	43.41	0.96	down
6/9/2021	613.13	573.85	39.28	43.41	0.90	down
6/15/2021	612.78	575.25	37.53	43.41	0.86	down
6/23/2021	612.45	571.74	40.71	43.41	0.94	down
7/12/2021	613.75	571.63	42.12	43.41	0.97	down
7/26/2021	613.05	569.74	43.31	43.41	1.00	down
			Middle of screen elevation G311			606.7
			Middle of screen elevation G311D			563.3

VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT

COFFEEN POWER PLANT

ASH POND NO. 1

COFFEEN, ILLINOIS

Date	G314 Groundwater Elevation (ft NAVD88)	G314D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	LCU (upper)	DA (PMP)				
3/29/2021	596.40	572.75	23.65	29.76	0.79	down
4/20/2021	603.16	571.76	31.40	27.40	1.15	down
5/3/2021	604.66	568.77	35.89	27.40	1.31	down
5/17/2021	605.61	566.84	38.77	27.40	1.42	down
6/9/2021	607.54	567.45	40.09	27.40	1.46	down
6/14/2021	608.16	568.60	39.56	27.40	1.44	down
6/23/2021	605.19	566.77	38.42	27.40	1.40	down
7/12/2021	605.32	566.88	38.44	27.40	1.40	down
7/26/2021	606.66	566.65	40.01	27.40	1.46	down
			Middle of screen elevation G314			594.0
			Middle of screen elevation G314D			566.6

[O: KLT 6/4/21, C:YMD 6/7/21; U:KLT 8/25/21, C:EDP 8/31/21]

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

DA = deep aquifer

dh = head change

dl = distance change

ft = foot/feet

LCU (lower) = lower confining unit (Smithboro)

LCU (upper) = lower confining unit (Vandalia)

NAVD88 = North American Vertical Datum of 1988

PMP = potential migration pathway

UA = uppermost aquifer

VERTICAL HYDRAULIC GRADIENTS

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GYPSUM MANAGEMENT FACILITY RECYCLE POND
COFFEEN, ILLINOIS

Date	G405 Groundwater Elevation (ft NAVD88)	T408 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	LCU (upper)				
2/4/2017	618.47	619.46	-0.99	12.00	-0.08	up
5/13/2017	618.74	619.00	-0.26	12.00	-0.02	up
7/8/2017	618.54	619.12	-0.58	12.00	-0.05	up
10/21/2017	614.47	614.81	-0.34	12.00	-0.03	up
5/8/2018	618.94	615.82	3.12	12.00	0.26	down
8/2/2018	617.55	614.45	3.10	12.00	0.26	down
10/23/2018	616.40	616.30	0.10	12.00	0.01	down
1/15/2019	616.81	617.01	-0.20	12.00	-0.02	up
8/5/2019	617.72	617.15	0.57	12.00	0.05	down
1/20/2020	619.28	619.13	0.15	12.00	0.01	down
8/10/2020	617.62	617.38	0.24	12.00	0.02	down
1/20/2021	617.12	616.85	0.27	12.00	0.02	down
4/20/2021	617.13	616.65	0.48	12.00	0.04	down
7/26/2021	617.37	617.21	0.16	12.00	0.01	down
			Middle of screen elevation G405D			610.0
			Middle of screen elevation T408			598.0

Date	G275 Groundwater Elevation (ft NAVD88)	G275D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	DA (PMP)				
4/20/21-4/21/20	605.00	568.33	36.67	42.14	0.87	down
7/12/21-7/13/21	605.63	570.43	35.20	42.77	0.82	down
7/26/2021	605.05	570.35	34.70	42.18	0.82	down
			Middle of screen elevation G275			605.7
			Middle of screen elevation G275D			562.9

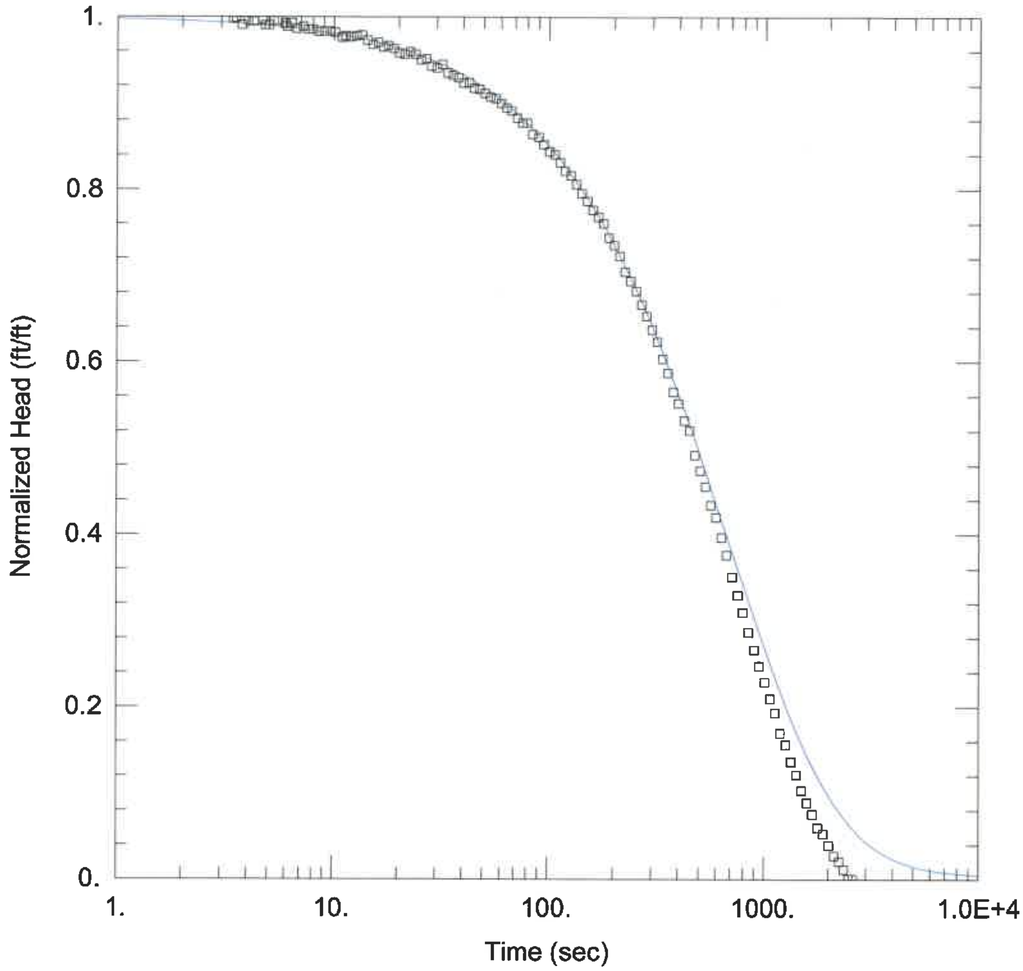
VERTICAL HYDRAULIC GRADIENTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GYPSUM MANAGEMENT FACILITY RECYCLE POND
COFFEEN, ILLINOIS

Date	T408 Groundwater Elevation (ft NAVD88)	G45D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	LCU (upper)	LCU (lower)				
2/4/2017	619.46	587.71	31.75	13.78	2.30	down
5/13/2017	619.00	586.19	32.81	13.78	2.38	down
7/8/2017	619.12	586.29	32.83	13.78	2.38	down
10/21/2017	614.81	584.69	30.12	13.78	2.19	down
5/8/2018	615.82	587.56	28.26	13.78	2.05	down
8/2/2018	614.45	585.81	28.64	13.78	2.08	down
10/23/2018	616.30	584.60	31.70	13.78	2.30	down
1/15/2019	617.01	586.96	30.05	13.78	2.18	down
8/5/2019	617.15	588.04	29.11	13.78	2.11	down
8/10/2020	617.38	614.21	3.17	13.78	0.23	down
1/20/2021	616.85	614.60	2.25	13.78	0.16	down
4/20/2021	616.65	614.32	2.33	13.78	0.17	down
7/26/2021	617.21	613.58	3.63	13.78	0.26	down
			Middle of screen elevation T408			598.0
			Middle of screen elevation G45D			584.2

[O: KLT 6/4/21, C:YMD 6/7/21][U:KLT 8/25/21, C:EDP 8/31/21]

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
DA = deep aquifer
dh = head change
dl = distance change
ft = foot/feet
LCU (lower) = lower confining unit (Smithboro)
LCU (upper) = lower confining unit (Vandalia)
NAVD88 = North American Vertical Datum of 1988
PMP = potential migration pathway
UA = uppermost aquifer

APPENDIX F
HYDRAULIC CONDUCTIVITY TEST DATA



G206 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G206-fh.aqt
Date: 06/02/21 Time: 15:40:13

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G206
Test Date: 17 March 2021

AQUIFER DATA

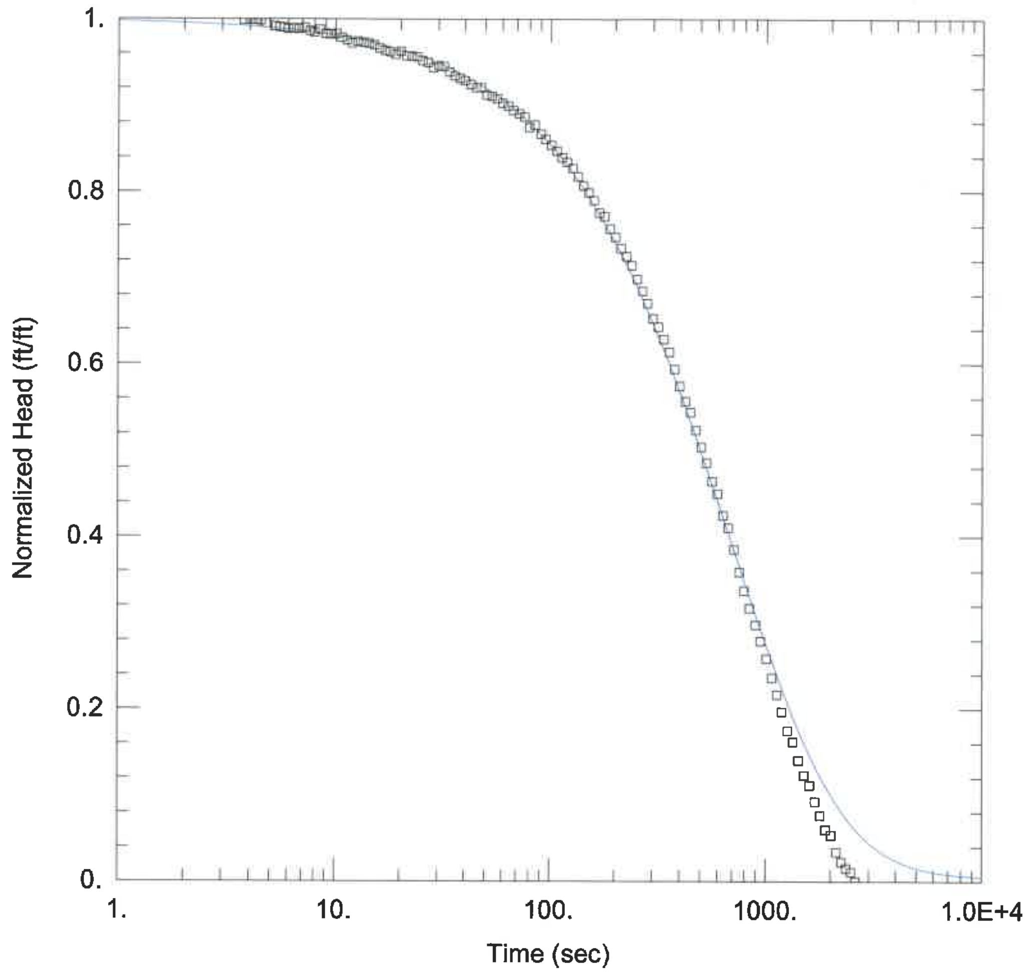
Saturated Thickness: 2.3 ft

WELL DATA (G206)

Initial Displacement: 1.5 ft
Total Well Penetration Depth: 13.97 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 14.47 ft
Screen Length: 4.41 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model
Kr = 0.0005 cm/sec
Ss = 1.0E-6 ft^{-1}
Kz/Kr = 1.



G206 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G206-rh.aqt
Date: 06/02/21
Time: 15:40:14

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G206
Test Date: 17 March 2021

AQUIFER DATA

Saturated Thickness: 2.3 ft

WELL DATA (G206)

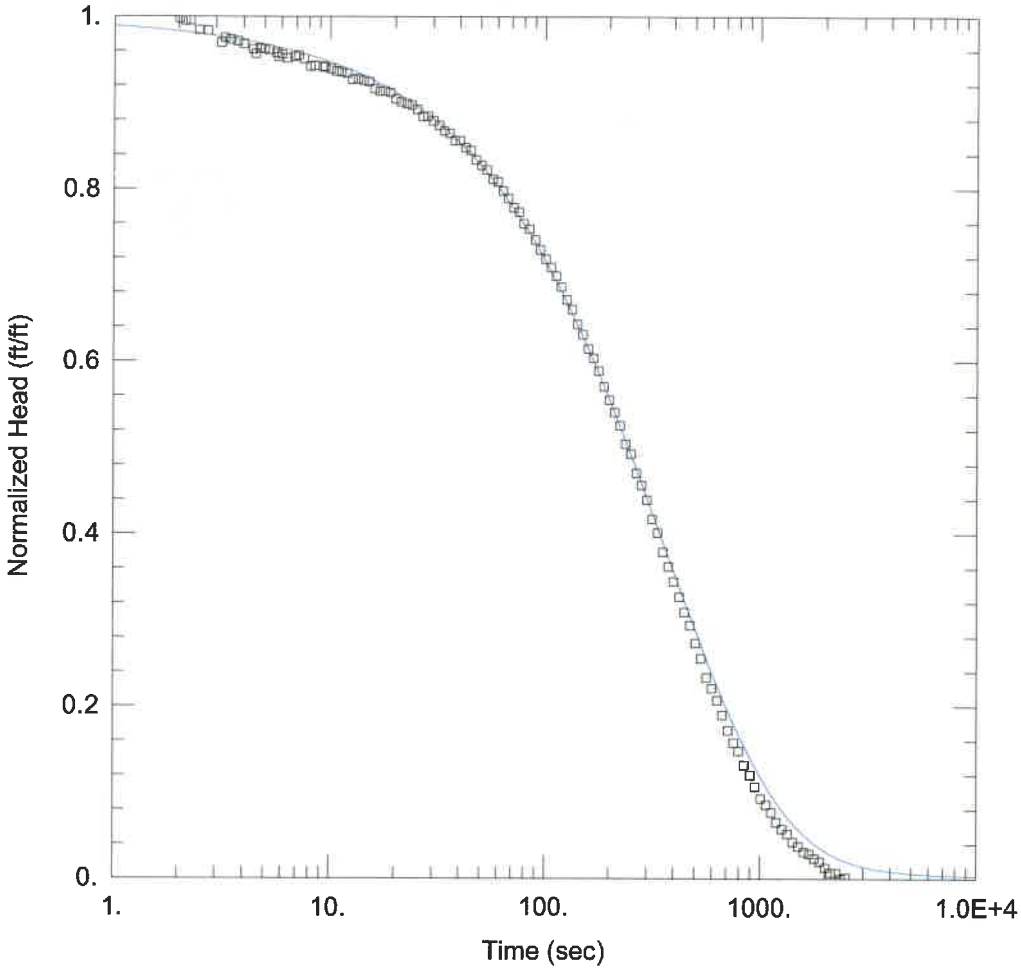
Initial Displacement: 1.385 ft
Total Well Penetration Depth: 13.97 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 14.47 ft
Screen Length: 4.41 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
Kr = 0.00049 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model
Ss = 1.0E-6 ft^{-1}



G209 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G209-rh.aqt
Date: 06/02/21 Time: 15:40:16

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G209
Test Date: 17 March 2021

AQUIFER DATA

Saturated Thickness: 8. ft

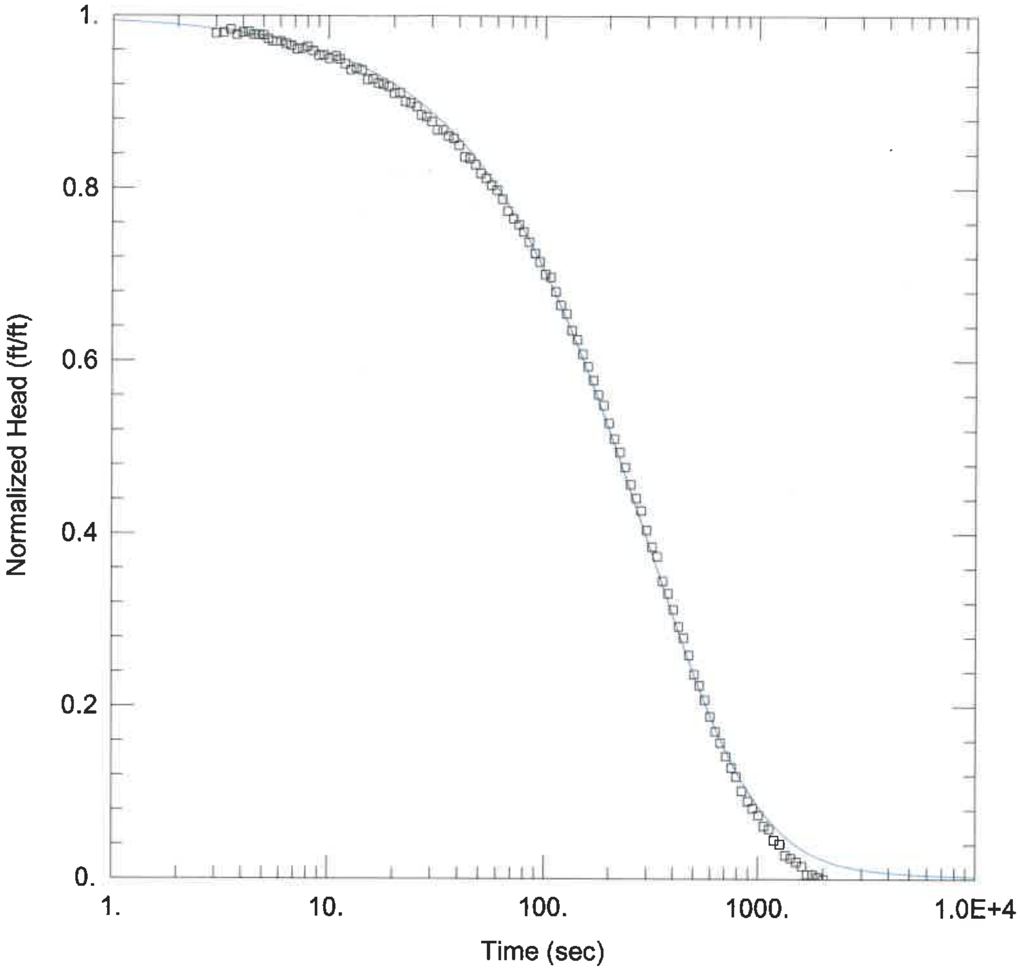
WELL DATA (G209)

Initial Displacement: 1.575 ft
Total Well Penetration Depth: 11.89 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 14.76 ft
Screen Length: 4.54 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.00025 cm/sec
Kz/Kr = 1.
Ss = 0.0007 ft^{-1}



G212 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G212-fh.aqt
Date: 06/02/21 Time: 15:40:17

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G212
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1. ft

WELL DATA (G212)

Initial Displacement: 1.45 ft
Total Well Penetration Depth: 12.62 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 13.14 ft
Screen Length: 4.55 ft
Well Radius: 0.08333 ft

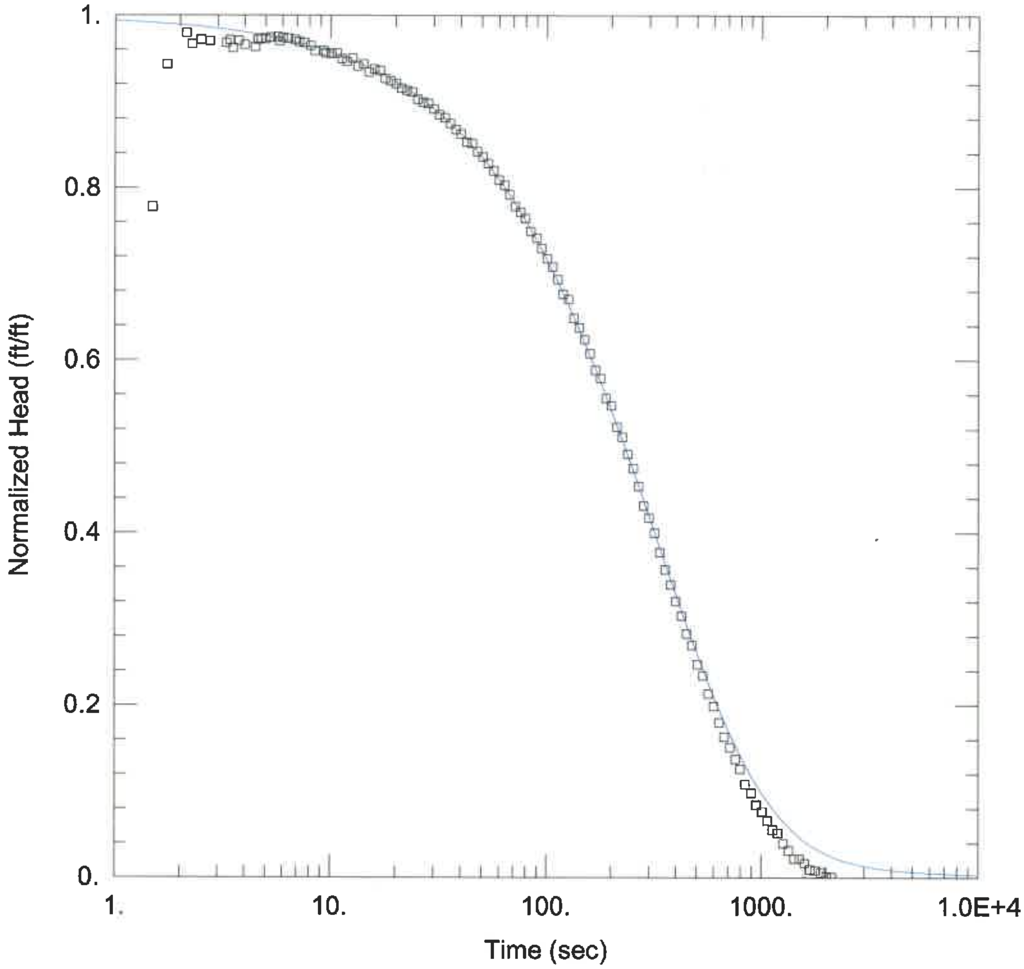
SOLUTION

Aquifer Model: Confined

Kr = 0.0021 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 1.5E-5 ft^{-1}



G212 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G212-rh.aqt
Date: 06/02/21 Time: 15:40:19

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Ciffeen, IL
Test Well: G212
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1. ft

WELL DATA (G212)

Initial Displacement: 1.525 ft
Total Well Penetration Depth: 12.62 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 13.14 ft
Screen Length: 4.55 ft
Well Radius: 0.08333 ft

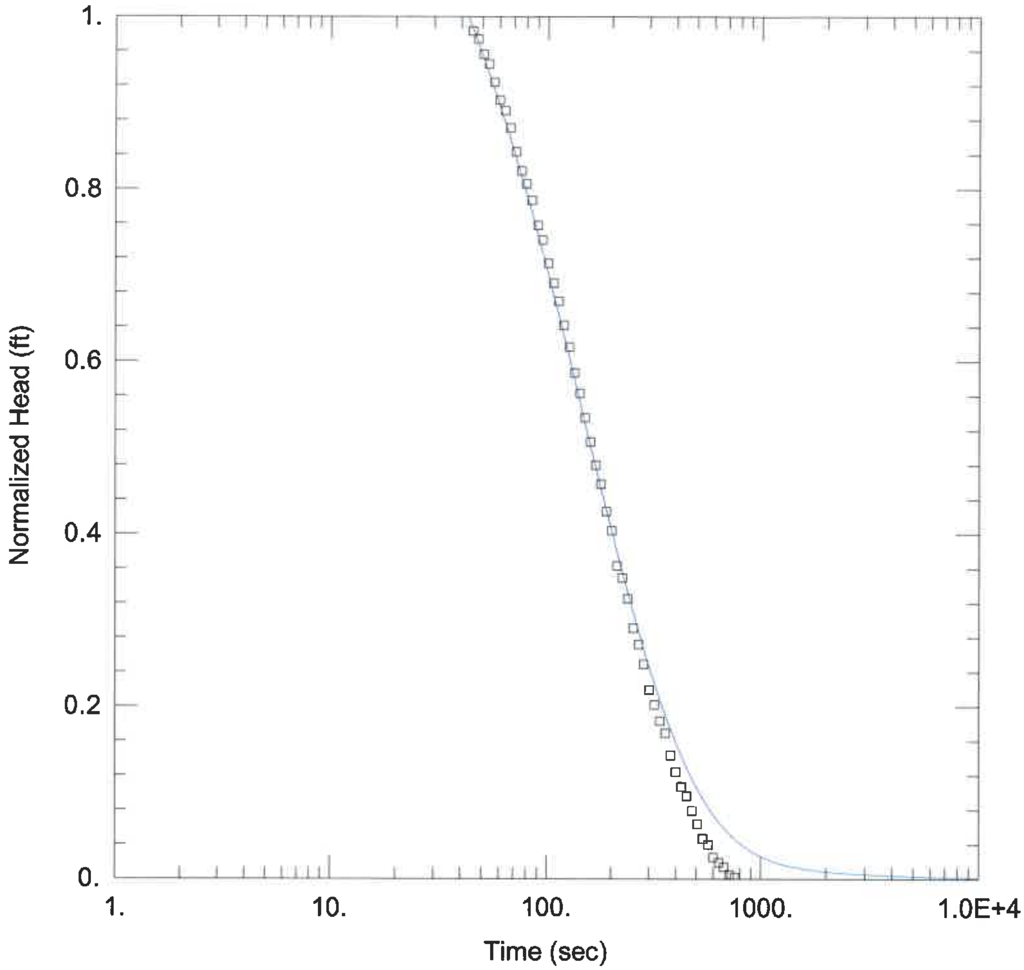
SOLUTION

Aquifer Model: Confined

Kr = 0.0018 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 4.0E-5 ft^{-1}



G215 FALLING HEAD TEST	
Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G215-fh.aqt	
Date: 06/02/21	Time: 15:40:20

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G215
Test Date: 16 March 2021

AQUIFER DATA

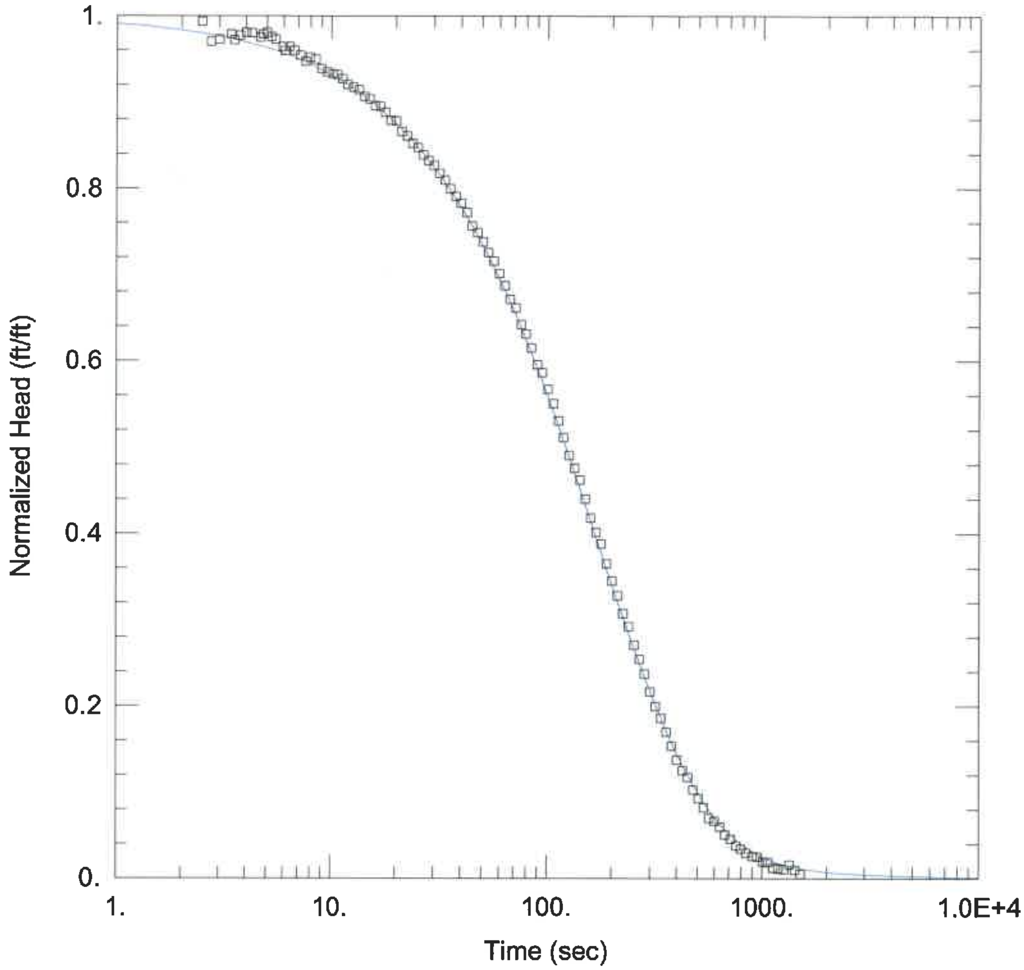
Saturated Thickness: 1.2 ft

WELL DATA (G215)

Initial Displacement: 1.35 ft	Static Water Column Height: 12.4 ft
Total Well Penetration Depth: 12.4 ft	Screen Length: 4.9 ft
Casing Radius: 0.08333 ft	Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined	Solution Method: KGS Model
Kr = 0.004 cm/sec	Ss = 1.0E-5 ft^{-1}
Kz/Kr = 1.	



G215 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G215-rh.aqt
Date: 06/02/21 Time: 15:40:21

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G215
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.2 ft

WELL DATA (G215)

Initial Displacement: 1.4 ft
Total Well Penetration Depth: 12.4 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 12.4 ft
Screen Length: 4.9 ft
Well Radius: 0.08333 ft

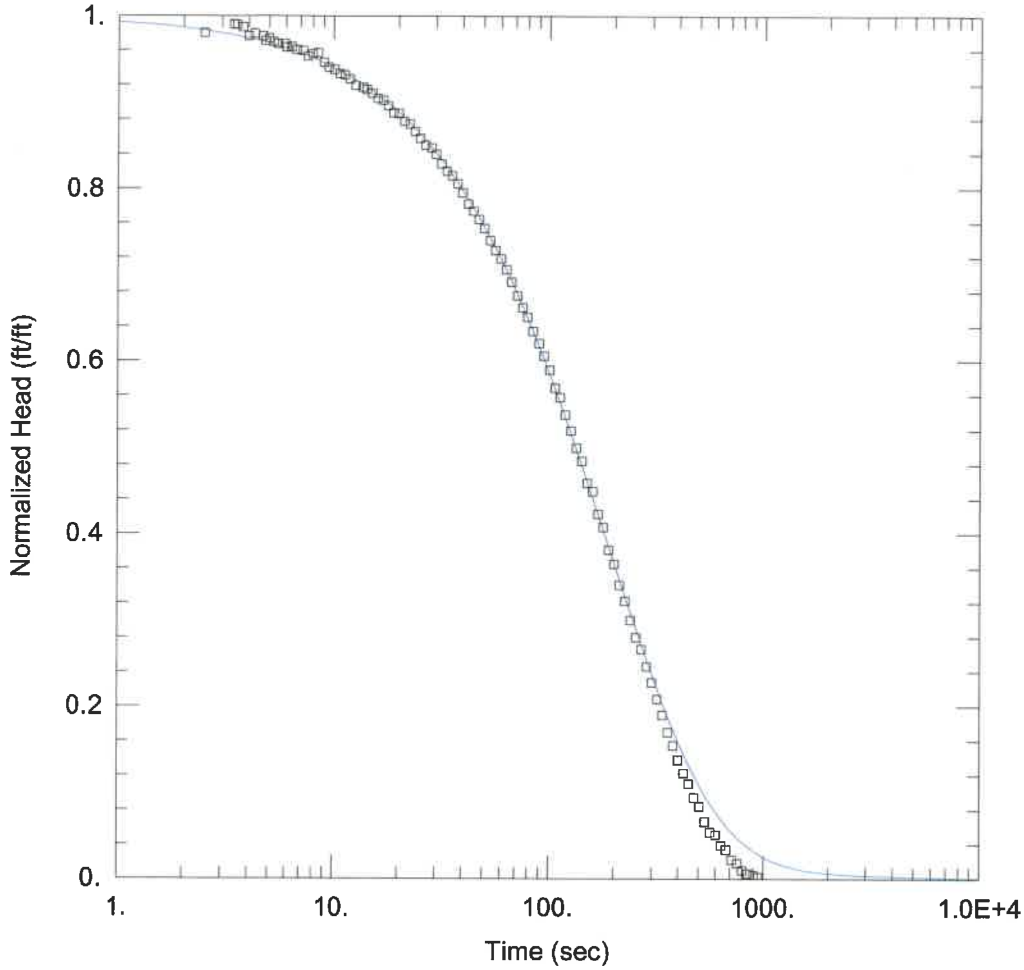
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0035 cm/sec
Kz/Kr = 1.

Ss = 1.0E-5 ft^{-1}



G218 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G218-fh.aqt
Date: 06/02/21 Time: 15:40:23

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G218
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.9 ft

WELL DATA (G218)

Initial Displacement: 1.45 ft
Total Well Penetration Depth: 12.86 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 20.86 ft
Screen Length: 4.44 ft
Well Radius: 0.08333 ft

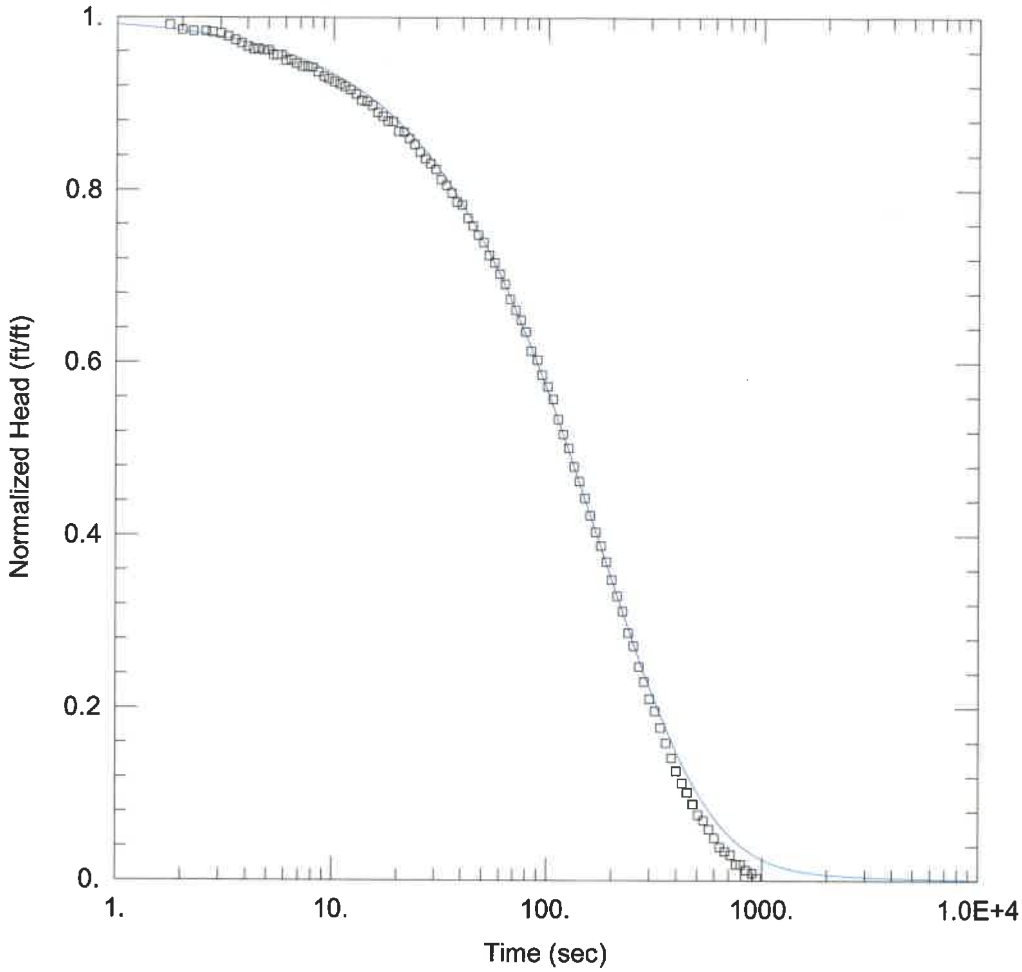
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0026 cm/sec
Kz/Kr = 1.

Ss = 1.0E-6 ft^{-1}



G218 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G218-rh.aqt
Date: 06/02/21 Time: 15:40:24

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G218
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.9 ft

WELL DATA (G218)

Initial Displacement: 1.5 ft
Total Well Penetration Depth: 12.86 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 20.86 ft
Screen Length: 4.44 ft
Well Radius: 0.08333 ft

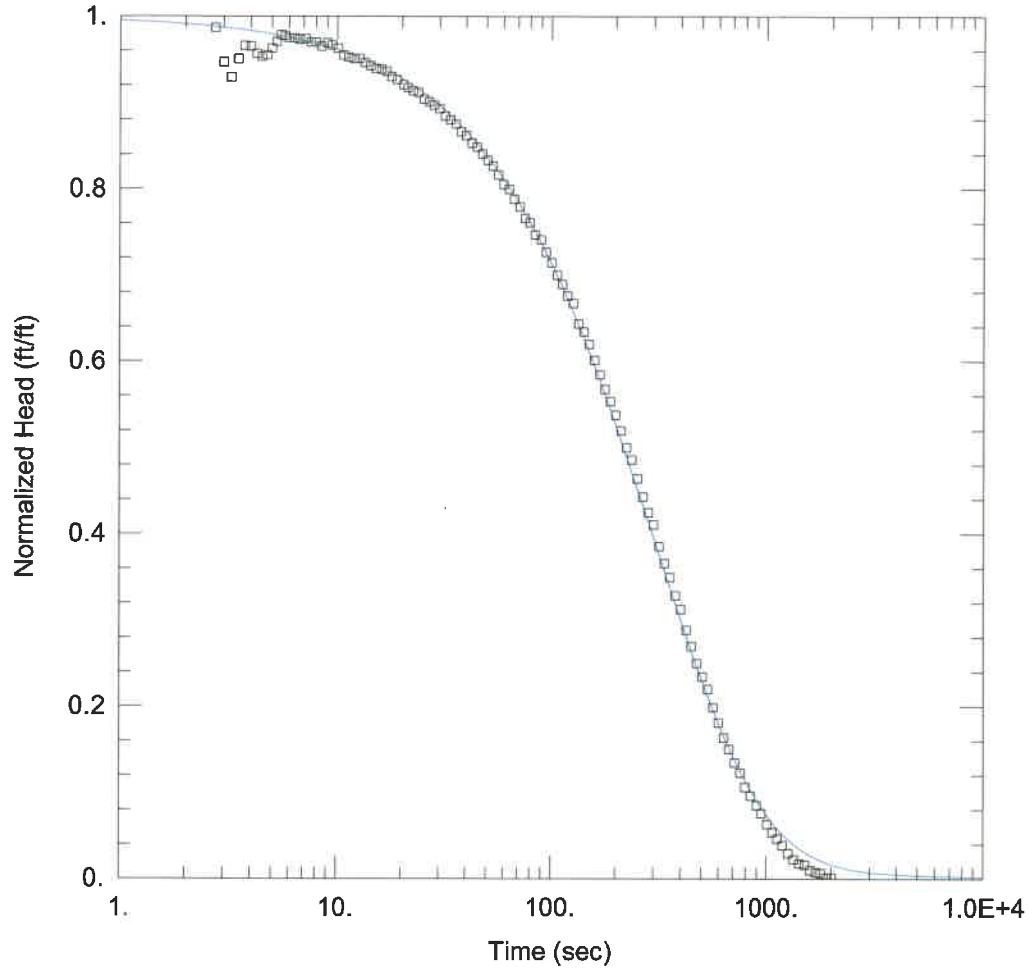
SOLUTION

Aquifer Model: Confined

Kr = 0.0024 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 1.0E-5 ft^{-1}



G272 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G272-fh.aqt
Date: 06/02/21 Time: 15:40:26

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G272
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.7 ft

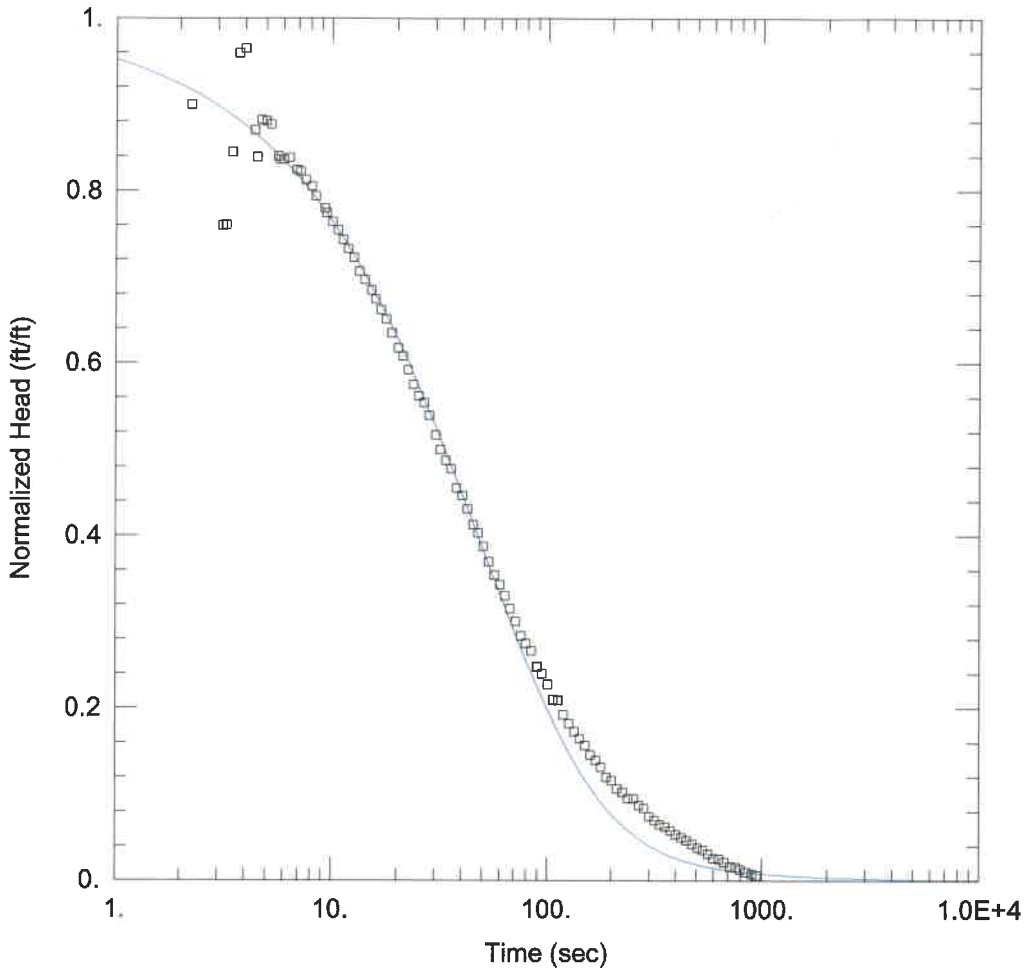
WELL DATA (G272)

Initial Displacement: 1.425 ft
Total Well Penetration Depth: 7.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.22 ft
Screen Length: 4.87 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.0017 cm/sec
Kz/Kr = 1.
Ss = 1.0E-6 ft^{-1}



G283 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G283-fh.aqt
Date: 06/02/21 Time: 15:41:16

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G283
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.8 ft

WELL DATA (G283)

Initial Displacement: 1.55 ft
Total Well Penetration Depth: 16.58 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 16.77 ft
Screen Length: 9.78 ft
Well Radius: 0.08333 ft

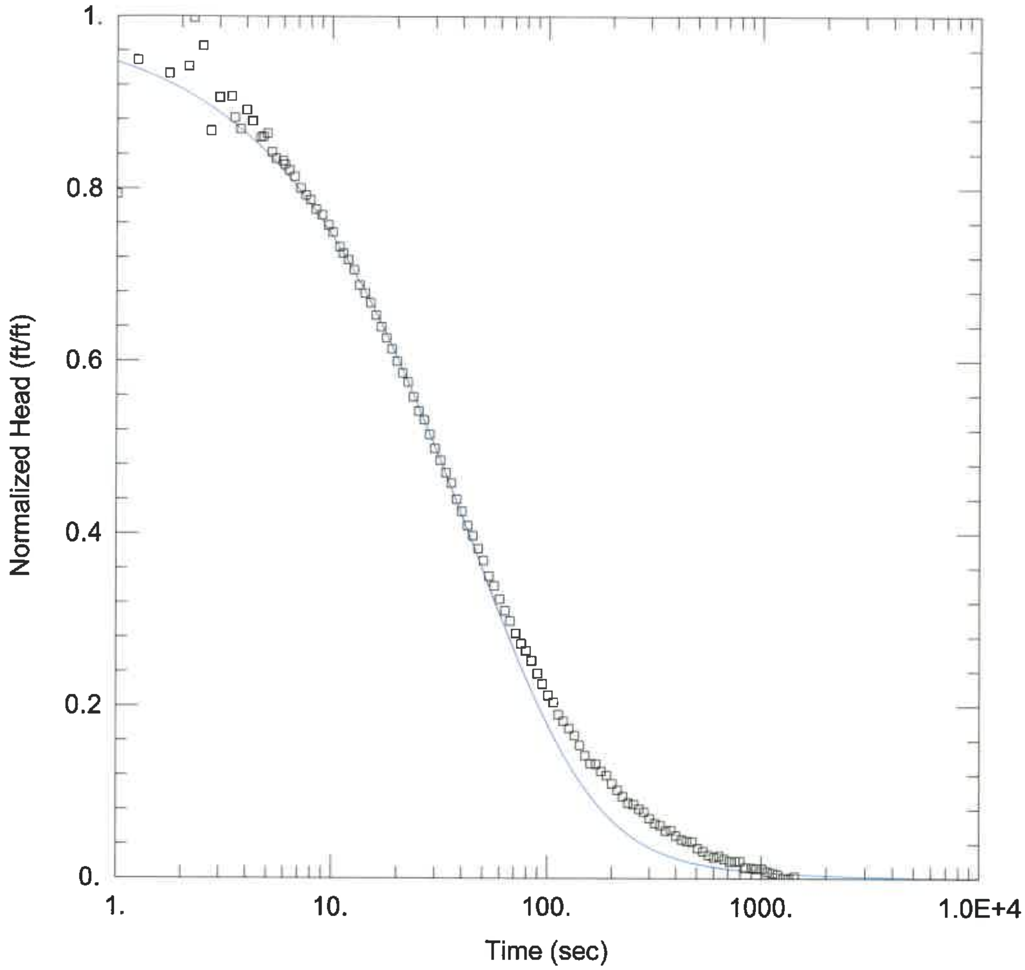
SOLUTION

Aquifer Model: Confined

Kr = 0.0042 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 0.005 ft^{-1}



G283 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G283-rh.aqt
Date: 06/02/21 Time: 15:41:17

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G283
Test Date: 16 March 2021

AQUIFER DATA

Saturated Thickness: 1.8 ft

WELL DATA (G283)

Initial Displacement: 1.6 ft
Total Well Penetration Depth: 16.58 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 16.77 ft
Screen Length: 9.78 ft
Well Radius: 0.08333 ft

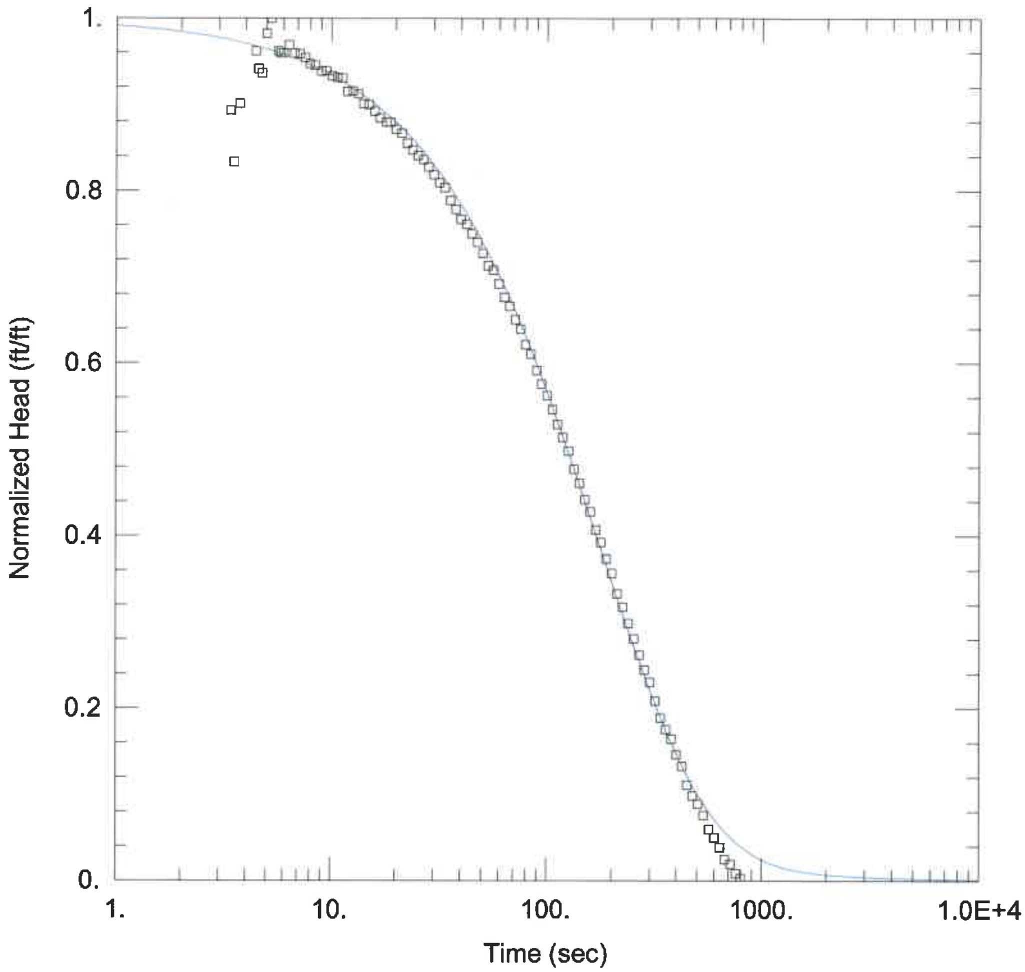
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0045 cm/sec
Kz/Kr = 1.

Ss = 0.006 ft^{-1}



G284 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G284-fh.aqt
Date: 06/02/21 Time: 15:41:19

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G284
Test Date: 12 March 2021

AQUIFER DATA

Saturated Thickness: 3.8 ft

WELL DATA (G284)

Initial Displacement: 1.425 ft
Total Well Penetration Depth: 6.67 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.05 ft
Screen Length: 4.77 ft
Well Radius: 0.08333 ft

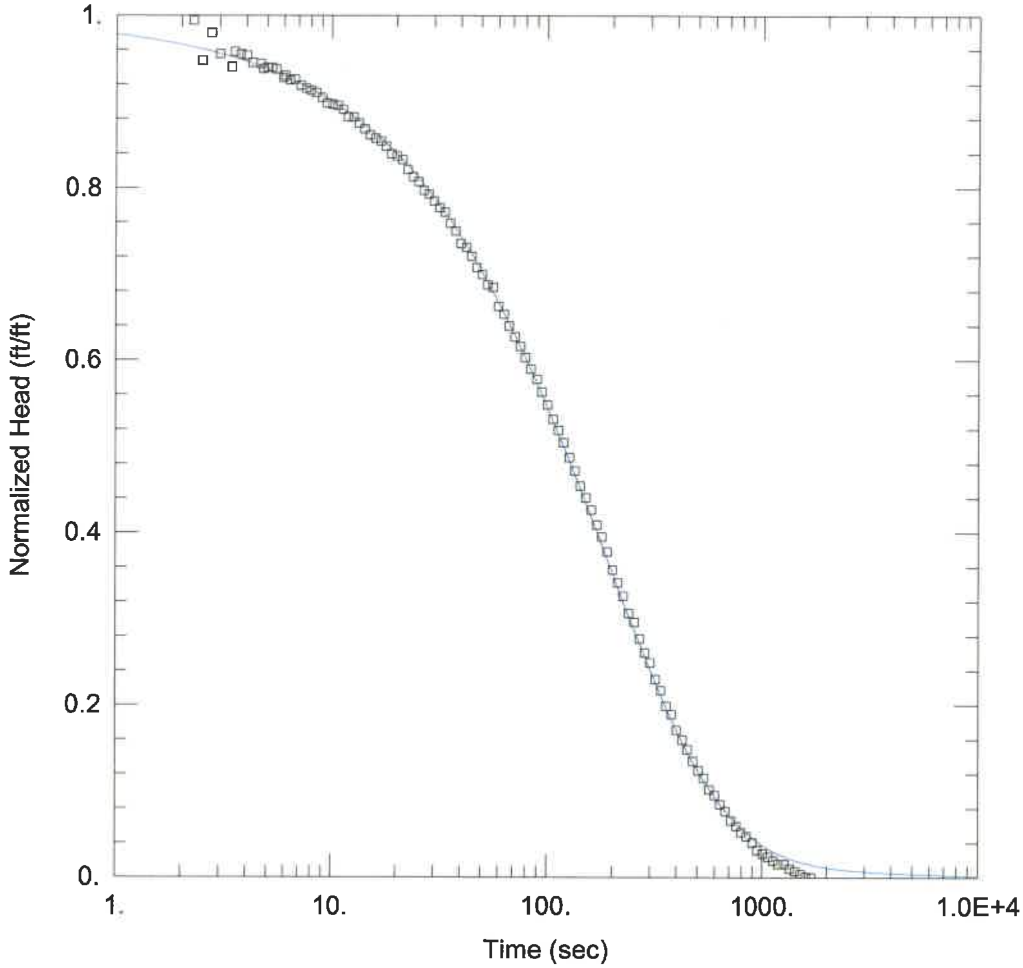
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0012 cm/sec
Kz/Kr = 1.

Ss = 2.5E-5 ft^{-1}



G284 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G284-rh.aqt
Date: 06/02/21 Time: 15:41:20

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G284
Test Date: 12 March 2021

AQUIFER DATA

Saturated Thickness: 3.8 ft

WELL DATA (G284)

Initial Displacement: 1.55 ft
Total Well Penetration Depth: 6.67 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 7.05 ft
Screen Length: 4.77 ft
Well Radius: 0.08333 ft

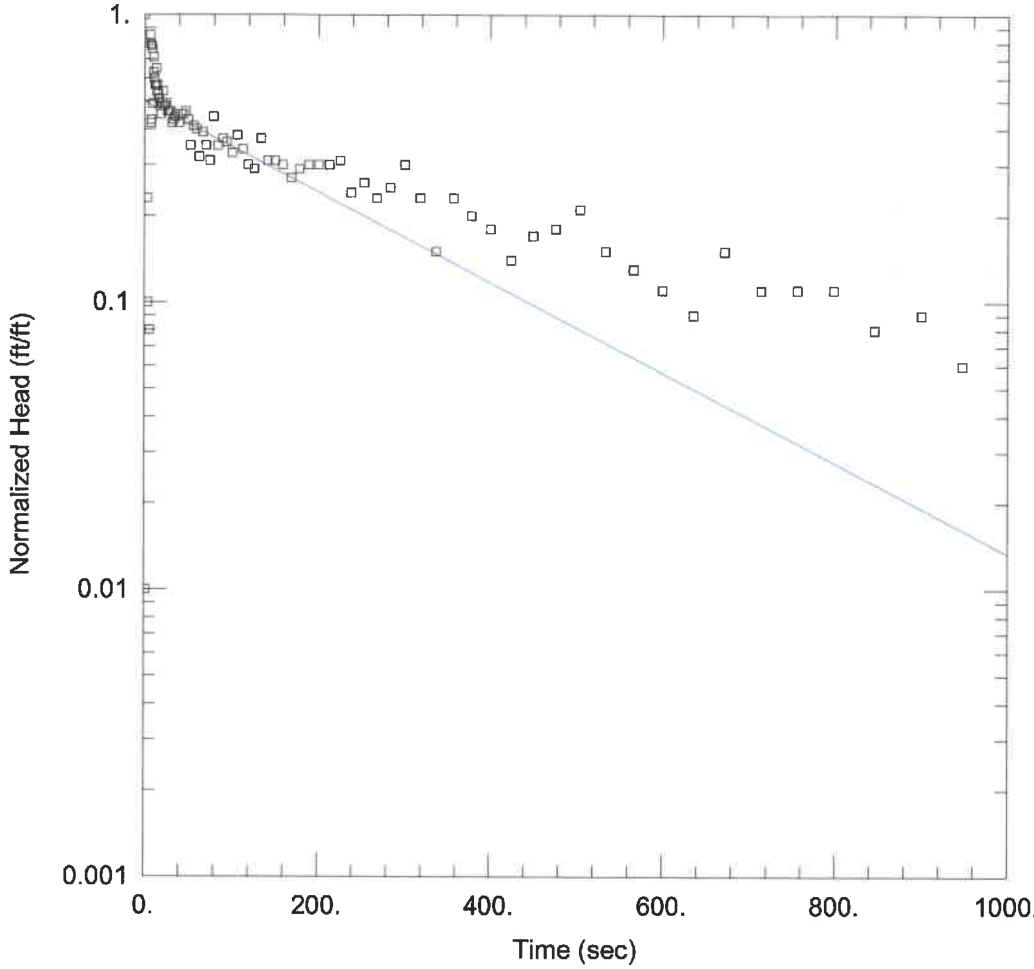
SOLUTION

Aquifer Model: Confined

Kr = 0.00078 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 0.0037 ft^{-1}



G285 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G285-fh.aqt
Date: 06/02/21 Time: 15:41:22

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G285
Test Date: 12 March 2021

AQUIFER DATA

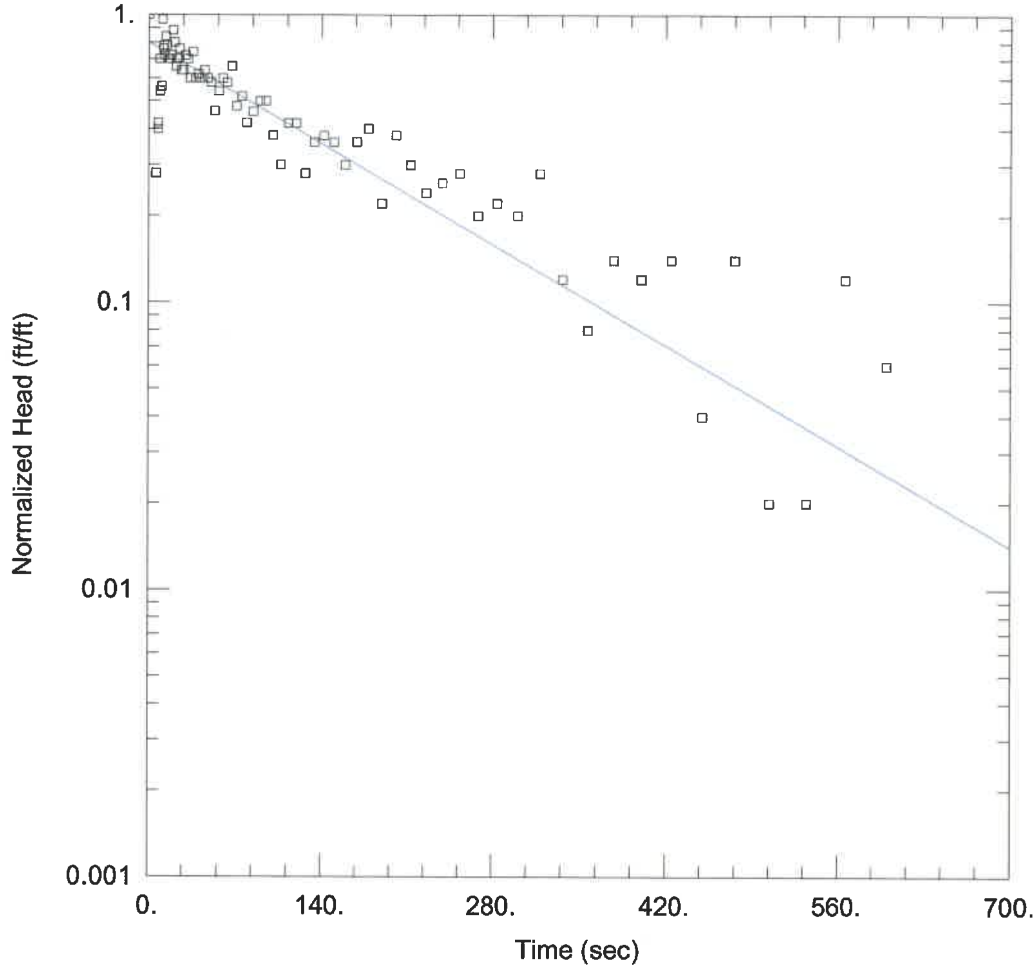
Saturated Thickness: 5.6 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G285)

Initial Displacement: 0.1 ft
Total Well Penetration Depth: 17.73 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 18.11 ft
Screen Length: 9.77 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
K = 0.00027 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.05 ft



G285 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G285-rh.aqt
Date: 06/02/21 Time: 15:41:23

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G285
Test Date: 12 March 2021

AQUIFER DATA

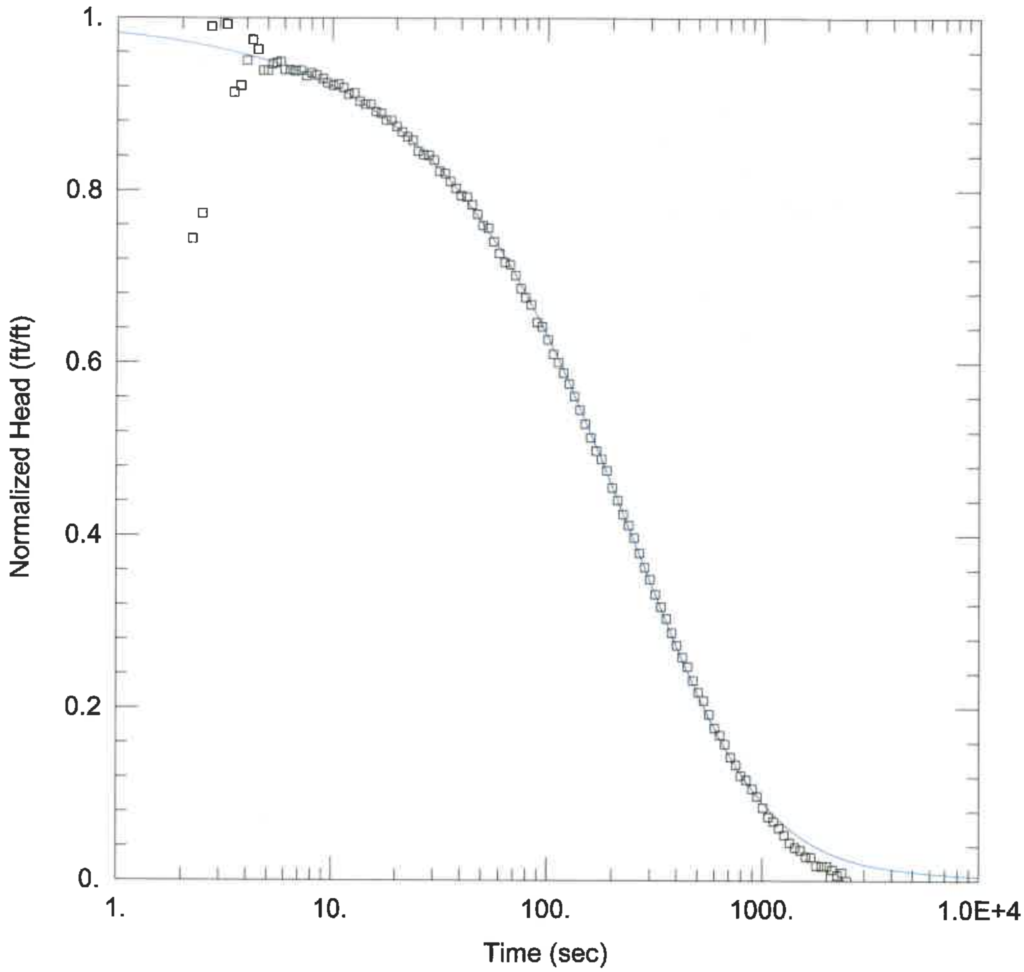
Saturated Thickness: 5.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G285)

Initial Displacement: 0.05 ft
Total Well Penetration Depth: 17.73 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 18.11 ft
Screen Length: 9.77 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.00043 cm/sec
y0 = 0.04 ft



G286 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G286-fh.aqt
Date: 06/02/21 Time: 15:41:25

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G286
Test Date: 12 March 2021

AQUIFER DATA

Saturated Thickness: 1. ft

WELL DATA (G286)

Initial Displacement: 1.25 ft
Total Well Penetration Depth: 5.92 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.26 ft
Screen Length: 4.79 ft
Well Radius: 0.08333 ft

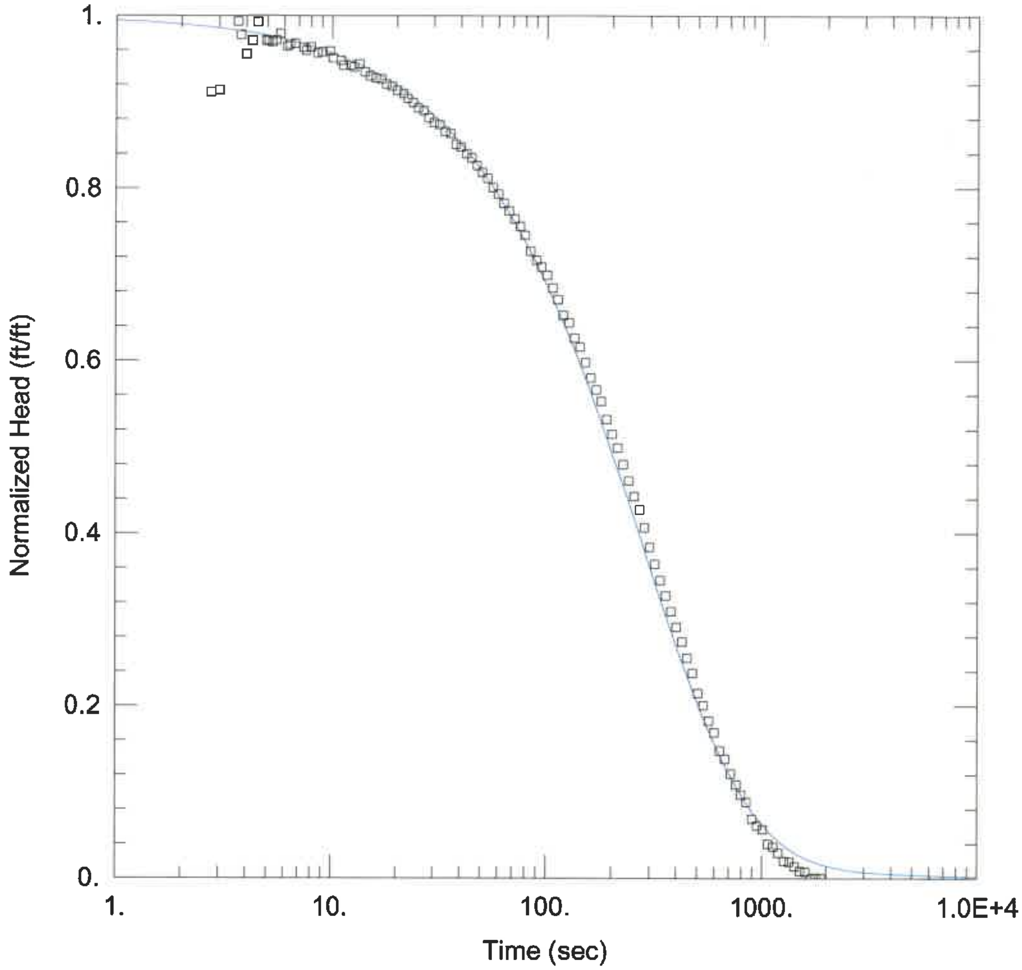
SOLUTION

Aquifer Model: Confined

K_r = 0.0012 cm/sec
K_z/K_r = 1.

Solution Method: KGS Model

S_s = 0.01 ft^{-1}



G287 FALLING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G287-fh.aqt
Date: 06/02/21 Time: 15:41:26

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G287
Test Date: 17 March 2021

AQUIFER DATA

Saturated Thickness: 2.7 ft

WELL DATA (G287)

Initial Displacement: 1.425 ft
Total Well Penetration Depth: 5.71 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.05 ft
Screen Length: 4.82 ft
Well Radius: 0.08333 ft

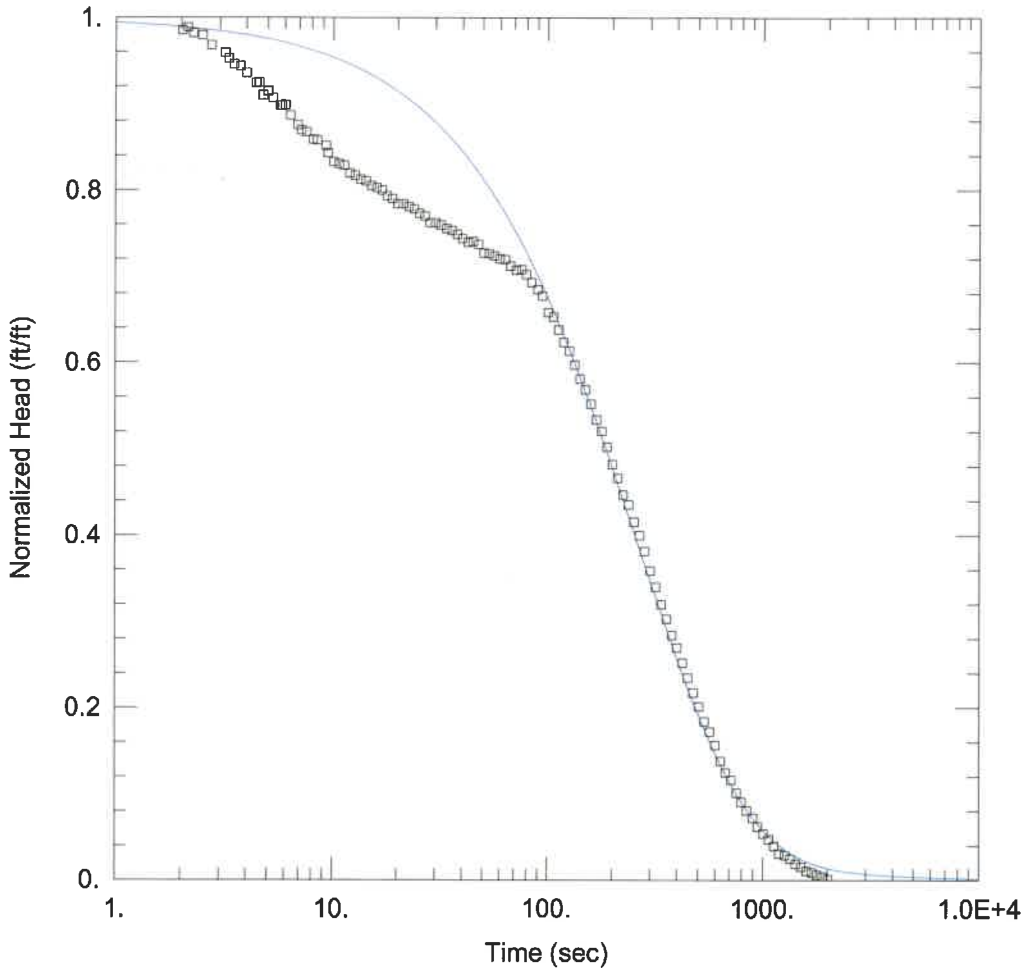
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0011 cm/sec
Kz/Kr = 1.

Ss = 3.5E-6 ft^{-1}



G287 RISING HEAD TEST

Data Set: I:\20jobs\20E0111A\Admin\13-Calculations\Slug Tests\Coffeen\G287-rh.aqt
Date: 06/02/21 Time: 15:41:28

PROJECT INFORMATION

Client: Coffeen Power Station
Project: 20E0111A
Location: Coffeen, IL
Test Well: G287
Test Date: 17 March 2021

AQUIFER DATA

Saturated Thickness: 2.7 ft

WELL DATA (G287)

Initial Displacement: 1.5 ft
Total Well Penetration Depth: 5.71 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.05 ft
Screen Length: 4.82 ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.0011 cm/sec
Kz/Kr = 1.

Ss = 7.0E-6 ft^{-1}

ADDITIONAL FIELD HYDRAULIC CONDUCTIVITIES

FIELD HYDRAULIC CONDUCTIVITIES

HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
ASH POND NO. 1
COFFEEN, 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) Hydraulic Conductivity (cm/s)	Rising Head (Slug Out) Hydraulic Conductivity (cm/s)	Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
Uppermost Aquifer											
G301	D	604.31	4.65	(ML)s	solid	Kansas Geological Survey	1.1E-03	1.2E-03	2.6E-04	9.1E-03	2.0E-03
G303	D	599.07	10	CL	solid	Kansas Geological Survey	2.8E-04	2.6E-04			
G308	D	606.70	4.79	s(ML), s(CL), (CL)s	solid	Kansas Geological Survey	5.5E-03	1.6E-03			
G309	D	605.02	4.78	SP, s(CL), (ML)s	solid	Kansas Geological Survey	9.1E-03	8.8E-04			
G310	D	604.86	4.79	SM, s(ML)	solid	Kansas Geological Survey	7.5E-03	5.9E-03			
G311	D	604.28	4.77	s(ML), s(CL)	solid	Bouwer-Rice	1.5E-03	- -			
G312	D	602.34	4.79	s(ML), s(CL)	solid	Kansas Geological Survey	1.1E-03	1.1E-03			
G313	D	600.40	4.81	SP, s(ML), (CL)s	solid	Kansas Geological Survey	2.7E-03	3.5E-03			
G315	D	606.46	4.79	s(CL)	solid	Kansas Geological Survey	6.6E-03	5.8E-03			
Lower Confining Unit											
G307D	D	563.76	9.77	(CL)s	solid	Kansas Geological Survey	3.2E-04	1.2E-04	1.2E-04	2.3E-03	5.0E-04
G311D	D	558.29	9.94	CL	solid	Kansas Geological Survey	3.8E-04	2.1E-04			
G316	D	584.82	4.80	SP, s(ML), (CL)s	solid	Kansas Geological Survey	2.3E-03	2.3E-03			
Deep Aquifer (PMP)											
G314D	D	561.76	9.77	SP, s(CL)	solid	Bouwer-Rice	3.3E-04	2.3E-05	2.3E-05	3.3E-04	8.7E-05

[O: KLT 07/09/21; C:EDP 8/31/21]

Notes:
1. All wells are constructed from 2 inch PVC with 0.01 inch slotted screens.
- - = Test not analyzed/performed
cm/s = centimeters per second
D = downgradient
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988
PMP= potential migration pathway
PVC = polyvinyl chloride

USCS = Unified Soil Classification System
CL = Lean Clay
s(CL) = Sandy Lean Clay
(CL)s = Lean Clay with Sand
s(ML) = Sandy Silt
(ML)s = Silt with Sand
SP = Poorly-Graded Sand

FIELD HYDRAULIC CONDUCTIVITIES
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
COFFEEN POWER PLANT
GMF RECYCLE POND
COFFEEN, ILLINOIS

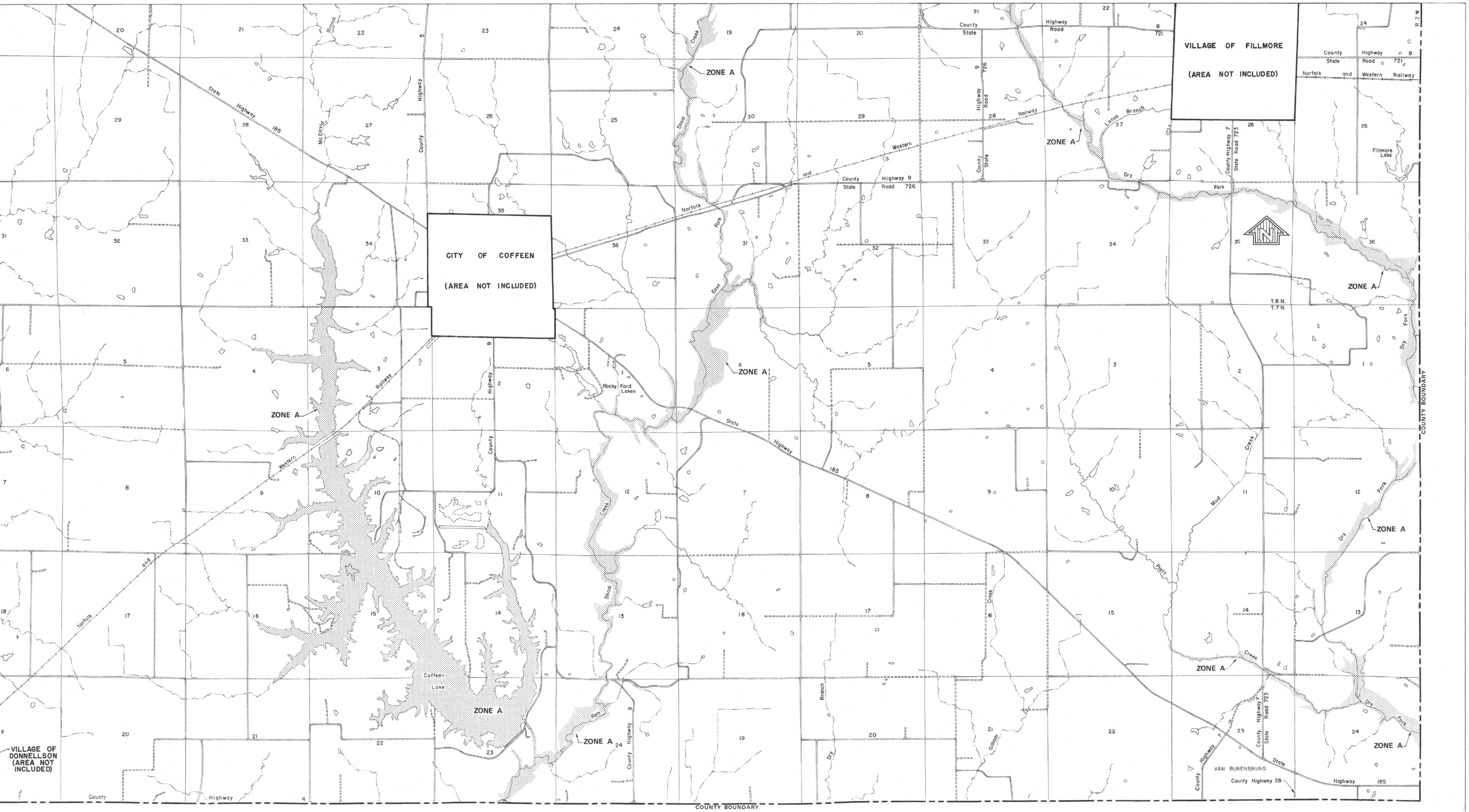
Well ID	Gradient Position	Bottom of Screen Elevation (ft NAVD88)	Screen Length [1] (ft)	Field Identified Screened Material	Slug Type	Analysis Method	Falling Head (Slug In) Hydraulic Conductivity (cm/s)	Rising Head (Slug Out) Hydraulic Conductivity (cm/s)	Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
Uppermost Aquifer											
G272	D	606.74	4.87	SP to ML, (CL)s	solid	Kansas Geological Survey	1.7E-03	- -	7.8E-04	1.7E-03	1.1E-03
G284	D	602.48	4.77	ML	solid	Kansas Geological Survey	1.2E-03	7.8E-04			
G286	D	601.81	4.79	SP, ML, CL	solid	Kansas Geological Survey	1.2E-03	- -			
G287	D	604.09	4.82	SP, ML, CL	solid	Kansas Geological Survey	1.1E-03	1.1E-03			
Lower Confining Unit (PMP)											
G283	D	590.13	9.78	SP, ML	solid	Kansas Geological Survey	4.2E-03	4.5E-03	2.7E-04	4.5E-03	1.2E-03
G285	D	587.09	9.77	CL	solid	Bouwer-Rice	2.7E-04	4.3E-04			

[O: KLT, C:EDP 8/31/21]

Notes:
1. All wells are constructed from 2 inch PVC with 0.01 inch slotted screens.
- - = Test not analyzed/performed
cm/s = centimeters per second
D = downgradient
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988
PVC = polyvinyl chloride
PMP = potential migration pathway

USCS = Unified Soil Classification System
CL = Lean Clay
(CL)s = Lean Clay with Sand
ML = Silt
SP = Poorly-Graded Sand

APPENDIX G
FEMA FLOOD HAZARD MAP



KEY TO SY

SPECIAL FLOOD HAZARD AREA

"TO DETERMINE IF FLOOD INSURANC COMMUNITY, CONTACT YOUR INSUR THE NATIONAL FLOOD INSURANCE P 6620, OR (800) 424-8872."

NATIONAL FLO

FHBM
FLOOD HAZA

MONT COUN ILLIN
UNINCOR

PANEL 9 OF
(SEE MAP INDEX

COMMUN

federal emerge
federal insu

Streams Classified by Risk: Montgomery County, Illinois

Illinois State WATER Survey (1895)

This map illustrates stream reaches at risk for potential flooding that were not designated as Special Flood Hazard Areas (SFHAs) and were not shown on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps as of July 1, 2007. Also shown are areas of Risk Class A (high), B (medium), and C (low) adopted by FEMA Region 5. Streams lacking a SFHA designation and draining more than one square mile in a Risk Class A area or draining more than 10 square miles in a Risk Class B or C area are shown with red lines.

A table associated with this map lists streams with unmapped potential flood risk, their names, and the number of miles not within a Special Flood Hazard Area.

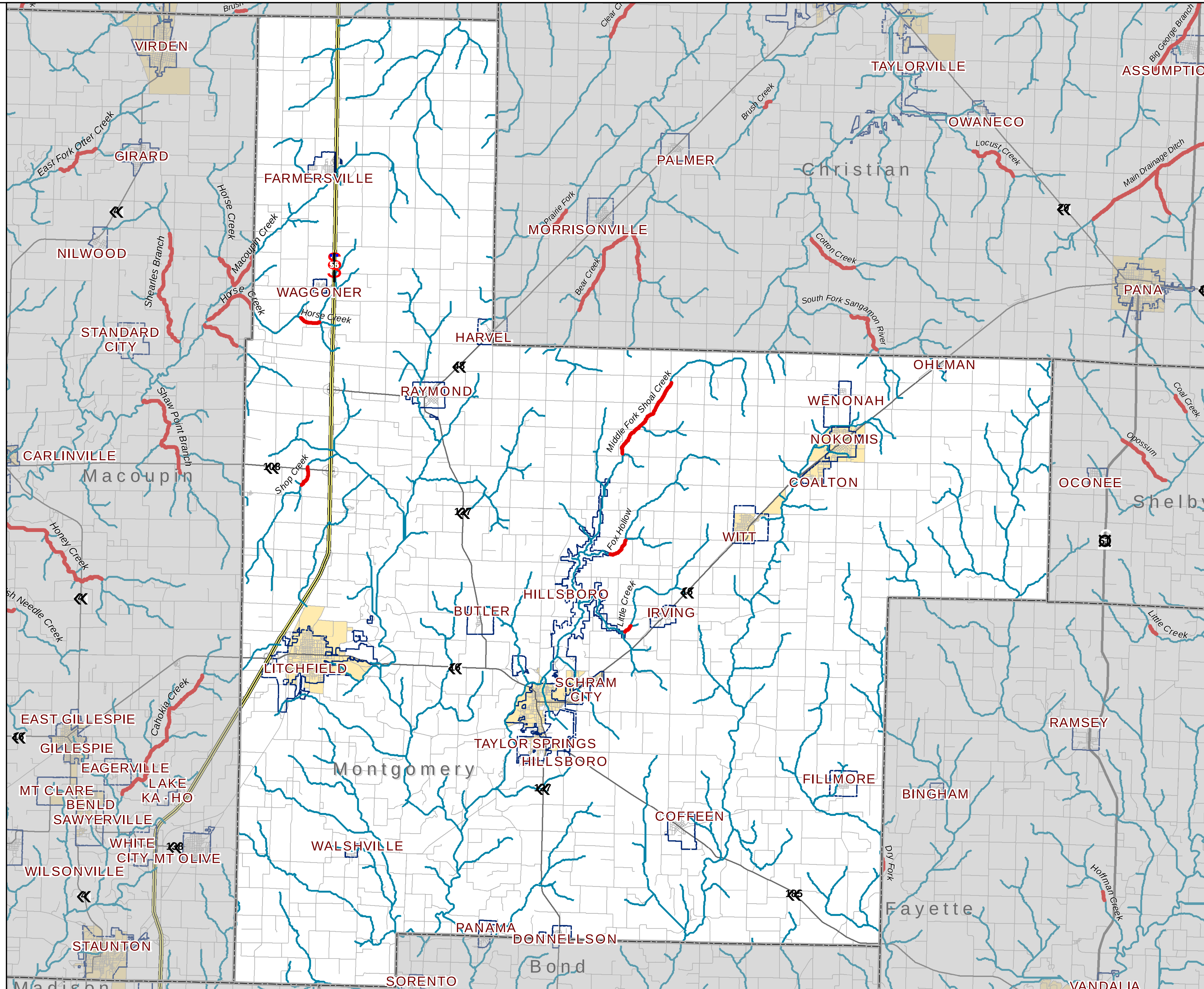
0 0.5 1 2 3 4 5
Miles

Legend

- Streams without SFHAs
- Streams
- Municipal Boundaries
- County Boundaries
- Interstate Hwy
- US Highways
- State Routes
- Roads

Risk Classes

- A - High Risk
- B - Medium Risk
- C - Low Risk



ATTACHMENT I

Intended for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-002

GROUNDWATER MONITORING PLAN

GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

GROUNDWATER MONITORING PLAN
COFFEEN POWER PLANT GMF GYPSUM STACK POND

Project Name	**Coffeen Power Plant GMF Gypsum Stack Pond**
Project No.	**1940100806-002**
Recipient	**Illinois Power Generating Company**
Document Type	**Groundwater Monitoring Plan**
Revision	**FINAL**
Date	**October 25, 2021**

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Senior Managing Hydrogeologist

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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, Coffeen Power Plant GMF Gypsum Stack 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, Coffeen Power Plant GMF Gypsum Stack 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

Licensed Professional Certifications		**2**
1.	**Introduction**	**6**
1.1	Overview	6
1.2	Site Location and Background	6
1.3	Conceptual Model	6
2.	**Groundwater Monitoring Systems**	**9**
2.1	Existing Monitoring Well Network and Analysis	9
2.1.1	**IEPA Groundwater Monitoring Program**	9
2.1.2	40 C.F.R. § 257 Monitoring Program	10
2.1.3	Part 845 Well Installation and Monitoring	10
2.2	Proposed Part 845 Monitoring Well Network	11
2.3	Well Abandonment	12
3.	**Applicable Groundwater Quality Standards**	**13**
3.1	Groundwater Classification	13
3.2	Statistical Evaluation of Background Groundwater Data	13
3.3	Applicable Groundwater Protection Standards	13
4.	**Groundwater Monitoring Plan**	**15**
4.1	Monitoring Networks and Parameters	15
4.1.1	IEPA Monitoring Program	15
4.1.2	40 C.F.R. § 257 Groundwater Monitoring	15
4.1.3	Part 845 Groundwater Monitoring	15
4.2	Sampling Schedule	16
4.3	Groundwater Sample Collection	17
4.4	Laboratory Analysis	17
4.5	Quality Assurance Program	17
4.6	Groundwater Monitoring System Maintenance Plan	18
4.7	Statistical Analysis	18
4.8	Data Reporting	18
4.9	Compliance with Applicable On-site Groundwater Protection Standards	18
4.10	Alternate Source Demonstrations	19
4.11	Assessment of Corrective Measures and Corrective Action	19
5.	**References**	**21**

TABLES (IN TEXT)

Table A	IEPA Groundwater Monitoring Program Parameters
Table B	40 C.F.R. § 257 Groundwater Monitoring Program Parameters
Table C	Part 845 Groundwater Monitoring Program Parameters
Table D	Proposed Part 845 Monitoring Well Network
Table E	Part 845 Groundwater Monitoring Program Parameters
Table F	Part 845 Sampling Schedule

TABLES (ATTACHED)

Table 1-1	Part 845 Requirements Checklist
Table 2-1	Monitoring Well Locations and Construction Details
Table 3-1	Background Groundwater Quality and Standards
Table 4-1	Sampling and Analysis Summary
Table 4-2	Detection and Reporting Limits for Part 845 Parameters

FIGURES (ATTACHED)

Figure 1-1	Site Location Map
Figure 1-2	Site Map
Figure 1-3	Uppermost Aquifer Groundwater Elevation Contours, April 20, 2021
Figure 2-1	Proposed Part 845 Groundwater Monitoring Well Network

APPENDICES

Appendix A	Statistical Analysis Plan

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
CPP	Coffeen Power Plant
DA	deep aquifer
DCU	deep confining unit
GMF	Gypsum Management Facility
GMP	Groundwater Monitoring Plan
GSP	Gypsum Stack Pond
GWPS	Groundwater Protection Standard
HCR	Hydrogeologic Site Characterization Report
HDPE	high-density polyethylene
ID	identification
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
LCU	lower confining unit
mg/L	milligrams per liter
NA	not applicable
NID	National Inventory of Dams
No.	number
NRT/OBG	Natural Resources Technology, Inc., an OBG Company
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
RP	Recycle Pond
SI	surface impoundment
TDS	total dissolved solids
UA	uppermost aquifer
UCU	upper confining unit
USEPA	United States Environmental Protection Agency
WLO	water level only
WPCP	Water Pollution Control Permit

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 Coffeen Power Plant (CPP), operated by Illinois Power Generating Company (IPGC). This report will apply specifically to the CCR Units referred to as the Gypsum Management Facility (GMF) Gypsum Stack Pond (GSP), Vistra identification (ID) number (No.) 103, IEPA ID No. W1350150004-03, and National Inventory of Dams (NID) No. IL50579. 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 GMF GSP at the CPP.

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 CPP is approximately two miles south of the city of Coffeen, Illinois and approximately eight miles southeast of the city of Hillsboro, Illinois (**Figure 1-1**). The GMF GSP is located in Montgomery County, in central Illinois, within Section 11, Township 7 North, and Range 7 East. The CPP is located between the two lobes of Coffeen Lake to the west, east, and south, and is bordered by agricultural land to the north. The CPP operated as a coal-fired power plant from 1964 to November 2019 and has five CCR management units. The approximately 1,100-acre Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the CPP.

The two GMFs, consisting of the 77-acre GMF GSP and the 17-acre GMF Recycle Pond (RP) (**Figure 1-2**), receive blowdown from the air emission scrubbers and have been in operation since 2010. Construction of the GMFs were in accordance with the IEPA Water Pollution Control Permit (WPCP) No. 2008-EA-4661 and feature a composite high-density polyethylene (HDPE) liner with three feet of compacted soil with a hydraulic conductivity of 1×10^{-7} centimeters per second (cm/s). Both GMF ponds have a groundwater underdrain system. The GMF GSP system was actively pumped during construction but is currently not used. The GMF RP underdrain is a passive, gravity drained system. IPGC ceased receipt of waste to the GMF GSP prior to April 11, 2021.

1.3 Conceptual Model

Significant site investigation has been completed at the CPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the CPP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (HCR; Ramboll, 2021), 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 at the GMF GSP, there are five principal layers of unlithified material present above the bedrock, which are categorized into hydrostratigraphic units below based on stratigraphic relationships and common hydrogeologic characteristics.

- **Upper Confining Unit (UCU):** Composed of the Roxana and Peoria Silts (Loess Unit) and the upper clayey portion of the Hagarstown member which are classified as silts to clayey silts and gravelly clay below the surficial soil. Construction of the GMF GSP required the excavation and removal of this layer within the unit footprint and the UCU has been eroded east of the GMF GSP, near the Unnamed Tributary.
- **Uppermost Aquifer:** The uppermost aquifer is the Hagarstown Member which is classified as primarily sandy to gravelly silts and clays with thin beds of sands. Similar to the Loess Unit, the Hagarstown Member was excavated to facilitate construction of the GMF GSP and the Hagarstown is also absent in some locations near the Unnamed Tributary.
- **Lower Confining Unit (LCU):** Comprised of the Vandalia Member, Mulberry Grove Member, and Smithboro Member. These units include a sandy to silty till with thin, discontinuous sand lenses, a discontinuous and limited extent sandy silt which has infilled prior erosional features, and silty to clayey diamicton, respectively.
- **Deep Aquifer (DA):** Sand and sandy silt/clay units of the Yarmouth Soil, which include accretionary deposits of fine sediment and organic materials, typically less than five feet thick and discontinuous across the site. Where present, the DA has been identified as a potential migration pathway (PMP) due to presence of downward gradients and the relatively greater hydraulic conductivities measured in the DA.
- **Deep Confining Unit (DCU):** Comprised of the Banner Formation, generally consists of clays, silts, and sands. The Lierle Clay Member is the upper layer of the Banner Formation which was encountered at the Site.

Flow of groundwater from central portions of the CPP to Coffeen Lake or the Unnamed Tributary through the uppermost aquifer are the primary pathways for contaminant migration. Groundwater elevations are primarily controlled by surface topography, geologic unit topography, and water levels within Coffeen Lake and the Unnamed Tributary. A groundwater divide trending north-south is observed running through the approximate center of the CPP (**Figure 1-3**). Water levels within the SIs are generally consistent and have not been observed to fluctuate with groundwater elevations indicating limited hydraulic connection with the SIs.

Part 845 parameters were monitored in the uppermost aquifer monitoring wells at the GMF GSP as part of the IEPA WPCP No. 2020-EO-65043 monitoring program and Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 monitoring program beginning in 2015. These data were supplemented by sampling of additional locations in 2021. The results indicate that the following parameters were detected at concentrations/measurements greater than (or less than for pH) the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Arsenic in compliance uppermost aquifer well G215.
- Beryllium in compliance uppermost aquifer well G209.
- Cobalt in compliance uppermost aquifer wells G209, G213, and G217.
- Lead in compliance uppermost aquifer wells G209 and G213.

- pH (lower limit) in compliance uppermost aquifer well G206.
- Sulfate in compliance uppermost aquifer well G215 and in compliance DA well G206D.
- Thallium in compliance uppermost aquifer well G209.
- Total dissolved solids (TDS) in compliance DA well G206D.

Concentration results for the above parameters were compared directly to 35 I.A.C. § 845.600 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 GMF GSP that will comply with Part 845. Monitoring networks and programs that apply to other units are not discussed in this GMP. Those programs will continue to be performed as specified in IEPA approvals. Any future modifications will be proposed and submitted to IEPA for approval in a separate document. The remaining discussion in this document will include only these networks and monitoring programs that are applicable and specific to the GMF GSP, specifically the IEPA WPCP monitoring network, the 40 C.F.R. § 257 network, and the proposed Part 845 monitoring network.

2.1.1 IEPA Groundwater Monitoring Program

Routine quarterly groundwater monitoring is completed for a monitoring well network that includes wells for both the GMF GSP and GMF RP. The monitoring well network consists of thirty-one monitoring wells screened in the uppermost aquifer (G102, G103, R104, G105, G106, G200, G205, G206, G207, G208, G209, G210, G211, G212, G213, G214, G215, G216, G217, G218, G270, G271, G272, G273, G274, G275, G276, G277, G279, G280, and R201) in accordance with IEPA WPCP No. 2020-EO-65043, issued on March 11, 2020. The boring logs and well construction forms for the GMF well network are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). Quarterly and annual samples are analyzed for the following field and laboratory parameters listed in **Table A** below.

Table A. IEPA Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Elevation of Measuring Point		Specific Conductance
Depth to Water (below measuring point, below ground surface)	Elevation of Groundwater Surface		Temperature
Metals (Dissolved)			
Antimony	Cadmium	Manganese	Thallium
Arsenic	Chromium	Mercury	Vanadium
Aluminum	Cobalt	Molybdenum	Zinc
Barium	Copper	Nickel	
Beryllium	Iron	Selenium	
Boron	Lead	Silver	
Inorganics (Dissolved)			
Chloride	Fluoride	TDS	
Cyanide	Sulfate		
Other (Total)			
Phenols			

Note: Parameters are monitored as dissolved quarterly, and as dissolved and total annually.

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

2.1.2 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 well network for the GMF GSP consists of seven monitoring wells installed nearby or adjacent to the GMF GSP within the uppermost aquifer. The GMF GSP 40 C.F.R. § 257 well network consists of two background monitoring wells (G200 and R201) and five compliance monitoring wells (G206, G209, G212, G215, and G218). 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).

Groundwater is being monitored at the GMF GSP in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94. Details on the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Sampling and Analysis Plan for GMF GSP (Natural Resource Technology, an OBG Company [NRT/OBG], 2017).

Groundwater samples are collected semiannually and analyzed for the laboratory and field 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.

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, one additional monitoring well (G206D), one source sample collection point (NE Riser), and one soil boring (G289) were installed along the perimeter of the GMF GSP 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).

Prospective Part 845 monitoring wells were sampled for eight rounds from March to August 2021 and the results were assessed for selection of the GMF GSP Part 845 monitoring well network. Groundwater samples were collected and analyzed for 35 I.A.C. § 845.600 parameters as summarized in **Table C** below.

Table C. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH	Turbidity	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total, except TDS)			
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 GMF GSP. 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 2021, 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 nine monitoring wells screened in the uppermost aquifer (G200, G206, G209, G212, G213, G215, G217, G218, and R201), one monitoring well screened in the DA (G206D), one temporary water level only well (NE Riser), and one temporary water level only surface water staff gage (SG-04). The proposed network is summarized in **Table D** below and displayed on **Figure 2-1**. Ten wells (two background and eight compliance) will be used to monitor groundwater concentrations within the hydrostratigraphic units.

The groundwater samples collected from the ten 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 D** below.

Table D. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type[1]
G200	UA	12.2 – 17.0	Background
G206	UA	17.5 – 21.9	Compliance
G206D	DA	49.2 – 59.0	Compliance
G209	UA	17.7 – 22.3	Compliance
G212	UA	16.7 – 21.3	Compliance
G213	UA	16.8 – 21.3	Compliance
G215	UA	19.4 – 23.8	Compliance
G217	UA	20.5 – 24.9	Compliance
G218	UA	20.3 – 24.8	Compliance
R201	UA	14.6 – 19.3	Background
NE Riser [2, 3]	CCR	NA	WLO
SG-04 [3, 4]	Surface Water	NA	WLO

[1] Well Type refers to the role of the well in the monitoring network.

[2] Well is to be for water level data collection only.

[3] Location is temporary pending implementation of impoundment closure per an approved Construction Permit Application.

[4] Surface water level measuring point.

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

Groundwater within the uppermost aquifer at the GMF GSP meets the definition of Class I - Potable Resource Groundwater (35 I.A.C. § 620.210), based on the following criteria:

- Groundwater in the uppermost aquifer is located 10 feet or more below the land surface.
- Field hydraulic conductivity testing performed in the uppermost aquifer resulted in an overall (geometric mean) horizontal hydraulic conductivity of 1.4 x 10^{-3} cm/s, exceeding the 1 x 10^{-4} cm/s criterion.

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) (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 uppermost aquifer and DA 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 only exception being arsenic, where the background concentration is greater than the 35 I.A.C. § 845.600(a)(1) standard (0.011 milligrams per liter [mg/L] versus 0.010 mg/L). In this instance, the GWPS will be the background concentration.

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 greater than 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 GMF GSP exist: the IEPA WPCP 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. Upon approval of the Operating Permits (and by extension the GMPs) for the GMF GSP and RP, the IEPA WPCP monitoring will be replaced by the Part 845 monitoring program. 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 Plan will continue until requirements of Part 845 have been achieved.

4.1 Monitoring Networks and Parameters

4.1.1 IEPA Monitoring Program

The existing IEPA monitoring program was discussed in detail in **Section 2.1.1**. Thirty-one monitoring wells are sampled quarterly for dissolved analyses, and annually for totals. No changes are proposed to this monitoring network. Well locations and parameters will continue to be monitored and reported as required by the WPCP until IEPA approves this GMP and the GMP prepared for the GMF RP.

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**. Seven wells (two background and five 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 (G200 and R201), eight compliance monitoring wells (G206, G206D, G209, G212, G213, G215, G217, and G218), one temporary water level only well (NE Riser) and one temporary water level only surface staff gage (SG-04) to monitor potential impacts from the GMF GSP (**Figure 2-1**). These monitoring wells are screened within the uppermost aquifer and DA along the perimeter of the GMF GSP. Groundwater samples will be collected and analyzed for the laboratory and field parameters in **Table E** below.

Table E. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH	Turbidity	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total, except TDS)			
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 F. 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 program 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 annual report will include the status of the groundwater monitoring and any required corrective action plan for the GMP GSP 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; 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 GMF GSP caused the contamination and the GMF GSP 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, an OBG Company (NRT/OBG), 2017. *Sampling and Analysis Plan, Coffeen GMF Gypsum Stack Pond, Coffeen Power Station, Coffeen, Illinois, Project No. 2285, Revision 0, October 17, 2017.*

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. *Hydrogeologic Site Characterization Report. Coffeen GMF Gypsum Stack Pond, Coffeen Power Plant*. *Coffeen, 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.

TABLES

TABLE 1-1. PART 845 REQUIREMENTS CHECKLIST
GROUNDWATER MONITORING PLAN
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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 3.2 & 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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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) and (3)	Staff gauge/ piezometer to monitor head in impoundment	Sections 2.2 & 4.1.3 Figure 2-1 (NE Riser)
NA	Staff gauge/ piezometer to monitor head of neighboring surface water body	Sections 2.2 & 4.1.3 Figure 2-1 (SG-04)

[O: CJC 09/02/21; C: SSW 09/16/21]

Notes:
GMP = Groundwater Monitoring Plan
NA = Not Applicable

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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)
G200	B	UA	02/25/2008	--	625.94	Top of Disk	623.27	12.19	16.98	611.08	606.29	17.36	605.30	4.8	2	39.075139	-89.395009
G206	C	UA	10/14/2010	--	632.82	Top of Disk	630.53	17.51	21.92	613.02	608.61	22.42	606.50	4.4	2	39.067399	-89.398548
G206D	C	DA	01/25/2021	634.14	634.14	Top of PVC	631.41	49.20	59.00	582.21	572.41	59.39	571.41	9.8	2	39.067428	-89.398493
G209	C	UA	10/07/2010	--	632.91	Top of Disk	630.57	17.74	22.28	612.83	608.29	22.81	606.60	4.5	2	39.067923	-89.39685
G212	C	UA	10/11/2010	--	632.89	Top of Disk	630.59	16.74	21.29	613.85	609.30	21.81	606.60	4.6	2	39.06843	-89.395318
G213	C	UA	10/12/2010	--	632.81	Top of Disk	630.34	16.75	21.29	613.59	609.05	21.82	606.30	4.5	2	39.068585	-89.394822
G215	C	UA	10/13/2010	--	633.06	Top of Disk	630.48	19.41	23.80	611.07	606.68	24.31	606.20	4.4	2	39.069309	-89.39394
G217	C	UA	10/12/2010	--	633.10	Top of Disk	630.67	20.49	24.88	610.18	605.79	25.38	604.70	4.4	2	39.07034	-89.393959
G218	C	UA	10/12/2010	--	633.11	Top of Disk	630.64	20.33	24.77	610.31	605.87	25.27	604.60	4.4	2	39.070876	-89.393956
R201	B	UA	10/08/2010	--	626.34	Top of Disk	624.02	14.59	19.32	609.43	604.70	19.85	604.20	4.7	2	39.075142	-89.397855
NE Riser	WLO	S	--	--	626.13	--	--	--	--	--	--	--	--	--	--	39.071111	-89.393889
SG-04	WLO	SW	--	--	599.52	Top of Prot Casing	599.52	--	--	--	--	--	--	--	--	39.064146	-89.390504

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
DA = deep aquifer
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
S = source water
SW = surface water
UA = uppermost aquifer
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TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS
GROUNDWATER MONITORING PLAN
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.003	0.006	0.006	mg/L
Arsenic, total	0.011	0.010	0.011	mg/L
Barium, total	0.13	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	0.11	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	94.9	200	200	mg/L
Chromium, total	0.0096	0.1	0.1	mg/L
Cobalt, total	0.0037	0.006	0.006	mg/L
Fluoride, total	0.552	4.0	4.0	mg/L
Lead, total	0.0059	0.0075	0.0075	mg/L
Lithium, total	0.02	0.04	0.04	mg/L
Mercury, total	0.0011	0.002	0.002	mg/L
Molybdenum, total	0.044	0.1	0.1	mg/L
pH (field)	7.4 / 6.8	9.0 / 6.5	9.0 / 6.5	SU
Radium 226 and 228 combined	1.48	5	5	pCi/L
Selenium, total	0.0035	0.05	0.05	mg/L
Sulfate, total	387	400	400	mg/L
Thallium, total	0.001	0.002	0.002	mg/L
Total Dissolved Solids	975	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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, 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	10	1	0	0	1	12	plastic	600 mL	HNO_3 to pH<2	6 months
Mercury	7470A or 6020	10	1	0	0	1	12	plastic	400 mL	HNO_3 to pH<2	28 days
Inorganic Parameters											
Fluoride	9214 or EPA 300	10	1	0	0	1	12	plastic	300 mL	Cool to 4 °C	28 days
Chloride	9251 or EPA 300	10	1	0	0	1	12	plastic	100 mL	Cool to 4 °C	28 days
Sulfate	9036 or EPA 300	10	1	0	0	1	12	plastic	50 mL	Cool to 4 °C	28 days
Total Dissolved Solids	SM 2540 C	10	1	0	0	1	12	plastic	200 mL	Cool to 4 °C	7 days
Radium											
Radium 226	9315 or EPA 903	10	0	0	0	0	10	plastic	1000 mL	HNO_3 to pH<2	6 months
Radium 228	9320 or EPA 904	10	0	0	0	0	10	plastic	1000 mL	HNO_3 to pH<2	6 months
Field Parameters											
pH	SM 4500-H+ B	10	NA	NA	NA	NA	10	flow-through cell	NA	none	immediately
Dissolved Oxygen [8]	SM 4500-O/405.1	10	NA	NA	NA	NA	10	flow-through cell	NA	none	immediately
Temperature [8]	SM 2550	10	NA	NA	NA	NA	10	flow-through cell	NA	none	immediately
Oxidation/Reduction Potential [8]	SM 2580 B	10	NA	NA	NA	NA	10	flow-through cell	NA	none	immediately
Specific Conductance [8]	SM 2510 B	10	NA	NA	NA	NA	10	flow-through cell	NA	none	immediately
Turbidity [7]	SM 2130 B	10	NA	NA	NA	NA	10	flow-through cell or hand-held turbidity meter	NA	none	immediately

[O: CJC 09/02/21; C: SSW 09/16/21]

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

TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS

GROUNDWATER MONITORING PLAN

COFFEEN POWER PLANT

GMF GYPSUM STACK POND

COFFEEN, 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]

TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS

GROUNDWATER MONITORING PLAN

COFFEEN POWER PLANT

GMF GYPSUM STACK POND

COFFEEN, ILLINOIS

Constituent	CAS	Unit	Analytical Methods [1]	USEPA MCL [2]	35 I.A.C. § 845.600	RL [4, 5]	MDL [5]
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 09/02/21; C: SSW 09/16/21]

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

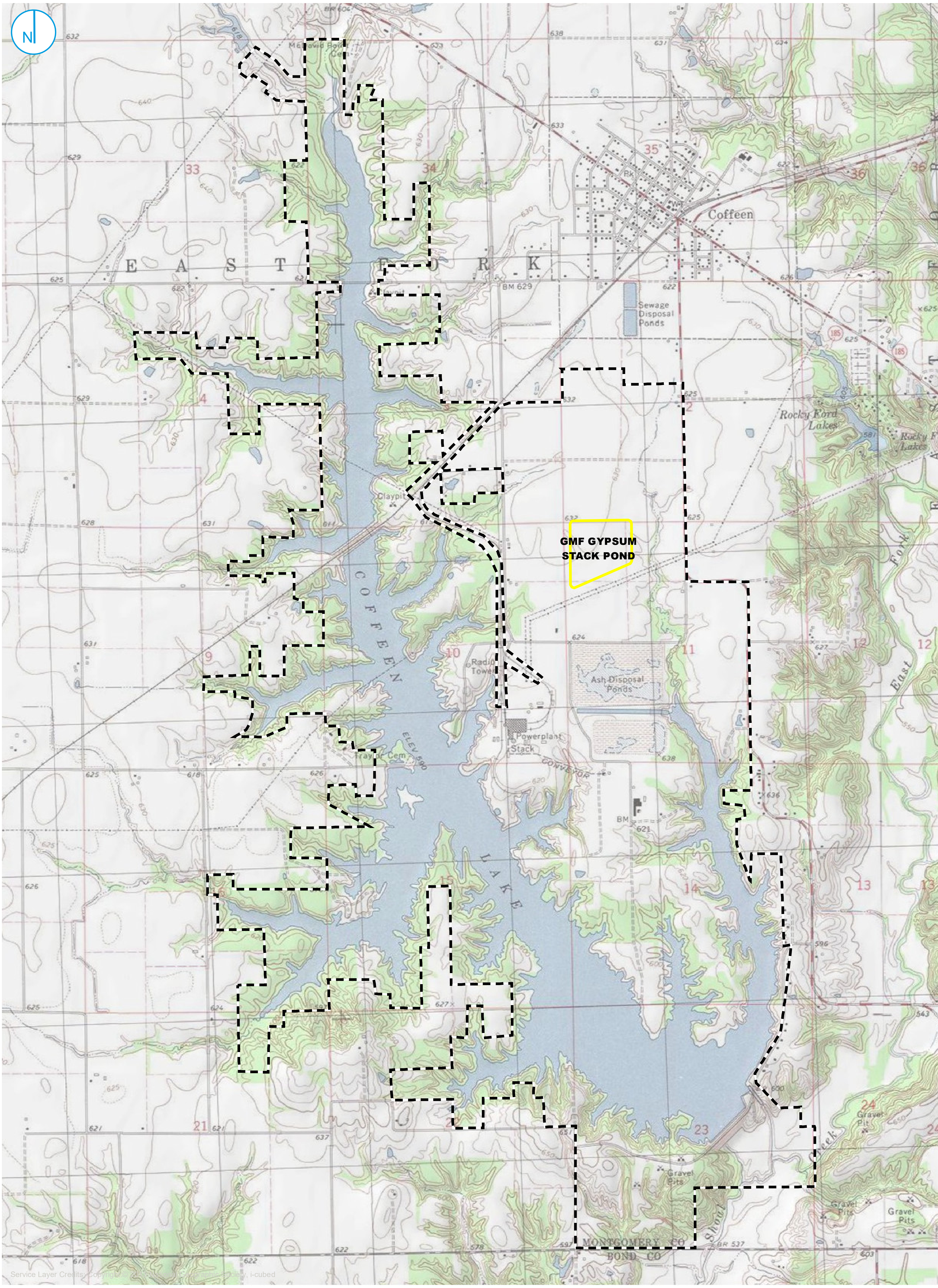
pCi/L = picoCuries per liter

RL = Reporting limit as established by the laboratory

SM = Standard Methods for the Examination of Water and Wastewater

SU = standard units

FIGURES



PART 845 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-1

GROUNDWATER MONITORING PLAN
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

■ COAL MINE SHAFT
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

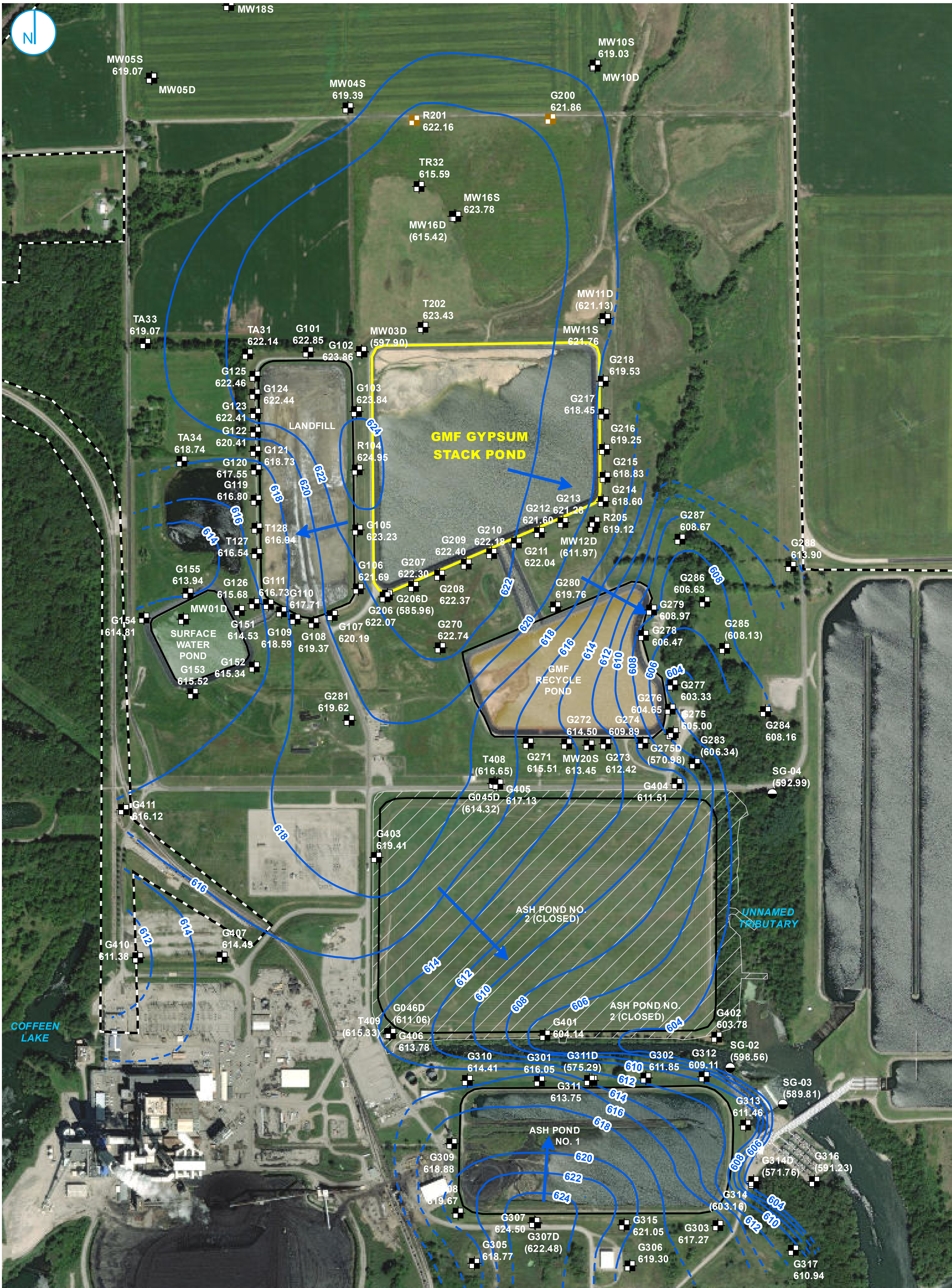
0 275 550
Feet

SITE MAP

FIGURE 1-2

GROUNDWATER MONITORING PLAN
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 275 550 Feet

PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTE:
ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

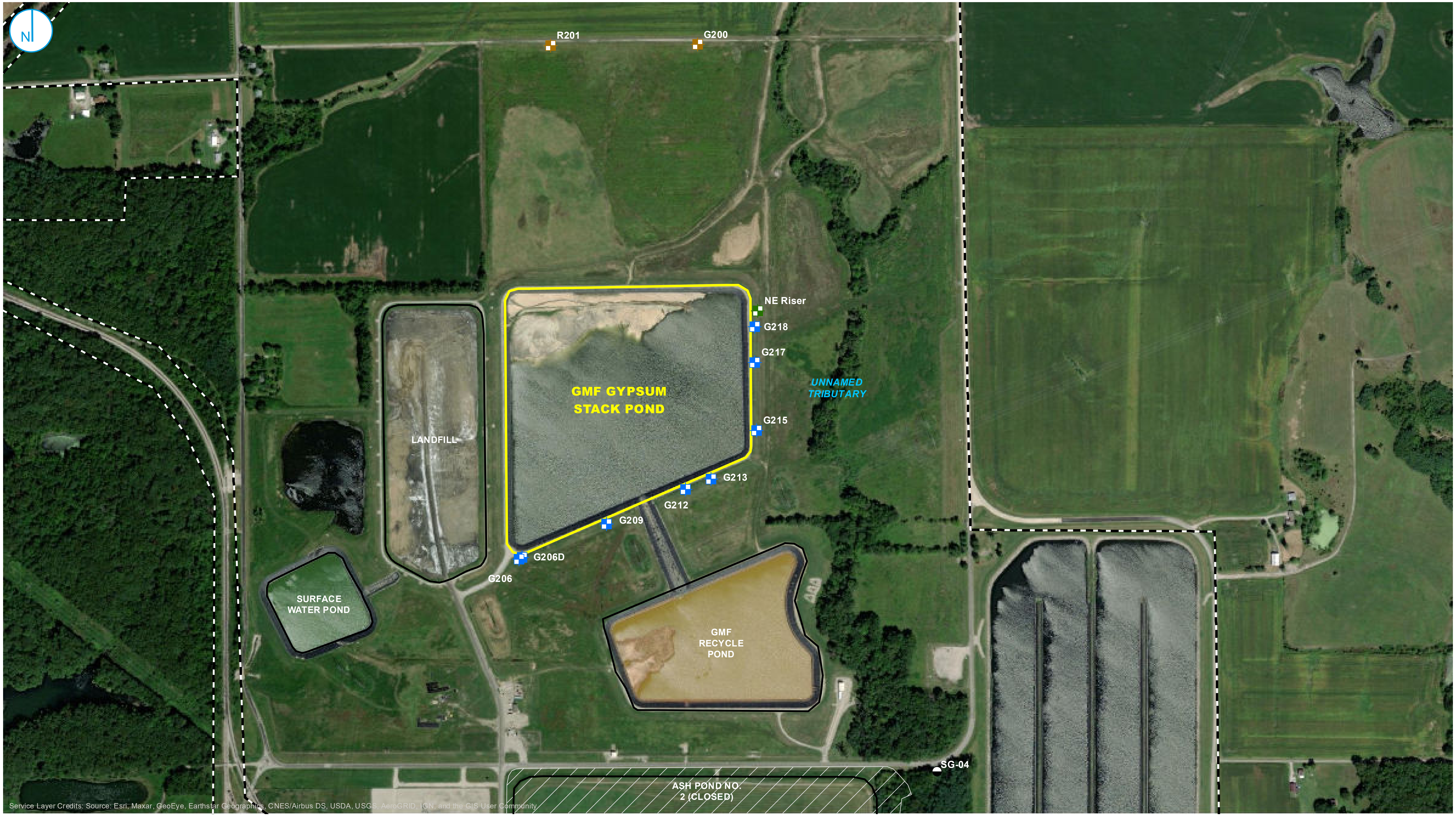
UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS APRIL 20, 2021

GROUNDWATER MONITORING PLAN
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 1-3

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL



Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Coffeen\GMF_GSP\GMP\Figure 2-1_Proposed Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 10/12/2021 | DESIGNER: HOTCALD

BACKGROUND WELL
COMPLIANCE WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 250 500 Feet

PROPOSED PART 845 GROUNDWATER MONITORING WELL NETWORK

GROUNDWATER MONITORING PLAN
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

APPENDIX A
STATISTICAL ANALYSIS PLAN

Prepared for

Illinois Power Generating Company

Date

October 25, 2021

Project No.

1940100806-002

STATISTICAL ANALYSIS PLAN

GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

STATISTICAL ANALYSIS PLAN
COFFEEN POWER PLANT GMF GYPSUM STACK POND

Project Name	**Coffeen Power Plant GMF Gypsum Stack Pond**
Project No.	**1940100806-002**
Recipient	**Illinois Power Generating Company**
Document Type	**Statistical Analysis Plan**
Version	**FINAL**
Date	**October 25, 2021**

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Senior Managing Hydrogeologist

Eric J. Tlachac, PE
Senior Managing Engineer

Rachel A. Banoff, EIT
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; Coffeen Power Plant GMF Gypsum Stack 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; Coffeen Power Plant GMF Gypsum Stack 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; Coffeen Power Plant GMF Gypsum Stack 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; Coffeen Power Plant GMF Gypsum Stack 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

Licensed Professional Certifications		**2**
1.	**Introduction**	**6**
1.1	Statistical Analysis Objectives	6
1.2	Statistical Analysis Plan Approach	6
2.	**Background Monitoring and Data Preparation**	**8**
2.1	Sample Independence	8
2.2	Non-Detect Data Processing	9
2.3	Testing for Normality	9
2.4	Testing for Outliers	9
2.5	Trend Analysis	10
2.6	Spatial Variation	10
2.7	Temporal Variation	10
2.8	Updating Background	11
3.	**Compliance Monitoring**	**13**
3.1	GWPS Establishment and Exceedance Determination	13
3.1.1	The Upper Tolerance Limit	14
3.1.2	Parametric Confidence Intervals around a Mean	16
3.1.3	Non-Parametric Confidence Intervals around a Median	16
3.1.4	The Upper Prediction Limit for a Future Mean	17
3.1.5	The Non-Parametric Upper Prediction Limit for a Future Median	17
3.1.6	Parametric Linear Regression and Confidence Band	18
3.1.7	Non-Parametric Thiel-Sen Trend Line and Confidence Band	20
3.2	Determination of Statistically Significant Increases over Background	21
4.	**References**	**22**

TABLES (IN TEXT)

Table A Statistical Calculations Used in Compliance Monitoring Procedures

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 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:

$$LCL_{1-\alpha} = \overline{x} - t_{1-\alpha,n-1} \cdot \frac{s}{\sqrt{n}}$$

$\overline{x}$ = 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 ɑ values are tabulated in Table 22-2 of Appendix D of the *Unified Guidance*. The selected minimum ɑ 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:

$$LCL_{1-\alpha} = \exp\left(\overline{y} - t_{1-\alpha,n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

$\overline{y}$ = 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-α) 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 $(1\text{-}2\alpha)^{\text{th}}$ 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: 35 I.A.C. Section 845.430 - Slope Maintenance Documentation for GMF Pond at Coffeen Power Plant

Illinois Power Generating Company operates the coal fired Coffeen Power Plant (Plant) located in Montgomery County, Illinois. The Coffeen GMF Pond is an inactive surface impoundment storing coal combustion residuals (CCR). The requirements for the Coffeen GMF Pond are found in 35 Ill. Admin. Code 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 Coffeen GMF 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.

Excerpt from the Coffeen GMF Pond Operations and Maintenance Manual

Operation and Maintenance Inspection

Occasional "walk-around" inspections of the dams and appurtenant works are to be made by the dam operator. During these inspections, a checklist of items to be maintained and items to be observed should be recorded. Appendix A provides an example of the Operation and Maintenance Inspection Checklist to be utilized for these inspections. **If any of the following items are found to be unusual or are cause for concern, the Shift Supervisor should be notified, and the Emergency Action Plan should be immediately consulted for guidance on an appropriate course of action.**

Frequency: Operation and maintenance inspections will be performed by the dam operator monthly and during and after unusual events such as heavy rainfall or an earthquake.

Inspection Items: During each inspection the following items should be noted.

1. Water Level - Maximum reservoir levels because of heavy rainfall should be recorded.

2. Earth Embankment - Walk the crest, side slopes and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. These are described as follows:

   - Surface Erosion - Removal of vegetative cover by water action or pedestrian or vehicle usage forming deep ruts or gullies.

   - Seepage - The passage of water through and/or underneath the earth embankment abutment and natural groundline or at the contact between the embankment and outlet works. It can be indicated by cattails or other wet environmental vegetation, erosion, channelization, or slumping on the embankment face.

   - Cracks - Deep cracks usually indicate the movement of the dam and/or the foundation and can be in either the longitudinal (along the length of the dam) or transverse (across the dam) directions. Cracking can be an indicator of the beginning of slumps. Shallow cracks may develop during the summer when the surface soils of the embankment become severely dried and are usually of no concern regarding the safety of the dam.

   - Settlement - Settlement is indicated by depressions or low spots and can be signs of consolidation of the dam or foundation or the loss of material beneath the settlement area.

   - Slumps/Slides - A slow or sudden movement of the earth embankment slope on either face toward the toe of the dam.

- If seepage indicates the presence of soil particles, or if deep cracks, settlement, slumps, or slides are noticed, a qualified engineer should be contacted immediately for consultation.

- Animal Burrows - Animal burrows result in a loss of earth embankment material and can provide seepage paths for water through the embankment.

3. Gypsum Embankment - Walk the crest, side slopes and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. The descriptions for these are the same as for earth embankment.

4. Vegetation - Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion from 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 toes or other structures. The gypsum embankment will not be seeded and is not expected to have any vegetation.

5. Gypsum Stack piezometers should be inspected for any damage or loss of function. Damaged piezometers must be promptly repaired or replaced since their function is critical to ensuring stability of the gypsum stack.

6. The water level in each Gypsum Stack piezometer must be measured and recorded during each monthly inspection. If the water level in any piezometer is above the "critical elevation" as discussed in Section 4.5.2 of this plan, the Ameren Technical Services Superintendent should be notified, and the **Emergency Action Plan should be immediately consulted for guidance on an appropriate course of action**.

7. Gypsum Pond LD/LCRS Drains - The change in location or amount of flow discharging from the Leak Detection/Leachate Collection Recovery System (LD/LCRS) should be recorded. If a significant change has occurred, a qualified engineer should be contacted for consultation.

8. Gypsum Stack Ring Drains - The change in location or amount of flow discharging from the Ring Drains should be recorded. If a significant change has occurred, a qualified engineer should be contacted for consultation.

9. Gypsum Stack Fixed Decant – Check the alignment and supports for the pipe. Record the amount of flow discharging from the pipe and any erosion or scour around the discharge point.

10. Gypsum Stack Perimeter Ditch – The perimeter ditch should have a consistent prismatic shape for the entire length. Inspect the perimeter ditch for evidence of erosion, sediment deposition and irregularity in channel geometry, especially in the vicinity of siphon, decant or ring drain outfall structures. If irregularities are noted, repairs should be scheduled and completed.

11. Drawdown Facilities - Check to make sure that the drawdown stop logs in the transfer ditch are undamaged, operating well and allowing for the free flow of water over them. Confirm during inspections the valves are opened and closed at least quarterly.

12. Transfer Channel - Check for any debris or other obstructions which may block or restrict the free flow of water. Check for any pools or undulation of the floor of the channel.

13. Recycle Pond Decant - Check for any debris or other obstructions around the Recycle Pond decant which may block or restrict the free flow of water. The emergency dewatering valve should be lubricated. If there is no return water in the pipe, the emergency dewatering valve should be exercised. Record the physical and operating conditions of the system.

14. Recycle Pond Drop Inlet Spillways - Check for any debris or other obstructions around the inlet crest and at the bottom of the drop inlet which may block or restrict the free flow of water. Check for the development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of the concrete. Check for settlement or cracking of the crest. Check for any debris in the pipes which may restrict the flow of water. Check for any tears or leaks in the HDPE liner covering the concrete.

15. Recycle Pond Rip Rap Basin - Check for any debris or other obstructions in the riprap basin which may block or restrict the free flow of water. Check to make sure that the rip rap is remaining in a uniform position. Freeze/thaw action or flow over the rip rap may tend to lift or fracture, thus requiring replacement or leveling to maintain the necessary level of protection. NO trees or woody vegetation should be growing through the rip rap.

16. Fences - Check for damage, accumulated debris, operation of gates and locks, and adequacy of locations (this may change with time as people access the area or development occurs in the area).

17. Perimeter - Check the perimeter of the dams for a distance of at least 100 feet beyond the toe for signs of seepage or boils.

18. HDPE Liner – Wherever exposed, the HDPE Liner should be inspected for tears, gouges, protrusions under the liner and abrasion.

Dam Inspection Report

Name of Dam: Coffeen GMF - Gypsum Stack Dam — Dam ID No. IL50579

Permit Number: DS2008082 — Class of Dam: I

Location: NW 1/4 Section 11 Township 7N Range 3W

Owner: Dynegy Midwest Generation, LLC
Name

Telephone Number (Day): ____________

134 CIPS Lane
Street

Telephone Number (Night): ____________

Coffeen, IL — 52017 — County: Montgomery
City — Zip Code

Type of Dam: Earth Embankment

Type of Spillway: Open Channel

Date(s) Inspected: 16-Nov-20

Weather When Inspected: Clear

Temperature When Inspected: 50° F

Pool Elevation When Inspected: 620.8

Tailwater Elevation When Inspected: N.A.

LICENSED PROFESSIONAL ENGINEER
JAMES P. KNUTELSKI
062-054206
OF ILLINOIS

12/30/2020
Exp 11/30/21

Professional Engineer's Seal

Inspection Personnel:

Name	Title
James Knutelski, PE	Geotechnical Engineer
Jason Campbell, PE	Dynegy Dam Safety Manager
Gina Kramer	IDNR-OWR
John Romang	Coffeen Plant

The Department of Nautural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act, 615 ILCS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams".

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 does not become worse
NA -	Not applicable to this dam
NI -	Not inspected - list the reason for non-inspection under deficiencies

GYPSUM STACK - 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	NE		
Upstream Face Slope Protection (HDPE Liner)	MM	Woody vegetation on west side liner at north end.	Remove woody vegetation.
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	NA		
Vegetative Cover	GC		
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

PRINCIPAL SPILLWAY
APPROACH CHANNEL

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Debris	NE		
Side Slope Stability	NE		
Slope Protection (HDPE Liner)	GC		
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

PRINCIPAL SPILLWAY

☐ Drop Inlet Spillway ☒ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation (HDPE Lined)	MM	Punctures in liner at outlet channel to recycle pond.	Repair punctures in liner.
Structure to Embankment Junction	NA		
Drains	NA		
Seepage Around or Into Structure	NA		
Surface Cracks	NE		
Structural Cracks	NA		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

(Continued)

☐ Drop Inlet Spillway ☒ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Alignment of Abutment Walls	NA		
Construction Joints (HDPE Liner)	GC		
Filter and Filter Drains	NA		
Trash Racks	NA		
Bridge and Piers	NA		
Differential Settlement	NE		
Other (Name)	NA		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

(Continued)

☒ Chute

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE		
Structure to Embankment Junction	GC		
Construction Joints (HDPE Liner)	GC		
Expansion and Contraction Joints	NA		
Differential Settlement	NE		
Surface Cracks	NE		
Structural Cracks	NE		
Wall Alignment	NA		
Other (Name)	NA		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

<u>EMERGENCY SPILLWAY</u>

☐ Earth　　　　Other: Name ____None____

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion	NA		
Weeds, Logs, Other Obstructions	NA		
Side Slope Sloughing	NA		
Vegetation	NA		
Sedimentation	NA		
Riprap	NA		
Settlement of Crest	NA		
Downstream Channel	NA		
Other (Name)	NA		

SUMMARY OF MAINTENANCE DONE AND/OR

REPAIRS MADE SINCE THE LAST INSPECTION

DATE OF PRESENT INSPECTION	16-Nov-20
DATE OF LAST INSPECTION	22-Oct-19

1. EARTH EMBANKMENT DAMS
   Periodic mowing of downstream embankment face.

2. CONCRETE MASONRY DAMS

   NA

3. PRINCIPAL SPILLWAY

   None noted.

4. OUTLET WORKS

   NA

5. EMERGENCY SPILLWAY

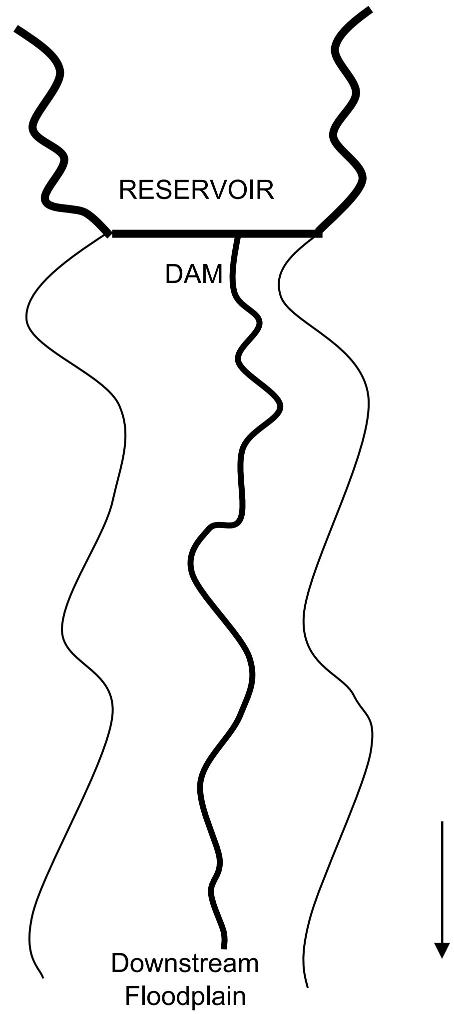
   NA

DOWNSTREAM DEVELOPMENT

APPROXIMATE WIDTH OF AFFECTED FLOODPLAIN 0.25 MILES

MILES DOWNSTREAM FROM DAM	DOWNSTREAM DEVELOPMENT												Loss of Life Potential			Economic Loss Potential		
	OCCUPIED HOMES	UNOCCUPIED HOMES	AGRICULTURAL BUILDINGS	INDUSTRIAL BUILDINGS	COMMERCIAL BUILDINGS	SCHOOLS	HOSPITALS	ROADS & BRIDGES	DAMS	OVERHEAD UTILITIES	OTHER DEVELOPMENT (Name	OTHER DEVELOPMENT (Name	NONE	1 TO 10	OVER 10	MINIMAL EXPECTED	APPRECIABLE EXPECTED	EXCESSIVE EXPECTED
0 to 1/4	2	0	2	1	0	0	0	3	0	0			X			X		
1/4 to 1/2																		
1/2 to 3/4																		
3/4 to 1																		
1 to 1-1/4																		
1-1/4 to 1-1/2																		
1-1/2 to 1-3/4																		
1-3/4 to 2																		
OVER 2																		

SKETCH IN DEVELOPMENTS DOWNSTREAM OF THE DAM



The number of homes, buildings, or other items in the floodplain downstream of the dam should be placed in the appropriate row and column to designate their location.

Owner's Maintenance Statement

I, ____ , owner of Coffeen Gypsum Management Facility - Gypsum Stack Dam,

Dam Identification Number IL50579 , in Montgomery County,

am maintaining the dam in accordance with the accepted maintenance plan which is part of

Permit Number DS2008082 .

____
Signature

____
Date

Owner's Operation and Maintenance Plan Statement

I, ____ , owner of Coffeen Gypsum Management Facility - Gypsum Stack Dam,

Dam Identification Number IL50579 , in Montgomery County,

have reviewed the operation and maintenance plan including the Emergency Action Plan (EAP),

which is part of, Permit Number ____________________ .

I _____ have enclosed the appropriate revisions or

_____ have determined that no revisions to the plan are necessary.

____
Signature

____
Date

The Department of Nautural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act, 615 ILCS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams".

Outlet channel inlet

Punctures in liner at inlet – repair

Outlet channel

West side

West side

West side – remove small woody vegetation growing on liner at north end

South side

South side

North side

North side

East side

East side

ATTACHMENT K

POST-CLOSURE PLAN FOR EXISTING CCR SURFACE IMPOUNDMENT
40 C.F.R. § 257.104 and 35 I.A.C. 845.780
REV 0 – 10/30/2021

SITE INFORMATION

Site Name / Address	Coffeen Power Plant / 134 Cips Lane, Coffeen, IL 61207		
Owner Name / Address	Illinois Power Generating Company / 6555 Sierra Drive Irving, Texas 75039		
CCR Unit	GMF 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 in40 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), 257.94(c), 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 a retired electric generation facility. Planned uses of the property during the post-closure period are currently unknown, 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 Coffeen GMF 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: Illinois Power Generating Company; Coffeen Power Plant; GMF 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

9/27/2021

Date

JOHN ROBERT HESEMANN
062-058523
LICENSED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

John R Hesemann
Exp.: 11/30/2021

ATTACHMENT L

Date: 25 October 2021

Subject: 35 Ill. Admin. Code Part 845 - CCR Liner Design Criteria Demonstration for GMF Pond at Coffeen Power Plant

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

This liner design criteria demonstration addresses the requirements of Section 845.400 Liner Design Criteria for Existing CCR Surface Impoundments, which states:

Section 845.400 Liner Design Criteria for Existing CCR Surface Impoundments

a) *An existing CCR surface impoundment is considered to be an existing lined surface impoundment if it has been constructed with either a composite liner that meets the requirements of subsection (b) or an alternative composite liner that meets the requirements of subsection (c).*

b) *Composite Liner*

    1) *A composite liner must consist of two components: the upper component consisting of, at a minimum, a 30-mil geomembrane liner, and the lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1 x 10−7 centimeters per second (cm/sec). The geomembrane liner components consisting of high-density polyethylene (HDPE) must be at least 60 mil. The geomembrane liner or upper liner component must be installed in direct and uniform contact with the compacted soil or lower liner component.*

    2) *The composite liner must be:*

        A) *Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;*

        B) *Constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component, including on slopes;*

        C) *Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and*

D) Installed to cover all surrounding earth likely to be in contact with the CCR or leachate.

c) Alternative Composite Liner

1) An alternative composite liner must consist of two components: the upper component consisting of, at a minimum, a 30-mil geomembrane liner, and a lower component, that is not a geomembrane, with a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than 1 x 10−7 cm/sec. The geomembrane liner components consisting of high-density polyethylene (HDPE) must be at least 60 mil. If the lower component of the alternative liner is compacted soil, the geomembrane liner must be installed in direct and uniform contact with the compacted soil.

2) The liquid flow rate through the lower component of the alternative composite liner must be no greater than the liquid flow rate through two feet of compacted soil with a hydraulic conductivity of 1 x 10−7 cm/sec. The hydraulic conductivity for the two feet of compacted soil used in the comparison must be no greater than 1 x 10−7 cm/sec. The hydraulic conductivity of any alternative to the two feet of compacted soil must be determined using recognized and generally accepted methods.

3) The liquid flow rate comparison must be made using the following equation, which is derived from Darcy's Law for gravity flow through porous media.

$$Q/A = q = k ((h/t)+1)$$

Where:
Q = flow rate (cubic centimeters/second)
A = Surface area of the liner (squared centimeters)
q = flow rate per unit area (cubic centimeters/ second/squared centimeter)
k = hydraulic conductivity of the liner (centimeters /second)
h = hydraulic head above the liner (centimeters); and
t = thickness of the liner (centimeters)

4) The alternative composite liner must meet the requirements specified in subsection (b).

d) The hydraulic conductivity of the compacted soil must be determined using recognized and generally accepted methods.

e) The owner or operator of an existing CCR surface impoundment that has not completed an Agency approved closure before July 30, 2021 must submit an initial operating permit application under Section 845.230 that demonstrates whether the CCR surface impoundment was constructed with either of the following:

1) *A composite liner that meets the requirements of subsection (b); or*

2) *An alternative composite liner that meets the requirements of subsection (c).*

h) *The owner or operator of the CCR surface impoundment must obtain a certification from a qualified professional engineer attesting that the CCR surface impoundment meets the requirements of subsection (a) and submit the certification to the Agency in the facility's initial operating permit application.*

A liner evaluation was conducted for the Coffeen Power Plant GMF Pond in 2016 to evaluate conformance with liner design criteria set forth in 40 C.F.R. § 257.71 and 257.70 (as referenced in 257.71). The evaluation included a review of design drawings, laboratory test data, field test data, construction records and other available information. The evaluation results were documented in the *Liner Evaluation Report – Coffeen GMF Pond*, prepared by Hanson Professional Services Inc. in October 2016. The report demonstrates that the Coffeen Power Plant GMF Pond was constructed with a composite liner, as defined in 40 C.F.R. § 257.70(b), that meets the design criteria set forth in 40 C.F.R. § 257.71 and 257.70 (as referenced in 257.71). The report includes a certification from a qualified professional engineer licensed in the State of Illinois stating that the Coffeen Power Plant GMF Pond meets the applicable requirements set forth in 40 C.F.R. § 257.71.

Because the liner design criteria set forth in Section 845.400 are nearly identical to those presented in 40 C.F.R. § 257.71 and 257.70, the previous liner evaluation report and associated certification demonstrate that the Coffeen Power Plant GMF Pond meets the design criteria for a composite liner set forth in Section 845.400(b). The previous liner evaluation report and associated certification are provided in Attachment L.

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, based on the information provided in the Coffeen GMF Pond Liner Evaluation Report prepared by Hanson Professional Services Inc., the Coffeen GMF Pond Liner meets the design criteria set forth in 35 I.A.C.845.400(a).

John R. Hesemann

Printed Name

10/18/2021

Date

JOHN ROBERT HESEMANN
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ENGINEER
OF
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John R. Hesemann
Exp.: 11/30/2021

Liner Evaluation Report
Coffeen GMF Pond

Illinois Power Generating Company
Coffeen Power Station
Montgomery County, Illinois

October 2016

HANSON
Engineering | Planning | Allied Services

COFFEEN GMF POND
ILLINOIS POWER GENERATING COMPANY
LICENSED PROFESSIONAL ENGINEER CERTIFICATION

As a Qualified Professional Engineer as defined by 40 CFR 257.53 and being a Professional Engineer licensed in the State of Illinois, I certify that I have personally examined and am familiar with the information in the Coffeen GMF Pond Liner Evaluation Report and the Coffeen GMF Pond Liner Documentation Report in the operating record and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete.

As required by 40 CFR 257.71(b), the Coffeen GMF Pond Liner Evaluation Report and the Coffeen GMF Pond Liner Documentation Report in the operating record are accurate and the **Coffeen GMF Pond** meets the requirements set forth in 40 CFR 257.71(a)(1)(ii) as published on April 17, 2015.

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Registration No. 062-040449

Seal: STEVEN M. BISHOFF 062-040449 LICENSED PROFESSIONAL ENGINEER STATE OF ILLINOIS

Signature: ____________________

Date: 10-10-2016

Table of Contents

1. **Summary** 1
2. **Foundation Preparation** 4
3. **Berm Construction** 4
4. **Test Soil Liner** 5

4.1 Prequalification of Borrow Material 5
4.2 Test Soil Liner Construction 6

5. **Full Scale Soil Liner Construction** 8
6. **HDPE Geomembrane Liner Installation** 9

Tables

Table 3.1 Laboratory Permeability Test Results of Perimeter Berm 5
Table 4.1 Properties of Borrow Material 5
Table 4.2 Constant Head Permeability Test Results of Borrow Material 6
Table 4.3 Results of Laboratory Testing Program for Test Soil Liner 7
Table 4.4 Results of Field Testing Program for Test Soil Liner 7
Table 5.1 Laboratory Permeability Test Results of Soil Liner 8

1. Summary

The Coffeen GMF Pond (GMF Pond) was constructed to retain wet-sluiced gypsum produced in the flue-gas scrubber at the Coffeen Power Station. Construction of the GMF Pond began in July 2008 and was completed in October 2010. It encompasses about 43.3 acres within the northwest quarter of Section 11, Township 7 North, Range 3 West of the Third Principal Meridian, just north of the Coffeen Power Station.

The composite liner system in the GMF Pond was designed to comply with Illinois Environmental Protection Agency rules for solid waste landfills. Liner system performance criteria is contained in 35 Illinois Administrative Code (IAC) Part 811 as follows:

35 IAC 811.306 Liner Systems

d) Compacted Earth Liner Standards

1) The minimum allowable thickness shall be 1.52 meters (5 feet).

2) The liner shall be compacted to achieve a maximum hydraulic conductivity of 1X10^{-7} centimeters per second.

3) The construction and compaction of the liner shall be carried out in accordance with the construction quality assurance procedures of Subpart E so as to reduce void spaces and allow the liner to support the loadings imposed by the waste disposal operation without settling that causes or contributes to the failure of the leachate collection system.

4) The liner shall be constructed from materials whose properties are not affected by contact with the constituents of the leachate expected to be produced.

5) Alternative specifications, using standard construction techniques, for hydraulic conductivity and liner thickness may be utilized under the following conditions:

A) The liner thickness shall be no less than 1.52 meter (5 feet) unless a composite liner consisting of a geomembrane immediately overlying a compacted earth liner is installed. The following minimum standards shall apply for a composite liner:

i) the geomembrane shall be no less than 60 mils in thickness and meet the requirements of subsection (e); and

ii) the compacted earth liner shall be no less than 0.91 meter in thickness (3 feet) and meet the requirements of subsection (d)(2) through (d)(4).

B) The modified liner shall operate in conjunction with a leachate drainage and collection system to achieve equivalent or superior performance to the requirements of this subsection. Equivalent performance shall be evaluated at maximum annual leachate flow conditions.

In accordance with 35 IAC 811.306(d)(5)(A)(i) and (ii), the GMF Pond composite liner was designed and constructed with 3-feet of compacted clay with a maximum permeability of 1 x 10^{-7} cm/sec, overlain by a 60-mil textured HDPE geomembrane.

In April 2015, the United States Environmental Protection Agency published rules at 40 CFR Part 257, Subpart D, regulating the disposal of coal combustion residuals (CCR) in landfills and surface impoundments located in association with electrical utilities utilizing coal as the primary fuel source. Liner system performance criteria for existing CCR surface impoundments is specified in 40 CFR Part 257, Subpart D, as follows:

257.71 Liner design criteria for existing CCR surface impoundments.

(a)(1) No later than October 17, 2016, the owner or operator of an existing CCR surface impoundment must document whether or not such unit was constructed with any one of the following:

(i) A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1 × 10^{-7} cm/sec;

(ii) A composite liner that meets the requirements of §257.70(b); or

(iii) An alternative composite liner that meets the requirements of §257.70(c).

(2) The hydraulic conductivity of the compacted soil must be determined using recognized and generally accepted methods.

(3) An existing CCR surface impoundment is considered to be an existing unlined CCR surface impoundment if either:

(i) The owner or operator of the CCR unit determines that the CCR unit is not constructed with a liner that meets the requirements of paragraphs (a)(1)(i), (ii), or (iii) of this section; or

(ii) The owner or operator of the CCR unit fails to document whether the CCR unit was constructed with a liner that meets the requirements of paragraphs (a)(1)(i), (ii), or (iii) of this section.

(4) All existing unlined CCR surface impoundments are subject to the requirements of §257.101(a).

(b) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer attesting that the documentation as to whether a CCR unit meets the requirements of paragraph (a) of this section is accurate.

(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(f), the notification requirements specified in §257.106(f), and the Internet requirements specified in §257.107(f).

As referenced in 40 CFR 257.71(a)(1)(ii), 40 CFR 257.70(b), Design criteria for new CCR landfills and any lateral expansion of a CCR landfill, provides:

(b) A composite liner must consist of two components; the upper component consisting of, at a minimum, a 30-mil geomembrane liner (GM), and the lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1 × 10^{-7} centimeters per second (cm/sec). GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. The GM or upper liner component must be installed in direct and uniform contact with the compacted soil or lower liner component. The composite liner must be:

(1) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

(2) Constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component including on slopes;

(3) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and

(4) Installed to cover all surrounding earth likely to be in contact with the CCR or leachate.

In accordance with 40 CFR 257.70(b)(1) above, the composite liner in the Coffeen GMF Pond was constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation. This information is located in Section 4 and Section 5 of the Coffeen GMF Pond Liner Documentation Report located in the operating record.

In accordance with 40 CFR 257.70(b)(2) above, the composite liner in the Coffeen GMF Pond was constructed of materials that provide appropriate shear resistance of the upper and lower component interface to prevent sliding of the upper component, including on slopes. This information is located in Section 4 of the Coffeen GMF Pond Liner Documentation Report located in the operating record.

In accordance with 40 CFR 257.70(b)(3) above, the composite liner in the Coffeen GMF Pond was placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift. This information is located in Section 4 of the Coffeen GMF Pond Liner Documentation Report located in the operating record.

In accordance with 40 CFR 257.70(b)(4) above, the composite liner in the Coffeen GMF Pond was installed to cover all surrounding earth likely to be in contact with the CCR or leachate. This information is located in the "Geosynthetics Quality Assurance Report, Gypsum Stack, AERG (Ameren) Coffeen Power Station, Coffeen, Montgomery County, Illinois. Feezor Engineering, Inc." in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

The purpose of this report is to document that the existing composite liner in the Coffeen GMF Pond meets the minimum requirements of 40 CFR 257.71(a)(1)(ii), i.e., a composite liner that meets the requirements of §257.70(b).

Briefly, in comparison:

35 IAC 811.306(d)(5)(A) requires a compacted clay liner of at least three (3) feet in thickness with a hydraulic conductivity of less than $1x10^{-7}$ cm/sec, overlain by a geomembrane of no less than 60-mils in thickness.

40 CFR 257.71(a)(1)(ii) requires a compacted soil liner of at least two (2) feet in thickness with a hydraulic conductivity of no more than $1x10^{-7}$cm/sec, overlain by a geomembrane of no less than 30-mils in thickness. If the geomembrane is composed of high-density polyethylene (HDPE), the geomembrane must be a minimum of 60-mils in thickness.

Thus, the composite liner in the Coffeen GMF Pond was designed and constructed with components exceeding the minimum required in 40 CFR 257.71(a)(1)(ii).

The major components of the construction and Construction Quality Assurance (CQA) of the GMF Pond liner are discussed in the sections below.

2. Foundation Preparation

Foundation preparation consisted of removing the soil to foundation grade in the bottom of the GMF Pond, construction of the perimeter berm containing the GMF Pond, and surveying and certifying the foundation surface.

The construction contractor initially stripped topsoil below the root zone within the GMF Pond and its perimeter berm location.

The bottom of the GMF Pond was excavated to and into the Vandalia Till. The excavated till was used to raise portions of the GMF Pond bottom to foundation grade sloping from the northwest corner to the south and east. The foundation surface was proof rolled and visually observed. Soils in undercut areas were removed and then backfilled with excavated till from the GMF Pond.

Nuclear moisture/density gauge testing was performed during foundation backfill placement at a minimum rate of one test per 10,000 yd^3 (and a minimum one test per compacted lift). The material was placed in approximately 8-inch lifts and compacted with a Cat 815 sheepsfoot compactor and/or a smooth drum roller to at least 95% Standard Proctor maximum dry density with moisture contents of -2% to +2% of optimum. Areas that showed deficiencies in compaction or moisture content were reworked or removed, and then compacted with a Cat 815 sheepsfoot compactor and/or a smooth drum roller and tested for moisture/density. Nuclear moisture/density and Standard Proctor test results are included in Appendix D in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

Finished foundation grades were verified by survey and certified (Appendices I and J in the Coffeen GMF Pond Liner Documentation Report located in the operating record), and CQA certifications of completion were provided by the CQA Officer.

3. Berm Construction

The perimeter berm was constructed with structural fill excavated and hauled directly from the GMF Pond and other borrow areas within the facility. Nuclear moisture/density gauge testing was performed during berm construction at a minimum rate of one test per 10,000 yd^3 (and a minimum one test per compacted lift). Fill was placed in approximately 8-inch lifts and compacted with a Cat 815 or 825 sheepsfoot compactor to at least 95% Standard Proctor maximum dry density with moisture contents of -2% to +2% of optimum. Areas that showed deficiencies in compaction or moisture content were reworked or removed, and then compacted with a Cat 815 or 825 sheepsfoot compactor and tested for moisture/density. Nuclear moisture/density and Standard Proctor test results are included in Appendix D in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

Four (4) Shelby tube samples (ST-040 through ST-043) were collected from the perimeter berm, and were delivered to Hanson's Geotechnical Laboratory in Springfield, Illinois. A soil sample from each tube was tested to determine in-place hydraulic conductivity (permeability). Table 3.1 summarizes the hydraulic conductivity test results.

Table 3.1 Laboratory Permeability Test Results of Perimeter Berm

Sample No.	Location	Hydraulic Conductivity, (k_V)
ST-040	East Berm	1.5×10^{-9} cm/sec
ST-041	North Berm	1.9×10^{-9} cm/sec
ST-042	West Berm	5.4×10^{-9} cm/sec
ST-043	South Berm	4.7×10^{-9} cm/sec

4. Test Soil Liner

Prior to construction of the full scale soil liner, one test soil liner was constructed to the west of Landfill Cell L1 using one borrow source. Landfill Cell L1 is located directly west of the GMF Pond. The purpose of the test soil liner was to verify that the material and methods of construction proposed for the full scale soil liner would provide the appropriate permeability performance criteria required by 35 IAC 811.306(d).

The borrow material for the test soil liner was obtained from clay material excavated from the footprint of Landfill Cell L1 that was stockpiled to the west of Cell L1 ("West Landfill Liner Stockpile"). The clay material from the West Landfill Liner Stockpile was determined to be the same material that was to be used to construct the full scale soil liner in the GMF Pond. Therefore, the single test liner was utilized for both Landfill Cell L1 and the GMF Pond. In accordance with 35 IAC 811.306(d)(2), the material selected had sufficient fines to achieve an in-place hydraulic conductivity of 1.0×10^{-7} cm/sec or less.

4.1 Prequalification of Borrow Material

While no prequalification testing is required by the regulations, a program of laboratory testing was carried out on typical samples of the material used for the construction of the test soil liner and the GMF Pond's full scale soil liner. Tables 4.1 and 4.2 summarize the borrow material properties determined from testing (Appendix E.1 in the Coffeen GMF Pond Liner Documentation Report located in the operating record contains laboratory test reports).

Table 4.1 Properties of Borrow Material

Sample No.	Percent of Fines	Liquid Limit	Plasticity Index	Maximum Dry Density (MDD)	Optimum Moisture Content (OMC)
West Landfill Liner Stockpile					
1 L1 Liner	71.0%	36%	22%	110.5 pcf	16.1%
GMF Pond Liner Stockpile					
SP-002-001	76.7%	40%	25%	110.8 pcf	15.9%
GMF Pond Test Pits (combined samples)					
DP-13 2'-6'	96.9%	54%	35%	98.3 pcf	22.1%
DP-13 4'-8'	85.5%	41%	25%	106.5 pcf	17.4%
DP-21 2'-6'	93.6%	48%	30%	100.0 pcf	19.7%
DP-21 4'-8'	86.2%	41%	25%	105.4 pcf	17.9%
West Borrow Pit	90.1%	41%	23%	103.4 pcf	16.5%

Table 4.2 Constant Head Permeability Test Results of Borrow Material

Sample No.	Dry Density	Moisture Content	Permeability Result
West Landfill Liner Stockpile 1 L1 Liner	95% of MDD	1.5% West of OMC	5.0×10^{-9} cm/sec
GMF Pond Test Pits (combined samples)			
DP-13 2'-6'	95% of MDD	2.0% Wet of OMC	1.1×10^{-8} cm/sec
DP-13 4'-8'	95% of MDD	0.5% Wet of OMC	4.1×10^{-8} cm/sec
DP-21 2'-6'	95% of MDD	1.5% Wet of OMC	9.1×10^{-9} cm/sec
DP-21 4'-8'	95% of MDD	1.5% Wet of OMC	8.8×10^{-9} cm/sec
West Borrow Pit	95% of MDD	1.0% Wet of OMC	7.9×10^{-8} cm/sec

Based on the test results summarized in Tables 4.1 and 4.2, the field compaction criteria for the soil liner were set as follows to assure that a field permeability value of 1.0×10^{-7} cm/sec or less could be achieved:

Dry Density $\geq$ 95% MDD
Moisture Content = 0% to 5% Wet of OMC

4.2 Test Soil Liner Construction

The construction of the test soil liner was initiated on May 20, 2009. The foundation was proof rolled and visually observed for soft areas or unsuitable soils. No material removal or backfilling was required.

The test soil liner was constructed west of Landfill Cell L1 with material from the West Landfill Liner Stockpile. The material was keyed into the foundation material and compacted with a Cat 815 sheepsfoot compactor in approximately 8-inch lifts. Nuclear moisture/density gauge testing was performed at a minimum rate of one test per acre per lift or one test per 1,000 yd^3 to 95% Standard Proctor MDD with moisture contents of optimum to +5% (as determined in Section 4.1 above). Areas that showed deficiencies in compaction or moisture content were reworked or removed, and then compacted with a Cat 815 sheepsfoot compactor and tested for moisture/density. Nuclear moisture/density test results and a drawing showing the testing locations are included in Appendix E.3 in the Coffeen GMF Pond Liner Documentation Report located in the operating record. The Standard Proctor test report is included in Appendix E.4 in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

On May 22, 2009, the test soil liner was completed after it was smooth drum rolled and then covered with a clear plastic covering to prevent moisture loss.

4.2.1 Sampling and Testing Programs for Test Soil Liner

Pursuant to the CQA Plan, the test soil liner was sampled and tested for physical properties utilizing both laboratory and field testing. Required were at least five (5) two-stage field tests to determine the hydraulic conductivity (both vertical and horizontal hydraulic conductivity were calculated), and at least two (2) undisturbed Shelby tube samples tested in the laboratory for vertical hydraulic conductivity to determine a statistical correlation with the field tests.

4.2.1.1 Laboratory Testing

Two (2) Shelby tube samples were collected from the test soil liner on May 22, 2009. ST-01 and ST-02 were delivered to Hanson's Geotechnical Laboratory for laboratory permeability testing. A sample from each tube was tested for particle size analysis, Atterberg limits, and hydraulic conductivity. Table 4.3 summarizes the test results (Appendix E.5 in the Coffeen GMF Pond Liner Documentation Report located in the operating record contains laboratory test reports and Shelby tube sample locations).

Table 4.3 Results of Laboratory Testing Program for Test Soil Liner

Sample No.	Percent of Fines	Liquid Limit	Plasticity Index	Hydraulic Conductivity, k_v	Pass / Fail	Lift
ST-01	75.1%	39.2%	25.2%	2.0 x 10^{-9} cm/sec	Pass	5
ST-02	76.0%	40.8%	26.9%	1.8 x 10^{-9} cm/sec	Pass	5

4.2.1.2 Field Testing

Six (6) two-stage (Boutwell) field permeability tests were conducted on the test soil liner. The tests were carried out to measure the limiting values of field saturated hydraulic conductivity. The first stage of the test measured the vertical component of hydraulic conductivity (k_v) while the second stage measured the horizontal component (k_h). Table 4.4 summarizes the Boutwell test results (Appendix E.6 in the Coffeen GMF Pond Liner Documentation Report located in the operating record contains Boutwell testing locations and the report of the field testing results).

Table 4.4 Results of Field Testing Program for Test Soil Liner

Boutwell Test No.	Stage 1 Hydraulic Conductivity, k_v	Stage 2 Hydraulic Conductivity, k_h
1	1.31 x 10^{-8} cm/sec	6.33 x 10^{-9} cm/sec
2	5.55 x 10^{-8} cm/sec	6.18 x 10^{-8} cm/sec
3	1.09 x 10^{-8} cm/sec	5.74 x 10^{-9} cm/sec
4	9.13 x 10^{-8} cm/sec	1.94 x 10^{-8} cm/sec
5	1.02 x 10^{-8} cm/sec	3.34 x 10^{-9} cm/sec
6	1.19 x 10^{-8} cm/sec	7.37 x 10^{-9} cm/sec

4.2.1.3 CQA Certification of Test Soil Liner

Based on the laboratory and field test results, the CQA Officer certified the construction of the test soil liner and that construction of the full scale soil liner could begin using the same soils and procedures used to construct the test liner.

5. Full Scale Soil Liner Construction

Construction of the full scale soil liner began on April 14, 2010 in the northwestern section of the GMF Pond and continued to the south and east. The soil material from the GMF Pond Liner Stockpile and the West Borrow Pit were used to construct the 3-ft thick soil liner within the GMF Pond. Like the test soil liner, the soil was placed in approximately 8-inch thick lifts and compacted with a Cat 815 sheepsfoot compactor. Nuclear moisture/density gauge testing was performed at a minimum rate of one test per acre per lift or one test per 1,000 yd^3 to 95% Standard Proctor MDD with moisture contents of optimum to +5%. Areas that showed deficiencies in compaction or moisture content were reworked or removed, and then compacted with a Cat 815 sheepsfoot compactor and tested for moisture/density. Nuclear moisture/density and Standard Proctor test results are included in Appendix F in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

Twenty-one (21) Shelby tube samples were collected at various stages of the liner construction. The hydraulic conductivity of the compacted soil liner was sampled and laboratory tested in accordance with ASTM D5084. The samples were delivered to Hanson's Geotechnical Laboratory for permeability testing. A sample from each tube was tested to determine hydraulic conductivity. The sample intervals included at least one permeability test from each of the five liner construction lifts. Table 5.1 summarizes the hydraulic conductivity test results, which are all less than the 1.0×10^{-7} cm/sec performance criterion. Permeability test results and a drawing showing Shelby tube sample locations are included in Appendix F.3 in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

Table 5.1 Laboratory Permeability Test Results of Soil Liner

Sample No.	Hydraulic Conductivity, (k_V)	Pass / Fail	Lift
ST-019	2.1×10^{-9} cm/sec	Pass	2
ST-020	4.3×10^{-9} cm/sec	Pass	1
ST-021	3.8×10^{-9} cm/sec	Pass	4
ST-022	1.8×10^{-9} cm/sec	Pass	4
ST-023	3.8×10^{-9} cm/sec	Pass	5
ST-024	4.0×10^{-9} cm/sec	Pass	1
ST-025	2.7×10^{-9} cm/sec	Pass	3
ST-026	9.6×10^{-9} cm/sec	Pass	3
ST-027	7.4×10^{-10} cm/sec	Pass	4
ST-028	2.7×10^{-9} cm/sec	Pass	2
ST-029	2.7×10^{-9} cm/sec	Pass	5
ST-030	6.0×10^{-9} cm/sec	Pass	3
ST-031	6.7×10^{-9} cm/sec	Pass	2
ST-032	4.2×10^{-9} cm/sec	Pass	5
ST-033	2.4×10^{-8} cm/sec	Pass	4
ST-034	4.5×10^{-9} cm/sec	Pass	4
ST-035	5.3×10^{-9} cm/sec	Pass	5
ST-036	1.1×10^{-8} cm/sec	Pass	3
ST-037	3.0×10^{-9} cm/sec	Pass	1
ST-038	3.8×10^{-9} cm/sec	Pass	1
ST-039	2.7×10^{-9} cm/sec	Pass	2

Base grades and completed liner elevations were surveyed to ensure construction to the design grades and to verify minimum soil liner thickness. Record drawings and certified survey data are included in Appendices I and J, respectively, in the Coffeen GMF Pond Liner Documentation Report located in the operating record. After the soil liner was smooth drum rolled, CQA certifications of its construction and grades were provided by the CQA Officer prior to installation of the 60 mil HDPE geomembrane liner.

6. HDPE Geomembrane Liner Installation

Prior to installation of the 60-mil textured HDPE geomembrane liner on the floor and side slopes of the GMF Pond, the surface of the full scale soil liner was accepted by the geomembrane installer. Installation of the geomembrane liner began on July 24, 2010, and placement continued through September 17, 2010, with liner installation testing and repairs completed by September 22, 2010. Textured geomembrane liner was used on the GMF Pond floor and side slopes.

On the side slopes, the HDPE geomembrane was laid parallel to the slope and the tie-in weld with the bottom geomembrane was welded a minimum of 5 feet past the toe of the slope. Adjacent panels were overlapped approximately 4-6 inches and were shingled in the direction of the drainage.

Production seaming of the geomembrane panels was made using a dual hot wedge fusion welder. This device creates an air channel between two fused seams that can later be tested with pressurized air to assure there is no leakage. Destruct sample sites and repairs were welded with extrusion welds which were checked for leaks with a vacuum box. All seams were sampled at a rate of one destruct sample for every 500 feet of seam and tested for strength parameters in the laboratory.

A third party engineering firm monitored the installation of all geosynthetic materials and assembled the manufacturing quality control (MQC) data, manufacturing quality assurance (MQA) testing data, installer subgrade acceptance, panel placement information, laboratory CQA test data from destruct samples, and field CQA test data for seam welding integrity. All of this data is included in the “Geosynthetics Quality Assurance Report, Gypsum Stack, AERG (Ameren) Coffeen Power Station, Coffeen, Montgomery County, Illinois. Feezor Engineering, Inc.” in the Coffeen GMF Pond Liner Documentation Report located in the operating record.

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 Coffeen Power Plant GMF Gypsum Stack Pond, Illinois Environmental Protection Agency (IEPA) ID No. W1350150004-03.

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.

Background Concentrations

Background monitoring wells identified in the GMP include G200 and R201.

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
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G102	UA	845	Antimony, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
G102	UA	845	Arsenic, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.001	0.011	0.011	0.01	Background
G102	UA	845	Barium, total	mg/L	04/08/2015 - 07/09/2017	CI around mean	0.037	2.0	0.13	2	Standard
G102	UA	845	Beryllium, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.004	0.001	0.004	Standard
G102	UA	845	Boron, total	mg/L	04/08/2015 - 01/26/2021	CI around median	0.010	2.0	0.11	2	Standard
G102	UA	845	Cadmium,total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
G102	UA	845	Chloride, total	mg/L	04/08/2015 - 01/26/2021	CI around mean	19	200	95	200	Standard
G102	UA	845	Chromium, total	mg/L	04/08/2015 - 07/09/2017	CI around geomean	0.00437	0.10	0.0096	0.1	Standard
G102	UA	845	Cobalt, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.002	0.006	0.0037	0.006	Standard
G102	UA	845	Fluoride, total	mg/L	04/08/2015 - 01/26/2021	CI around mean	0.30	4.0	0.55	4	Standard
G102	UA	845	Lead, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.001	0.0075	0.0059	0.0075	Standard
G102	UA	845	Lithium, total	mg/L	11/16/2015 - 07/09/2017	CI around median	0.010	0.040	0.020	0.04	Standard
G102	UA	845	Mercury, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.0002	0.002	0.0011	0.002	Standard
G102	UA	845	Molybdenum, total	mg/L	07/23/2015 - 07/09/2017	CI around mean	0.000974	0.10	0.044	0.1	Standard
G102	UA	845	pH (field)	SU	01/20/2015 - 01/26/2021	CI around median	7.1	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G102	UA	845	Radium-226 + Radium 228, tot	pCi/L	11/16/2015 - 07/09/2017	CI around mean	0.42	5.0	1.5	5	Standard
G102	UA	845	Selenium, total	mg/L	04/08/2015 - 07/09/2017	CI around mean	0.0014	0.050	0.0035	0.05	Standard
G102	UA	845	Sulfate, total	mg/L	04/08/2015 - 01/26/2021	CI around mean	73	400	387	400	Standard
G102	UA	845	Thallium, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G102	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 01/26/2021	CI around mean	389	1200	975	1200	Standard
G103	UA	845	Antimony, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G103	UA	845	Arsenic, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0012	0.011	0.011	0.01	Background
G103	UA	845	Barium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.10	2.0	0.13	2	Standard
G103	UA	845	Beryllium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G103	UA	845	Boron, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.010	2.0	0.11	2	Standard
G103	UA	845	Cadmium,total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.005	0.001	0.005	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G103	UA	845	Chloride, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	66	200	95	200	Standard
G103	UA	845	Chromium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.019	0.10	0.0096	0.1	Standard
G103	UA	845	Cobalt, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G103	UA	845	Fluoride, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.25	4.0	0.55	4	Standard
G103	UA	845	Lead, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.0075	0.0059	0.0075	Standard
G103	UA	845	Mercury, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G103	UA	845	Molybdenum, total	mg/L	07/23/2015 - 10/06/2015	Most recent sample	0.0034	0.10	0.044	0.1	Standard
G103	UA	845	pH (field)	SU	01/20/2015 - 10/06/2015	CI around mean	6.9	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G103	UA	845	Selenium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G103	UA	845	Sulfate, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	69	400	387	400	Standard
G103	UA	845	Thallium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G103	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 10/06/2015	CI around mean	353	1200	975	1200	Standard
G105	UA	845	Antimony, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G105	UA	845	Arsenic, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0013	0.011	0.011	0.01	Background
G105	UA	845	Barium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.078	2.0	0.13	2	Standard
G105	UA	845	Beryllium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G105	UA	845	Boron, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.13	2.0	0.11	2	Standard
G105	UA	845	Cadmium,total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.005	0.001	0.005	Standard
G105	UA	845	Chloride, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	37	200	95	200	Standard
G105	UA	845	Chromium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0046	0.10	0.0096	0.1	Standard
G105	UA	845	Cobalt, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G105	UA	845	Fluoride, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.30	4.0	0.55	4	Standard
G105	UA	845	Lead, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0011	0.0075	0.0059	0.0075	Standard
G105	UA	845	Mercury, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G105	UA	845	Molybdenum, total	mg/L	07/23/2015 - 10/06/2015	Most recent sample	0.0028	0.10	0.044	0.1	Standard
G105	UA	845	pH (field)	SU	01/20/2015 - 10/06/2015	CI around mean	6.7	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
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COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G105	UA	845	Selenium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.0011	0.050	0.0035	0.05	Standard
G105	UA	845	Sulfate, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	110	400	387	400	Standard
G105	UA	845	Thallium, total	mg/L	04/08/2015 - 10/06/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G105	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 10/06/2015	CI around mean	486	1200	975	1200	Standard
G106	UA	845	Antimony, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
G106	UA	845	Arsenic, total	mg/L	04/08/2015 - 07/09/2017	CB around linear reg	0.00106	0.011	0.011	0.01	Background
G106	UA	845	Barium, total	mg/L	04/08/2015 - 07/09/2017	CI around mean	0.053	2.0	0.13	2	Standard
G106	UA	845	Beryllium, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.004	0.001	0.004	Standard
G106	UA	845	Boron, total	mg/L	04/08/2015 - 01/26/2021	CB around linear reg	0.020	2.0	0.11	2	Standard
G106	UA	845	Cadmium,total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.005	0.001	0.005	Standard
G106	UA	845	Chloride, total	mg/L	04/08/2015 - 01/26/2021	CB around linear reg	42	200	95	200	Standard
G106	UA	845	Chromium, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.004	0.10	0.0096	0.1	Standard
G106	UA	845	Cobalt, total	mg/L	04/08/2015 - 07/09/2017	CI around median	0.002	0.006	0.0037	0.006	Standard
G106	UA	845	Fluoride, total	mg/L	04/08/2015 - 01/26/2021	CI around mean	0.40	4.0	0.55	4	Standard
G106	UA	845	Lead, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.0075	0.0059	0.0075	Standard
G106	UA	845	Lithium, total	mg/L	11/17/2015 - 07/09/2017	All ND - Last	0.010	0.040	0.020	0.04	Standard
G106	UA	845	Mercury, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.0002	0.002	0.0011	0.002	Standard
G106	UA	845	Molybdenum, total	mg/L	07/23/2015 - 07/09/2017	CI around mean	0.00145	0.10	0.044	0.1	Standard
G106	UA	845	pH (field)	SU	01/20/2015 - 06/29/2021	CI around mean	7.0	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G106	UA	845	Radium-226 + Radium 228, tot	pCi/L	11/17/2015 - 07/09/2017	CI around mean	0.28	5.0	1.5	5	Standard
G106	UA	845	Selenium, total	mg/L	04/08/2015 - 07/09/2017	CI around mean	0.00108	0.050	0.0035	0.05	Standard
G106	UA	845	Sulfate, total	mg/L	04/08/2015 - 01/26/2021	CB around linear reg	66	400	387	400	Standard
G106	UA	845	Thallium, total	mg/L	04/08/2015 - 07/09/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G106	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 01/26/2021	CI around mean	416	1200	975	1200	Standard
G206	UA	257	Antimony, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
G206	UA	257	Arsenic, total	mg/L	01/21/2015 - 07/15/2017	CI around median	0.001	0.010	0.010	0.01	Standard

RAMBOLL

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COFFEEN POWER PLANT
GMF GYPSUM STACK POND
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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
G206	UA	257	Barium, total	mg/L	04/09/2015 - 07/15/2017	CI around mean	0.048	2.0	0.27	2	Standard
G206	UA	257	Beryllium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.0067	0.0067	0.004	Background
G206	UA	257	Boron, total	mg/L	01/21/2015 - 01/27/2021	CI around median	0.010	2.0	0.39	2	Standard
G206	UA	257	Cadmium,total	mg/L	01/21/2015 - 07/15/2017	All ND - Last	0.001	0.005	0.0012	0.005	Standard
G206	UA	257	Chloride, total	mg/L	01/21/2015 - 01/27/2021	CI around mean	25	200	96	200	Standard
G206	UA	257	Chromium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.004	0.10	0.013	0.1	Standard
G206	UA	257	Cobalt, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.002	0.0074	0.0074	0.006	Background
G206	UA	257	Fluoride, total	mg/L	04/09/2015 - 01/27/2021	CI around median	0.39	4.0	0.50	4	Standard
G206	UA	257	Lead, total	mg/L	01/21/2015 - 07/15/2017	Future median	0.001	0.018	0.018	0.0075	Background
G206	UA	257	Lithium, total	mg/L	11/18/2015 - 07/15/2017	All ND - Last	0.010	0.040	0.021	0.04	Standard
G206	UA	257	Mercury, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G206	UA	257	Molybdenum, total	mg/L	07/22/2015 - 07/15/2017	CI around mean	0.00108	0.10	0.0069	0.1	Standard
G206	UA	257	pH (field)	SU	01/21/2015 - 01/27/2021	CI around median	7.0	6.5/9.0	6.9/7.3	6.5/9	Standard/Standard
G206	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/18/2015 - 07/15/2017	CI around mean	0.34	9.8	9.8	5	Background
G206	UA	257	Selenium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.001	0.050	0.0097	0.05	Standard
G206	UA	257	Sulfate, total	mg/L	01/21/2015 - 01/27/2021	CI around median	110	400	300	400	Standard
G206	UA	257	Thallium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G206	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 01/27/2021	CI around median	450	1200	949	1200	Standard
G206D	DA	845	Antimony, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
G206D	DA	845	Arsenic, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.00199	0.011	0.011	0.01	Background
G206D	DA	845	Barium, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.068	2.0	0.13	2	Standard
G206D	DA	845	Beryllium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
G206D	DA	845	Boron, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.11	2.0	0.11	2	Standard
G206D	DA	845	Cadmium,total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
G206D	DA	845	Chloride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	38	200	95	200	Standard
G206D	DA	845	Chromium, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0	0.10	0.0096	0.1	Standard

RAMBOLL

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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
G206D	DA	845	Cobalt, total	mg/L	03/30/2021 - 07/27/2021	CI around median	0	0.006	0.0037	0.006	Standard
G206D	DA	845	Fluoride, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.44	4.0	0.55	4	Standard
G206D	DA	845	Lead, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.0000301	0.0075	0.0059	0.0075	Standard
G206D	DA	845	Lithium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.020	0.040	0.020	0.04	Standard
G206D	DA	845	Mercury, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.0002	0.002	0.0011	0.002	Standard
G206D	DA	845	Molybdenum, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	0.026	0.10	0.044	0.1	Standard
G206D	DA	845	pH (field)	SU	03/30/2021 - 07/27/2021	CI around mean	7.0	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G206D	DA	845	Radium-226 + Radium 228, tot	pCi/L	03/30/2021 - 07/27/2021	CI around mean	-0.093	5.0	1.5	5	Standard
G206D	DA	845	Selenium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.050	0.0035	0.05	Standard
G206D	DA	845	Sulfate, total	mg/L	03/30/2021 - 07/27/2021	CI around mean	224	400	387	400	Standard
G206D	DA	845	Thallium, total	mg/L	03/30/2021 - 07/27/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
G206D	DA	845	Total Dissolved Solids	mg/L	03/30/2021 - 07/27/2021	CI around mean	1080	1200	975	1200	Standard
G207	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G207	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.000614	0.011	0.011	0.01	Background
G207	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.12	2.0	0.13	2	Standard
G207	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G207	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00421	2.0	0.11	2	Standard
G207	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G207	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	51	200	95	200	Standard
G207	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.004	0.10	0.0096	0.1	Standard
G207	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G207	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.44	4.0	0.55	4	Standard
G207	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.000508	0.0075	0.0059	0.0075	Standard
G207	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G207	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.0016	0.10	0.044	0.1	Standard
G207	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.7	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G207	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G207	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-23.9	400	387	400	Standard
G207	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G207	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 07/22/2015	Most recent sample	440	1200	975	1200	Standard
G208	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G208	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.011	0.011	0.01	Background
G208	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.091	2.0	0.13	2	Standard
G208	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G208	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	2.0	0.11	2	Standard
G208	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G208	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	21	200	95	200	Standard
G208	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.004	0.10	0.0096	0.1	Standard
G208	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G208	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.39	4.0	0.55	4	Standard
G208	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.0075	0.0059	0.0075	Standard
G208	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G208	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.0017	0.10	0.044	0.1	Standard
G208	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.8	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G208	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0033	0.050	0.0035	0.05	Standard
G208	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	400	387	400	Standard
G208	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G208	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	156	1200	975	1200	Standard
G209	UA	257	Antimony, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.003	0.006	0.003	0.006	Standard
G209	UA	257	Arsenic, total	mg/L	01/21/2015 - 07/15/2017	CI around geomean	0.0012	0.010	0.010	0.01	Standard
G209	UA	257	Barium, total	mg/L	04/09/2015 - 07/15/2017	CI around mean	0.057	2.0	0.27	2	Standard
G209	UA	257	Beryllium, total	mg/L	04/09/2015 - 07/15/2017	Future median	0.001	0.0067	0.0067	0.004	Background

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G209	UA	257	Boron, total	mg/L	01/21/2015 - 01/27/2021	CI around median	0.010	2.0	0.39	2	Standard
G209	UA	257	Cadmium,total	mg/L	01/21/2015 - 07/15/2017	CI around median	0.001	0.005	0.0012	0.005	Standard
G209	UA	257	Chloride, total	mg/L	01/21/2015 - 01/27/2021	CI around mean	63	200	96	200	Standard
G209	UA	257	Chromium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.004	0.10	0.013	0.1	Standard
G209	UA	257	Cobalt, total	mg/L	04/09/2015 - 07/15/2017	Future median	0.002	0.0074	0.0074	0.006	Background
G209	UA	257	Fluoride, total	mg/L	04/09/2015 - 01/27/2021	CI around mean	0.39	4.0	0.50	4	Standard
G209	UA	257	Lead, total	mg/L	01/21/2015 - 07/15/2017	Future median	0.001	0.018	0.018	0.0075	Background
G209	UA	257	Lithium, total	mg/L	11/18/2015 - 07/15/2017	All ND - Last	0.010	0.040	0.021	0.04	Standard
G209	UA	257	Mercury, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.0002	0.002	0.0002	0.002	Standard
G209	UA	257	Molybdenum, total	mg/L	07/22/2015 - 07/15/2017	CI around geomean	0.00118	0.10	0.0069	0.1	Standard
G209	UA	257	pH (field)	SU	01/21/2015 - 01/27/2021	CI around median	7.0	6.5/9.0	6.9/7.3	6.5/9	Standard/Standard
G209	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/18/2015 - 07/15/2017	CI around mean	0.32	9.8	9.8	5	Background
G209	UA	257	Selenium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.001	0.050	0.0097	0.05	Standard
G209	UA	257	Sulfate, total	mg/L	01/21/2015 - 01/27/2021	CB around T-S line	159	400	300	400	Standard
G209	UA	257	Thallium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.001	0.002	0.001	0.002	Standard
G209	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 01/27/2021	CI around mean	778	1200	949	1200	Standard
G210	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G210	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.011	0.011	0.01	Background
G210	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.033	2.0	0.13	2	Standard
G210	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G210	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around geomean	0.00255	2.0	0.11	2	Standard
G210	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G210	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	46	200	95	200	Standard
G210	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.011	0.10	0.0096	0.1	Standard
G210	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G210	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.37	4.0	0.55	4	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G210	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.0075	0.0059	0.0075	Standard
G210	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G210	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.0018	0.10	0.044	0.1	Standard
G210	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.7	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G210	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G210	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	76	400	387	400	Standard
G210	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G210	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	457	1200	975	1200	Standard
G211	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G211	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.011	0.011	0.01	Background
G211	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.092	2.0	0.13	2	Standard
G211	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G211	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	2.0	0.11	2	Standard
G211	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G211	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	34	200	95	200	Standard
G211	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.004	0.10	0.0096	0.1	Standard
G211	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G211	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.31	4.0	0.55	4	Standard
G211	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.0075	0.0059	0.0075	Standard
G211	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G211	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.001	0.10	0.044	0.1	Standard
G211	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.8	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G211	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0013	0.050	0.0035	0.05	Standard
G211	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	67	400	387	400	Standard
G211	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G211	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	443	1200	975	1200	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G212	UA	257	Antimony, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
G212	UA	257	Arsenic, total	mg/L	01/21/2015 - 07/15/2017	CI around median	0.001	0.010	0.010	0.01	Standard
G212	UA	257	Barium, total	mg/L	04/09/2015 - 07/15/2017	CI around mean	0.051	2.0	0.27	2	Standard
G212	UA	257	Beryllium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.0067	0.0067	0.004	Background
G212	UA	257	Boron, total	mg/L	01/21/2015 - 01/26/2021	CI around median	0.010	2.0	0.39	2	Standard
G212	UA	257	Cadmium,total	mg/L	01/21/2015 - 07/15/2017	All ND - Last	0.001	0.005	0.0012	0.005	Standard
G212	UA	257	Chloride, total	mg/L	01/21/2015 - 01/26/2021	CI around mean	39	200	96	200	Standard
G212	UA	257	Chromium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.004	0.10	0.013	0.1	Standard
G212	UA	257	Cobalt, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.002	0.0074	0.0074	0.006	Background
G212	UA	257	Fluoride, total	mg/L	04/09/2015 - 01/26/2021	CI around median	0.32	4.0	0.50	4	Standard
G212	UA	257	Lead, total	mg/L	01/21/2015 - 07/15/2017	Future median	0.001	0.018	0.018	0.0075	Background
G212	UA	257	Lithium, total	mg/L	11/18/2015 - 07/15/2017	All ND - Last	0.010	0.040	0.021	0.04	Standard
G212	UA	257	Mercury, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G212	UA	257	Molybdenum, total	mg/L	07/22/2015 - 07/15/2017	CI around median	0.001	0.10	0.0069	0.1	Standard
G212	UA	257	pH (field)	SU	01/21/2015 - 06/29/2021	CI around mean	7.1	6.5/9.0	6.9/7.3	6.5/9	Standard/Standard
G212	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/18/2015 - 07/15/2017	CI around mean	0.28	9.8	9.8	5	Background
G212	UA	257	Selenium, total	mg/L	04/09/2015 - 07/15/2017	CI around mean	0.00397	0.050	0.0097	0.05	Standard
G212	UA	257	Sulfate, total	mg/L	01/21/2015 - 01/26/2021	CB around linear reg	46	400	300	400	Standard
G212	UA	257	Thallium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G212	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 01/26/2021	CI around geomean	367	1200	949	1200	Standard
G213	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G213	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00341	0.011	0.011	0.01	Background
G213	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.10	2.0	0.13	2	Standard
G213	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.004	0.001	0.004	Standard
G213	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	2.0	0.11	2	Standard
G213	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	0.005	0.001	0.005	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G213	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	36	200	95	200	Standard
G213	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.026	0.10	0.0096	0.1	Standard
G213	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0057	0.006	0.0037	0.006	Standard
G213	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.31	4.0	0.55	4	Standard
G213	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00915	0.0075	0.0059	0.0075	Standard
G213	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G213	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.004	0.10	0.044	0.1	Standard
G213	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.6	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G213	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0038	0.050	0.0035	0.05	Standard
G213	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	46	400	387	400	Standard
G213	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0014	0.002	0.001	0.002	Standard
G213	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	362	1200	975	1200	Standard
G214	UA	845	Antimony, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G214	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.011	0.011	0.01	Background
G214	UA	845	Barium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.089	2.0	0.13	2	Standard
G214	UA	845	Beryllium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G214	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	2.0	0.11	2	Standard
G214	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G214	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	46	200	95	200	Standard
G214	UA	845	Chromium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0067	0.10	0.0096	0.1	Standard
G214	UA	845	Cobalt, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G214	UA	845	Fluoride, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.32	4.0	0.55	4	Standard
G214	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.0075	0.0059	0.0075	Standard
G214	UA	845	Mercury, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G214	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.0019	0.10	0.044	0.1	Standard
G214	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.7	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G214	UA	845	Selenium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G214	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	62	400	387	400	Standard
G214	UA	845	Thallium, total	mg/L	04/09/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G214	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	450	1200	975	1200	Standard
G215	UA	257	Antimony, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.003	0.006	0.003	0.006	Standard
G215	UA	257	Arsenic, total	mg/L	01/21/2015 - 07/15/2017	CI around mean	0.00752	0.010	0.010	0.01	Standard
G215	UA	257	Barium, total	mg/L	04/09/2015 - 07/15/2017	CI around mean	0.094	2.0	0.27	2	Standard
G215	UA	257	Beryllium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.0067	0.0067	0.004	Background
G215	UA	257	Boron, total	mg/L	01/21/2015 - 01/26/2021	CI around geomean	0.027	2.0	0.39	2	Standard
G215	UA	257	Cadmium,total	mg/L	01/21/2015 - 07/15/2017	All ND - Last	0.001	0.005	0.0012	0.005	Standard
G215	UA	257	Chloride, total	mg/L	01/21/2015 - 06/29/2021	CB around linear reg	63	200	96	200	Standard
G215	UA	257	Chromium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.004	0.10	0.013	0.1	Standard
G215	UA	257	Cobalt, total	mg/L	04/09/2015 - 07/15/2017	Future median	0.002	0.0074	0.0074	0.006	Background
G215	UA	257	Fluoride, total	mg/L	04/09/2015 - 01/26/2021	CI around median	0.33	4.0	0.50	4	Standard
G215	UA	257	Lead, total	mg/L	01/21/2015 - 07/15/2017	Future median	0.001	0.018	0.018	0.0075	Background
G215	UA	257	Lithium, total	mg/L	11/24/2015 - 07/15/2017	All ND - Last	0.010	0.040	0.021	0.04	Standard
G215	UA	257	Mercury, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G215	UA	257	Molybdenum, total	mg/L	07/22/2015 - 07/15/2017	CI around median	0.001	0.10	0.0069	0.1	Standard
G215	UA	257	pH (field)	SU	01/21/2015 - 06/29/2021	CI around mean	6.9	6.5/9.0	6.9/7.3	6.5/9	Standard/Standard
G215	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/24/2015 - 07/15/2017	CI around mean	0.18	9.8	9.8	5	Background
G215	UA	257	Selenium, total	mg/L	04/09/2015 - 07/15/2017	CI around median	0.001	0.050	0.0097	0.05	Standard
G215	UA	257	Sulfate, total	mg/L	01/21/2015 - 06/29/2021	CI around median	110	400	300	400	Standard
G215	UA	257	Thallium, total	mg/L	04/09/2015 - 07/15/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G215	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 06/29/2021	CI around median	480	1200	949	1200	Standard
G216	UA	845	Antimony, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G216	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00056	0.011	0.011	0.01	Background

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G216	UA	845	Barium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.16	2.0	0.13	2	Standard
G216	UA	845	Beryllium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G216	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00463	2.0	0.11	2	Standard
G216	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G216	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	53	200	95	200	Standard
G216	UA	845	Chromium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.004	0.10	0.0096	0.1	Standard
G216	UA	845	Cobalt, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.002	0.006	0.0037	0.006	Standard
G216	UA	845	Fluoride, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.29	4.0	0.55	4	Standard
G216	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	0.0075	0.0059	0.0075	Standard
G216	UA	845	Mercury, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G216	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.013	0.10	0.044	0.1	Standard
G216	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.7	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G216	UA	845	Selenium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G216	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	196	400	387	400	Standard
G216	UA	845	Thallium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G216	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	671	1200	975	1200	Standard
G217	UA	845	Antimony, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.003	0.006	0.003	0.006	Standard
G217	UA	845	Arsenic, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00234	0.011	0.011	0.01	Background
G217	UA	845	Barium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.11	2.0	0.13	2	Standard
G217	UA	845	Beryllium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.004	0.001	0.004	Standard
G217	UA	845	Boron, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	2.0	0.11	2	Standard
G217	UA	845	Cadmium,total	mg/L	01/21/2015 - 10/07/2015	All ND - Last	0.001	0.005	0.001	0.005	Standard
G217	UA	845	Chloride, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	72	200	95	200	Standard
G217	UA	845	Chromium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.0086	0.10	0.0096	0.1	Standard
G217	UA	845	Cobalt, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.0032	0.006	0.0037	0.006	Standard
G217	UA	845	Fluoride, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.29	4.0	0.55	4	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G217	UA	845	Lead, total	mg/L	01/21/2015 - 10/07/2015	CI around mean	-0.00356	0.0075	0.0059	0.0075	Standard
G217	UA	845	Mercury, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.0002	0.002	0.0011	0.002	Standard
G217	UA	845	Molybdenum, total	mg/L	07/22/2015 - 10/07/2015	Most recent sample	0.0013	0.10	0.044	0.1	Standard
G217	UA	845	pH (field)	SU	01/21/2015 - 10/07/2015	CI around mean	6.6	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
G217	UA	845	Selenium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.050	0.0035	0.05	Standard
G217	UA	845	Sulfate, total	mg/L	01/21/2015 - 10/07/2015	CI around median	0	400	387	400	Standard
G217	UA	845	Thallium, total	mg/L	04/10/2015 - 10/07/2015	Most recent sample	0.001	0.002	0.001	0.002	Standard
G217	UA	845	Total Dissolved Solids	mg/L	01/21/2015 - 10/07/2015	CI around mean	603	1200	975	1200	Standard
G218	UA	257	Antimony, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
G218	UA	257	Arsenic, total	mg/L	01/21/2015 - 07/17/2017	CI around median	0.001	0.010	0.010	0.01	Standard
G218	UA	257	Barium, total	mg/L	04/10/2015 - 07/17/2017	CI around mean	0.14	2.0	0.27	2	Standard
G218	UA	257	Beryllium, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.001	0.0067	0.0067	0.004	Background
G218	UA	257	Boron, total	mg/L	01/21/2015 - 01/26/2021	CI around median	0.010	2.0	0.39	2	Standard
G218	UA	257	Cadmium,total	mg/L	01/21/2015 - 07/17/2017	All ND - Last	0.001	0.005	0.0012	0.005	Standard
G218	UA	257	Chloride, total	mg/L	01/21/2015 - 01/26/2021	CB around linear reg	72	200	96	200	Standard
G218	UA	257	Chromium, total	mg/L	04/10/2015 - 07/17/2017	CI around median	0.004	0.10	0.013	0.1	Standard
G218	UA	257	Cobalt, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.002	0.0074	0.0074	0.006	Background
G218	UA	257	Fluoride, total	mg/L	04/10/2015 - 01/26/2021	CI around mean	0.30	4.0	0.50	4	Standard
G218	UA	257	Lead, total	mg/L	01/21/2015 - 07/17/2017	All ND - Last	0.001	0.018	0.018	0.0075	Background
G218	UA	257	Lithium, total	mg/L	11/24/2015 - 07/17/2017	All ND - Last	0.010	0.040	0.021	0.04	Standard
G218	UA	257	Mercury, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
G218	UA	257	Molybdenum, total	mg/L	07/22/2015 - 07/17/2017	CI around median	0.001	0.10	0.0069	0.1	Standard
G218	UA	257	pH (field)	SU	01/21/2015 - 01/26/2021	CI around mean	7.0	6.5/9.0	6.9/7.3	6.5/9	Standard/Standard
G218	UA	257	Radium-226 + Radium 228, tot	pCi/L	11/24/2015 - 07/17/2017	CI around mean	0.58	9.8	9.8	5	Background
G218	UA	257	Selenium, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.001	0.050	0.0097	0.05	Standard
G218	UA	257	Sulfate, total	mg/L	01/21/2015 - 01/26/2021	CB around linear reg	174	400	300	400	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
G218	UA	257	Thallium, total	mg/L	04/10/2015 - 07/17/2017	All ND - Last	0.001	0.002	0.001	0.002	Standard
G218	UA	257	Total Dissolved Solids	mg/L	01/21/2015 - 01/26/2021	CI around median	600	1200	949	1200	Standard
MW16S	UA	845	pH (field)	SU	04/09/2015 - 04/09/2015	Most recent sample	7.2	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
MW16S	UA	845	Total Dissolved Solids	mg/L	04/09/2015 - 04/09/2015	Most recent sample	410	1200	975	1200	Standard
R104	UA	845	Antimony, total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.003	0.006	0.003	0.006	Standard
R104	UA	845	Arsenic, total	mg/L	04/08/2015 - 08/03/2016	CI around median	0.001	0.011	0.011	0.01	Background
R104	UA	845	Barium, total	mg/L	04/08/2015 - 08/03/2016	CI around mean	0.061	2.0	0.13	2	Standard
R104	UA	845	Beryllium, total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.001	0.004	0.001	0.004	Standard
R104	UA	845	Boron, total	mg/L	04/08/2015 - 08/03/2016	CI around median	0.010	2.0	0.11	2	Standard
R104	UA	845	Cadmium,total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.001	0.005	0.001	0.005	Standard
R104	UA	845	Chloride, total	mg/L	04/08/2015 - 08/03/2016	CI around mean	45	200	95	200	Standard
R104	UA	845	Chromium, total	mg/L	04/08/2015 - 08/03/2016	CI around median	0.004	0.10	0.0096	0.1	Standard
R104	UA	845	Cobalt, total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.002	0.006	0.0037	0.006	Standard
R104	UA	845	Fluoride, total	mg/L	04/08/2015 - 08/03/2016	CI around mean	0.30	4.0	0.55	4	Standard
R104	UA	845	Lead, total	mg/L	04/08/2015 - 08/03/2016	CI around median	0.001	0.0075	0.0059	0.0075	Standard
R104	UA	845	Lithium, total	mg/L	11/17/2015 - 08/03/2016	All ND - Last	0.010	0.040	0.020	0.04	Standard
R104	UA	845	Mercury, total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.0002	0.002	0.0011	0.002	Standard
R104	UA	845	Molybdenum, total	mg/L	07/23/2015 - 08/03/2016	CI around mean	0.00386	0.10	0.044	0.1	Standard
R104	UA	845	pH (field)	SU	01/20/2015 - 08/03/2016	CI around mean	7.3	6.5/9.0	6.8/7.4	6.5/9	Standard/Standard
R104	UA	845	Radium-226 + Radium 228, tot	pCi/L	11/17/2015 - 08/03/2016	CI around mean	-0.166	5.0	1.5	5	Standard
R104	UA	845	Selenium, total	mg/L	04/08/2015 - 08/03/2016	CI around mean	0.00582	0.050	0.0035	0.05	Standard
R104	UA	845	Sulfate, total	mg/L	04/08/2015 - 08/03/2016	CI around mean	72	400	387	400	Standard
R104	UA	845	Thallium, total	mg/L	04/08/2015 - 08/03/2016	All ND - Last	0.001	0.002	0.001	0.002	Standard
R104	UA	845	Total Dissolved Solids	mg/L	01/20/2015 - 08/03/2016	CI around mean	424	1200	975	1200	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
COFFEEN POWER PLANT
GMF GYPSUM STACK POND
COFFEEN, ILLINOIS

Notes:
Potential exceedance of GWPS (note: No potential exceedances were determined based on data collected from 2015 through 2021)
HSU = hydrostratigraphic unit:
DA = deep aquifer
UA = uppermost aquifer
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
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
Future median = Median of the three most recent samples
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)

ATTACHMENT N

Certification of Financial Assurance Requirements

On June 17, 2021, Illinois Power Generating Company provided financial assurance in the form of performance bonds to the Illinois Environmental Protection Agency in the amount of $27,884,983 for Ash Pond 1, Ash Pond 2, and the GMF Pond System at the Coffeen Power Plant.[1]

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 Units that the financial assurance instruments satisfy the requirements of 35 I.A.C. Part 845, Subpart I.

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Matthew A. Goering
Senior Vice President
Illinois Power Generating Company

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[1]In the operating permit applications, the GMF Pond System is referred to as the GMF Gypsum Stack Pond and GMF Recycle Pond.

ATTACHMENT O

Stantec Consulting Services Inc.
1859 Bowles Avenue Suite 250, Fenton MO 63026-1944

October 12, 2016
File: let_001_175666013_certification
Revision 0

Initial Hazard Potential Classification Assessment
EPA Final CCR Rule
GMF Pond
Coffeen Power Station
Montgomery County, Illinois

1.0 PURPOSE

This report documents Stantec's certification of the initial hazard potential classification assessment for the Coffeen Power Station GMF 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

Stantec reviewed an existing breach analysis (dated 2007) to evaluate potential hazards associated with a failure of the GMF Pond's perimeter containment dike and to see if the existing analysis was suitable for the purpose of informing Stantec's initial hazard potential classification assessment. The existing breach analysis utilized an approximate method of computing the inundation limits of gypsum slurry by computing a runout distance on a constant slope. The breach analysis used parameters consistent with the final design gypsum stack height and volume within the GMF Pond containment dike. The analysis also utilized topography and imagery of the surrounding area to estimate inundation limits. Breaches were simulated at multiple locations along the perimeter dike and the corresponding results were used to create inundation extents. The inundation extents are depicted for two inundations limits; a 10 foot inundation depth area and a 5 foot inundation depth area. There are a total of 12 potentially impacted structures (11 residential) within the 5 foot inundation depth area.

Based on its review, Stantec concluded that the existing analysis is suitable for the purpose of hazard potential classification and that there have not been any material changes to the GMF Pond or downstream areas that would significantly impact the previous analysis results. The existing breach analysis indicates that a breach failure near the northwest corner of the GMF Pond perimeter dike would inundate eight occupied structures, seven being residential structures and one industrial facility. The existing breach analysis also indicates that a breach to the east would inundate two residential structures along Red Ball Trail/County HWY 9 and a breach to the south would inundate frequently occupied Coffeen Power Station facilities. Based upon review of the existing breach analysis predicted depths and velocities at various frequently occupied Coffeen

Power Station facilities and surrounding residential structures, it was concluded that a failure of the GMF Pond's perimeter dike will probably cause loss of human life.

40 CFR 257.53 defines a "high hazard potential CCR surface impoundment" as a diked surface impoundment where failure or mis-operation will probably cause loss of human life.

Based on the results of the analysis summarized above, the GMF Pond was assigned a High 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 Coffeen Power Station GMF 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

ATTACHMENT P

AECOM

Submitted to
Illinois Power Generating Company
134 Cips Lane
Coffeen, IL 62017

Submitted by
AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Structural Stability Assessment

For

GMF Pond

At Coffeen Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Gypsum Management Facility (GMF) Pond at the Illinois Power Generating Company Coffeen Power Station meets the structural stability assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(d). The GMF Pond is located near Coffeen, Illinois in Montgomery County, approximately 0.6 miles north of the Coffeen Power Station. The GMF Pond serves as the primary wet impoundment basin for gypsum produced by the wet scrubber system at the Coffeen Power Station.

The GMF 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 GMF 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 GMF 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 GMF Pond is a ring dike structure and does not have abutments.

The foundation consists of medium stiff to stiff soil, overlying soft to very soft soil, which in turn overlies very stiff to hard glacial till. Slope stability analyses exceed the criteria listed in §257.73(e)(1)(i) through (iii) for slip surfaces passing through the foundation. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for GMF Pond at Coffeen Power Station* (October 2016). Additional slope stability analyses were performed to evaluate the effects of liquefaction and cyclic softening in the foundation, and were found to satisfy the criteria listed in §257.73(e)(1)(iv) applicable to dikes. 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 GMF 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 GMF 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 GMF Pond. No evidence of significant areas of erosion or wave action was observed. The interior slopes are protected with a geomembrane liner that underlies the entire GMF Pond and extends up the interior slopes, and the exterior slopes are protected with vegetation. The geomembrane liner on the interior slopes isolates the embankment soils from surface erosion or wave action. Operational and maintenance procedures to repair the vegetation (exterior slopes) and liner (interior slopes) as needed are appropriate to protect against surface erosion or wave action. Given the presence of a liner that serves to prevent saturation of the dike's soils below the normal pool, sudden drawdown, as well as the corresponding adverse effects, is not applicable to the GMF Pond. Therefore, the GMF 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 medium stiff to stiff material, which is indicative of mechanically compacted dikes. As discussed in the *CCR Rule Report: Initial Safety Factor Assessment for GMF Pond at Coffeen Power Station* (2016), 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 GMF Pond included sufficient dike compaction. Operational and maintenance procedures are in place to identify and mitigate deficiencies in order to maintain sufficient compaction of the dikes to withstand the range of loading conditions. Therefore, the GMF 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 exterior slopes is adequate as no substantial bare or overgrown areas were observed. Exposed geomembrane liners on the interior slopes are used as an alternate form of slope protection, which is adequate as significant tears or defects were not observed. Therefore, the original design and construction of the GMF 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 GMF 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 spillway system was 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 probable maximum flood (PMF) inflow design flood (IDF) event for the high hazard potential GMF Pond. The hazard potential classification assessment was performed by Stantec in 2016 in accordance with §257.73(a)(2).

The spillway system at the GMF Pond includes a geomembrane-lined transfer channel and a high-density polyethylene low-flow pipe. Both the lined channel and the low-flow pipe are constructed from non-erodible materials that are designed to carry sustained flows. The capacity of the spillway system was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The analysis found that the spillway system can adequately manage flow during peak discharge resulting from the PMF IDF 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 GMF Pond at Coffeen Power Station* (October 2016). Operational and maintenance procedures are in place to repair any tears in the spillway liner and remove debris or other obstructions from the transfer channel and low-flow pipe, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillway system. Therefore, the GMF 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.

Based on an evaluation of design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM, no hydraulic structures are present that underlie the base or pass through the dike of the GMF Pond. Therefore, the §257.73(d)(1)(vi) requirements are not applicable to the GMF Pond.

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 GMF Pond was evaluated by comparing the location of the GMF Pond relative to adjacent water bodies using published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), aerial imagery, and conditions observed in the field by AECOM.

Based on this evaluation, water bodies adjacent to the downstream slopes of the GMF Pond are not present. The nearest downstream water body is the GMF Recycle Pond, which is approximately 500 lateral feet beyond the downstream slopes of the GMF Pond. The GMF Recycle Pond is a CCR unit, rather than a river, stream, or lake. Coffeen Lake is also located in the vicinity of the GMF Pond, but the GMF Pond is outside of the flood zone shown on the FEMA FIRM. Therefore, adjacent water bodies that can inundate the downstream slopes of the GMF Pond are not present.

Based on this evaluation, the requirements in §257.73(d)(1)(vii) are not applicable to the GMF Pond, as inundation of the downstream slopes is not expected to occur.

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Coffeen Power Station; GMF 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 Sr.
Printed Name

10/13/16
Date

VICTOR ALBERT MODEER JR
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October 2016

CCR Rule Report: Initial Safety Factor Assessment

For

GMF Pond

At Coffeen Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Gypsum Management Facility (GMF) Pond at the Illinois Power Generating Company Coffeen Power Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The GMF Pond is located near Coffeen, Illinois in Montgomery County, approximately 0.6 miles north of the Coffeen Power Station. The GMF Pond serves as the primary wet impoundment basin for gypsum produced by the wet scrubber system at the Coffeen Power Station.

The GMF 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 GMF Pond. The exploration consisted of cone penetration test soundings. 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 GMF Pond consist of medium stiff to stiff embankment fill (clay) overlying medium stiff to stiff clay, overlying soft to very soft clay, with in turn overlies stiff to hard glacial till (clay) with dense to very dense sand and gravel. Phreatic water is typically near the embankment/foundation interface at the GMF Pond.

Four (4) 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 GMF Pond dikes. As a result, this loading condition is not applicable to the GMF Pond.

Results of the Initial Safety Factor Assessments, for the critical cross-section for each loading condition, are listed in **Table 1** (i.e., the table identifies the lowest calculated factor of safety for any one of the four analyzed cross sections for each loading condition).

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	3.45
Maximum Surcharge Pool Loading	(ii)	1.40	3.45
Seismic	(iii)	1.00	1.47
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

Based on this evaluation, the GMF Pond meets the requirements in §257.73(e)(1).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Coffeen Power Station; GMF 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

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October 2016

CCR Rule Report: Initial Inflow Design Flood Control System Plan

For

GMF Pond

At Coffeen Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the initial inflow design flood control system plan for Gypsum Management Facility (GMF) Pond at the Illinois Power Generating Company Coffeen Power Station meets the requirements specified in 40 Code of Federal Regulations (CFR) §257.82. The GMF Pond is located near Coffeen, Illinois in Montgomery County, approximately 0.6 miles north of the Coffeen Power Station. The GMF Pond serves as the primary wet impoundment basin for gypsum produced by the wet scrubber system at the Coffeen Power Station.

The GMF 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 GMF Pond are described in the following subsections. Data and analysis results in the following subsection 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 GMF Pond has a high 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 GMF Pond by evaluating the effects of a 24-hour duration design storm for the probable maximum flood (PMF) Inflow Design Flood (IDF) using a hydrologic HydroCAD (Version 10) computer model and a starting water surface elevation of 621.2 feet. The computer model evaluated the GMF Pond's ability to collect and control the PMF IDF under existing operational and maintenance procedures. Rainfall data for the PMF IDF, which corresponds to the probable maximum precipitation rainfall event, was obtained from the National Weather Service Hydrometeorological Report No. 51 (HMR 51). The HMR 51 rainfall depth is 34.25 inches.

The HydroCAD model results for the GMF 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 PMF IDF and (2) flow from the CCR unit to collect and control the peak discharge resulting from the PMF IDF. The peak water surcharge elevation is 623.8 feet during the IDF, and the minimum crest elevation of the GMF Pond dike is 631.0 feet. Therefore, overtopping is not expected.

Based on this evaluation, the GMF 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, the GMF Pond does not discharge into waters of the United States. Clear water from the GMF Pond flows downstream into the GMF Recycle Pond. Hydraulic and hydrologic analyses performed as part of the initial inflow design flood control system plan found the GMF Pond adequately manages outflow during the PMF IDF, as overtopping of the GMF Pond embankments is not expected.

Therefore, discharge into waters of the United States is not expected during normal or PMF IDF conditions, and the GMF Pond meets the requirements in §257.82(b).

3 Certification Statement

CCR Unit: Illinois Power Resources Generating, LLC; Coffeen Power Station; GMF 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 13, 2016 meets the requirements of 40 CFR §257.82.

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ATTACHMENT S

PART 845 SAFETY AND HEALTH PLAN

COFFEEN POWER PLANT GMF GYPSUM STACK POND, GMF RECYCLE POND, AND ASH POND NO. 1

CONTENTS

REVISION SUMMARY		**1**
PREFACE		**2**
1.	**INTRODUCTION**	**3**
1.1	Site Description/History	3
1.2	Facility Personnel	3
1.3	Responsibilities	3
1.3.1	**IPGC Point of Contact**	3
1.3.2	**IPGC Employees**	4
1.3.3	**Contract Workers**	4
1.3.4	**Third-Party Contractor Employees**	4
1.3.5	**Third-Party Contractor Safety Competent Person**	4
2.	**SITE ACCESS & CONTROL**	**5**
2.1	Facility Security	5
2.2	Third-Party Contractor Management	5
2.3	Third-Party Contractor Safety and Health Plan	5
2.4	Authorized Personnel	5
2.5	Visitors	5
2.6	Communication	5
3.	**TRAINING & MEDICAL REQUIREMENTS**	**6**
3.1	HAZWOPER Training	6
3.2	OSHA Construction Outreach Training	6
3.3	Site Safety and Health Plan Review	6
3.4	Emergency and Monitoring Equipment Training	7
3.5	Hazard Communication	7
3.6	Medical Surveillance	7
3.7	Drug Screen and Background Investigations	8
3.8	COVID-19 Site Entry Guidelines	8
3.9	Document Management	8
3.10	Industrial Hygiene Sampling Records	8
4.	**HAZARD & CONTROLS**	**9**
4.1	Ash/Unstable Surfaces	9
4.2	Ash Inhalation/Airborne Exposure	10
4.3	Stuck Vehicles/Equipment	11
4.4	Working Near/Over Water	11
4.5	Heavy Equipment	12
4.6	Overhead Powerlines	13
4.7	Severe Weather	14
4.8	Heat Stress	15
4.8.1	**Heat Stress Prevention**	15
4.9	Cold Stress	17
4.10	Biological Hazards	18
4.10.1	**Ticks (Lyme Disease) & Mites**	18
4.10.2	**Insect Bites/Stings**	20
4.10.3	**Venomous Snakes**	21
4.10.4	**Poisonous Plants and Plant Hazards**	22
4.11	Working Alone	23
5.	**HAZARD COMMUNICATION**	**25**
5.1	Coal Combustion Residuals	25
5.2	Safety Data Sheets	26
5.3	Signage	26
6.	**EMERGENCY RESPONSE PLAN**	**27**
6.1	Emergency Phone Numbers & Notifications	27
6.2	Evacuation Signal	27
6.3	Muster Point	27

6.4	Calls for Emergency Support	27
6.5	Fire & Explosion Response Plan	27
6.6	Injury Response Plan	28
6.7	Spill Response Plan	28
6.8	CCR Spill or Release Response Plan	28
6.9	Ash Pond Rescue	29
6.10	Incident Reporting	29

APPENDICES

Appendix A	Site Map
Appendix B	Safety and Health Plan Acknowledgment Form
Appendix C	Vistra Drug Screen Policies and Supplemental Terms
Appendix D	COVID-19 Vistra Site Entry Guidelines
Appendix E	Safety Data Sheets

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
AP1	Ash Pond No. 1
CCR	Coal Combustion Residual
CPP	Coffeen Power Plant
GMF	Gypsum Management Facility
GMF GSP	GMF Gypsum Stack Pond
GMF RP	GMF Recycle Pond
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
IDLH	Immediately Dangerous to Life and Health
kV	kilovolt
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
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	GMF GSP, GMF RP, and AP1
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 Coffeen Power Plant (CPP) Gypsum Management Facility (GMF) Gypsum Stack Pond (GMF GSP; Vistra identification [ID] number [No.] 103, Illinois Environmental Protection Agency [IEPA] ID No. W1350150004-03, National Inventory of Dams [NID] No. IL50579), GMF Recycle Pond (GMF RP; Vistra ID No. 104, IEPA ID No. W1350150004-04, NID No. IL50578), and Ash Pond No. 1 (AP1; Vistra ID No. 101, IEPA ID No. W13501050004-01, NID No. IL50722), collectively 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 CCR Units at the Site. 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 Site and will be available on-site.

1.1 Site Description/History

The CPP is a retired coal-fired power plant located in Montgomery County, in central Illinois, within Section 11 Township 7 North and Range 7 East. The CPP is approximately 2 miles south of the city of Coffeen and about 8 miles southeast of the city of Hillsboro, Illinois. The Site is located between the two lobes of Coffeen Lake to the west, east, and south, and is bordered by agricultural land to the north. The approximately 1,100-acre Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the CPP. Appendix A is a site map showing the location of the CCR Units at the Site.

1.2 Facility Personnel

The following table outlines key personnel with respect to facility operations and health and safety.

Name	Position	Phone Number
Scott Bell	Primary Point-of-Contact / Plant Manager	217-248-7720
John Romang	Secondary Point-of-Contact / Environmental Manager	217-341-7319
Gate House	Security Guard	217-534-2363
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
Charles Koudelka	Plant Closure Director	903-235-8633

1.3 Responsibilities

The following persons have responsibilities associated with communicating and implementing the Safety and Health Plan for the CCR Units at the Site.

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 Site. 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 Site 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 the CPP POC or their representative.

Upon arrival to the facility all IPGC employees, contract workers, and third-party contractors must sign in at the gate house. The security guard will call the POC to confirm the individual(s) is authorized to enter the facility.

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 Site, 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.

2.3 Third-Party Contractor Safety and Health Plan

Prior to being authorized to conduct work at the Site, 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 Site. 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 received the Site Orientation Training

2.5 Visitors

Visitors must be escorted by Authorized Personnel through the Site 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 consistently available and can be relied upon to summon emergency services.

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 CCR Units at the Site.

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 Site. 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 Site Safety and Health Plan Review

Pursuant to 35 I.A.C. § 845.530(d)(e), before beginning any activity at the Site, 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 Site 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 previously 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 in the main 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.

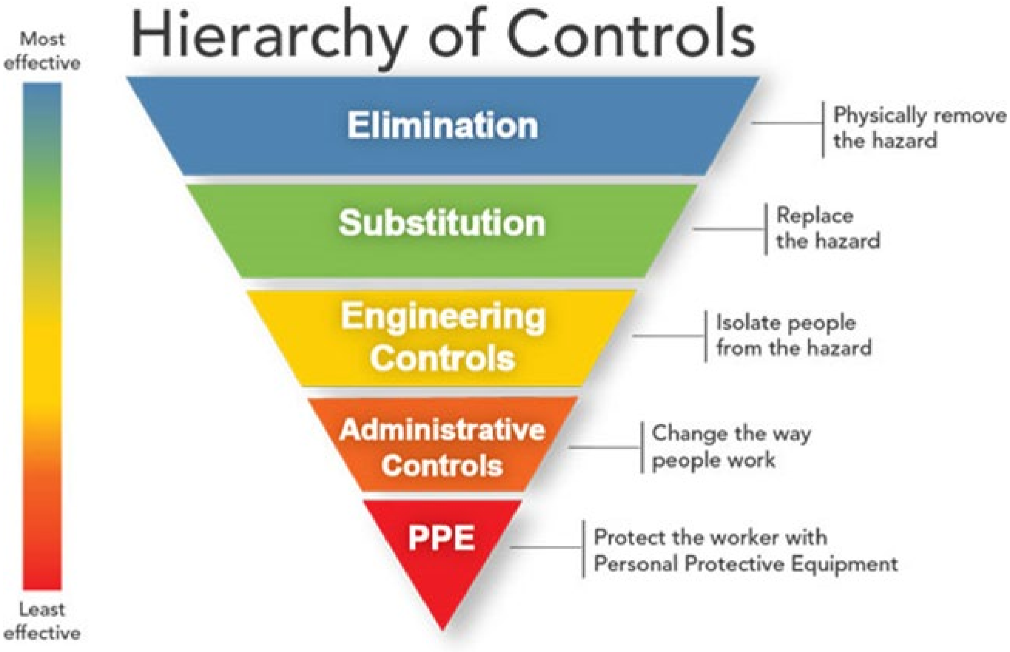
3.10 Industrial Hygiene Sampling Records

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 CPP, 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 Site will not be accepted by the IPGC.

IPGC requires that a hierarchy of controls be considered when performing work at the Site. 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

At least 24 hours 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.

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 POC will be notified. The POC will make recommendations on extraction companies depending on the type of vehicle/equipment that is stuck. 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 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	
		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.

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 location is the storm shelter located next to the security office.

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 is the storm shelter located next to the security office; shelter locations will be reviewed during the Site Orientation Training. 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.	

Elimination	Substitution	Engineering	Administrative	PPE
			Periodically monitor weather throughout the day. Use a weather app which issues alerts for severe weather and lightning, assuming cell service is available	
			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 Site.

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

Elimination	Substitution	Engineering	Administrative	PPE
			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 Site 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	

Elimination	Substitution	Engineering	Administrative	PPE
			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 an ash pond 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 Site 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	
			Implement a buddy system whenever feasible (required for high hazard work)	

Elimination	Substitution	Engineering	Administrative	PPE
			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/m^3 (respirable)</td><td>25 mg/m^3 (respirable)</td><td>0.025 mg/m^3 (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/m^3</td><td>2500 mg/m^3</td><td>5 mg/m^3</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/m^3</td><td>25 mg/m^3</td><td>2 mg/m^3</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/m^3</td><td>ND</td><td>10 mg/m^3</td><td>Lung fibrosis; [potential occupational carcinogen]</td></tr>
<tr><td>Aluminosilicates</td><td>10-60%</td><td rowspan="3">15 mg/m^3 (PNOR)</td><td rowspan="3">ND</td><td rowspan="3">10 mg/m^3 (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 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 incorporate SDSs in their Safety and Health Plan and provide SDSs to IPGC prior to bringing a material on site. SDSs are provided in Appendix E.

5.3 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 Site:

- 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:

- 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 CPP 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**
134 Cips Lane Coffeen, IL	911
	Security Guard: 217-534-2363

Medical Treatment	
Local Hospital	**Phone Number**
Hillsboro Area Hospital 1200 East Tremont Street Hillsboro, IL 62049	217-532-6111

Incident Notifications		
Title	**Name**	**Contact Number**
Primary POC / Plant Manager	Scott Bell	217-248-7720
Secondary POC / Environmental Manager	John Romang	217-341-7319

6.2 Evacuation Signal

Upon hearing verbal notification (cell phones and radios) to evacuate all personnel will leave the work area and proceed to the muster point.

6.3 Muster Point

The muster point for the Site is located at the Plant Closure/Environmental Office. The severe weather shelter location is the storm shelter located next to the Security Office. The muster point and severe weather locations will be reviewed during the Site Orientation Training.

6.4 Calls for Emergency Support

In the case of an emergency site personnel will call the facility emergency phone number. 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 Site Emergency Response Plan.

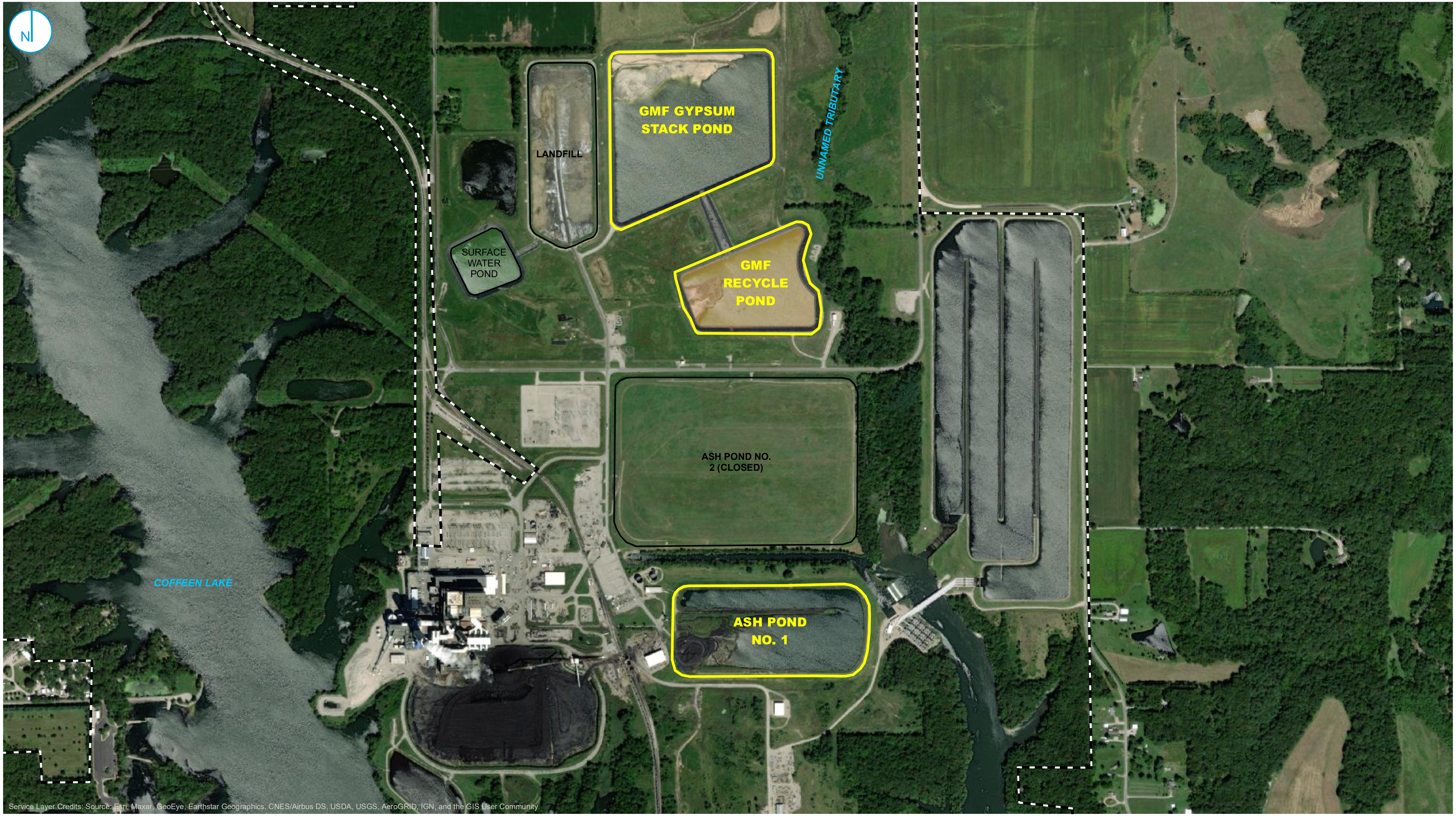
6.9 Ash Pond Rescue

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 CPP emergency number and state that an “ash pond rescue” is required. The CPP 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



PROJECT: 169000XXXX | DATED: 9/29/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Coffeen\Appendix A_COF Site Map_SnHP.mxd

PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

0 375 750 Feet

SITE MAP

APPENDIX A

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

PART 845 SAFETY AND HEALTH PLAN
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL

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

VISTRA

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

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

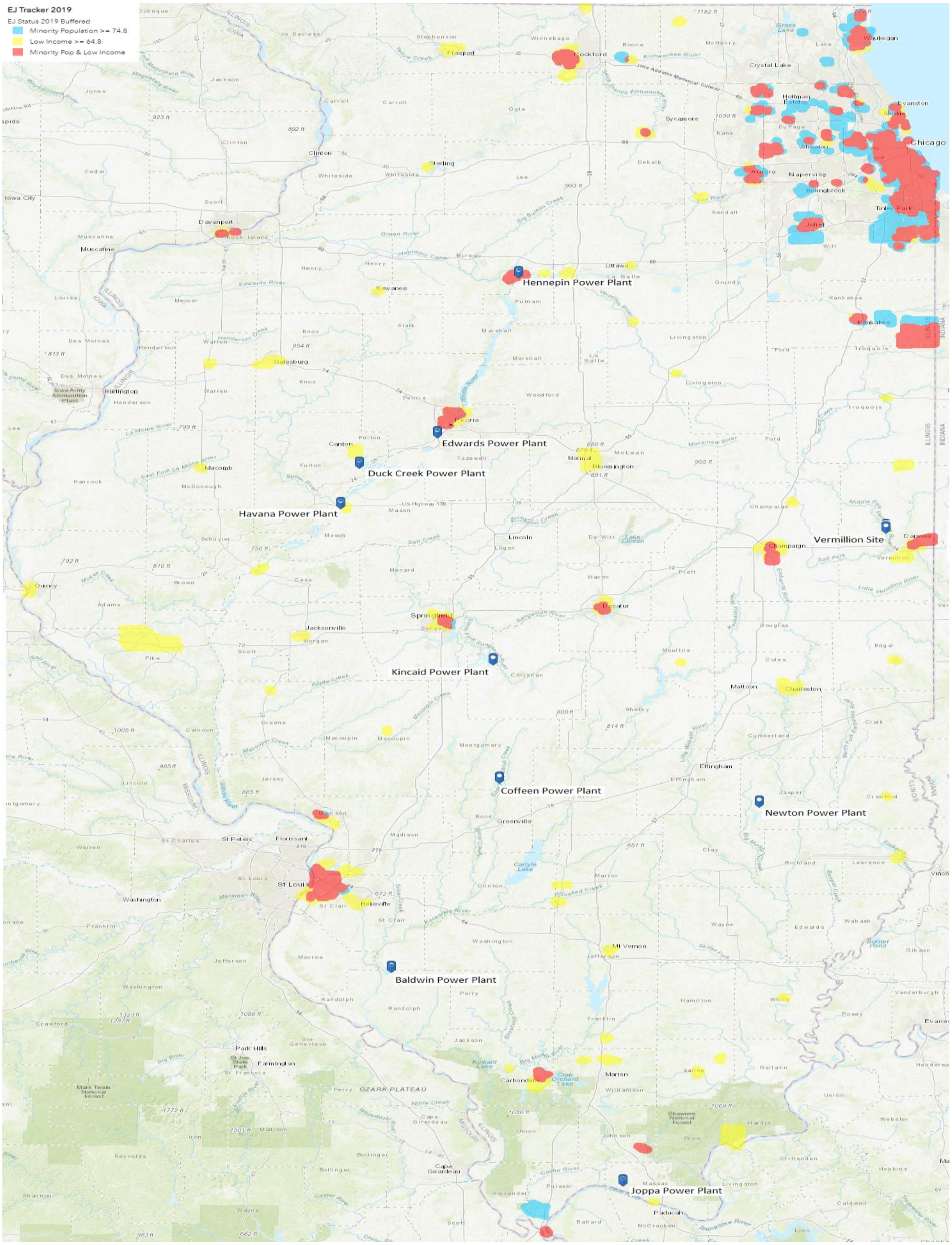
[2] Ground water analyses for purposes of categories 4-7, assumptions have been made based on current groundwater data. However, since sampling and analysis is ongoing and subject to IEPA review and approval, IPGC reserves the right to update its category designations for Categories 4-7.

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

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Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 11, 2021

Illinois Power Generating Company
134 Cips Lane
Coffeen, Illinois 62017

Subject: USEPA CCR Rule and IEPA Part 845 Rule Applicability Cross-Reference
2021 USEPA CCR Rule Periodic Certification Report
GMF Gypsum Stack Pond, Coffeen Power Plant, Coffeen, 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 9 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,

Lucas P. Carr, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

2021 USEPA CCR RULE PERODIC CERTIFICATION REPORT §257.73(a)(2), (c), (d), (e) and §257.82 GMF GYPSUM STACK POND Coffeen Power Plant Coffeen, Illinois

Submitted to

Illinois Power Generating Company

134 Cips Lane
Coffeen, Illinois 62017

Submitted by

Geosyntec consultants

engineers | scientists | innovators

1 McBride and Son Center Drive, Suite 202
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October 11, 2021

TABLE OF CONTENTS

Executive Summary 1
SECTION 1 Introduction and Background 3
1.1 GMF GSP Description 4
1.2 Report Objectives 6
SECTION 2 Comparision of Initial and Peroiodic Site Conditions 7
2.1 Overview 7
2.2 Review of Annual Inspection Reports 7
2.3 Review of Instrumentation Data 7
2.4 Comparison of Initial to Periodic Surveys 9
2.5 Comparison of Initial to Periodic Aerial Photography 9
2.6 Comparison of Initial to Periodic Site Visits 10
2.7 Interview with Power Plant Staff 10
SECTION 3 Hazard Potential Classification - §257.73(a)(2) 12
3.1 Overview of Initial HPC 12
3.2 Review of Initial HPC 12
3.3 Summary of Site Changes Affecting the Initial HPC 13
3.4 Periodic Hazard Potential Classification 13
SECTION 4 History of Construction Report - §257.73(c) 14
4.1 Overview of Initial HoC 14
4.2 Summary of Site Changes Affecting the Initial HoC 15
SECTION 5 Structural Stability Assessment - §257.73(d) 16
5.1 Overview of Initial SSA 16
5.2 Review of Initial SSA 16
5.3 Summary of Site Changes Affecting Initial SSA 17
5.4 Periodic SSA 17
SECTION 6 Safety Factor Assessment - §257.73(E)(1) 18
6.1 Overview of Initial SFA 18
6.2 Review of Initial SFA 18
6.3 Summary of Site Changes Affecting the Initial SFA 19
6.4 Periodic SFA 19
SECTION 7 Inflow Design Flood Conrol System Plan - §257.82 21
7.1 Overview of 2016 Inflow Design Flood Control System Plan 21
7.2 Review of Initial IDF 21
7.3 Summary of Site Changes Affecting the Initial IDF 22
7.4 Periodic IDF 22

SECTION 8 Conclusions...25
SECTION 9 Certification Statement 26
SECTION 10 References...27

LIST OF FIGURES

Figure 1 Site Location Map
Figure 2 Site Plan
Figure 3 GMF Gypsum Stack Pond Monitoring Well Locations

LIST OF TABLES

Table 1 Periodic Certification Summary
Table 2 Initial to Periodic Survey Comparison
Table 3 Factors of Safety from Periodic SFA
Table 4 GMF RP Culvert Attributes in Periodic IDF
Table 5 GMF GSP Outlet Geometry in Periodic IDF
Table 6 GM GSP Transfer Channel Geometry in Periodic IDF
Table 7 Water Levels from Periodic IDF

LIST OF DRAWINGS

Drawing 1 Initial to Periodic Survey Comparison
Drawing 2 Survey Comparison Isopach
Drawing 3 Initial to Periodic Aerial Imagery Comparison

LIST OF ATTACHMENTS

Attachment A GMF Gypsum Stack Pond Phreatic Data Plots
Attachment B GMF Gypsum Stack Pond Site Visit Photolog
Attachment C Periodic History of Construction Report Update Letter
Attachment D Periodic Structural Stability and Safety Factor Assessment Analyses
Attachment E Periodic Inflow Design Flood Control System Plan Analyses

EXECUTIVE SUMMARY

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule [1] certification report (Periodic Certification Report) for the Gypsum Management Facility (GMF) Gypsum Stack Pond (GMF GSP)[1] at the Coffeen Power Plant (CPP), also known as the Coffeen Power Station (COF), 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 the 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 were independently reviewed by Geosyntec ([2], [7], [3], [8], [4], [5], [6]). Additionally, field observations, interviews with plant staff, updated engineering analyses, and evaluations were performed to compare conditions in 2021 at the GMF GSP relative to the 2016 and 2017 initial certifications. These tasks determined 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,
- 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 GMF GSP meets all requirements for hazard potential classification, history of construction reporting, structural stability, safety factor assessment, and hydrologic and hydraulic control. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[1] The GMF GSP is also referred to as ID Number W13501250004-03, GMF GSP by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 103 by IPGC; and IL50579 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 GMF GSP.

Table 1 – Periodic Certification Summary

	CCR Rule Reference	Requirement Summary	2016 Initial Certification		2021 Periodic Certification	
			Requirement Met?	Comments	Requirement Met?	Comments
Hazard Potential Classification						
3	§257.73(a)(2)	Document hazard potential classification	Yes	Impoundment was determined to have a High hazard potential classification [2].	Yes	The Initial Hazard Potential Classification (HPC) is conservative due to the consideration of ultimate buildout conditions relative to existing conditions. An update to the Initial HPC is not required at this time but could be performed to potentially reduce the HPC to Significant.
History of Construction						
4	§257.73(c)(1)	Compile a history of construction	Yes	A History of Construction report was prepared for the GMF GSP, Ash Pond 1, Ash Pond 2, and the GMF Recycle Pond [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 were not present [8].	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 was adequate [8].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(iii)	Sufficiency of dike compaction	Yes	Dike compaction was sufficient for expected ranges in loading conditions [8].	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 was present on exterior slopes and was maintained. Interior slopes had alternate protection (geomembrane liner) [8].	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 were adequately designed and constructed to adequately manage flow during the probable maximum flood (PMF) [8].	Yes	Spillways were found to be adequately designed and constructed and are expected to adequately manager flow during the PMF, after performing updated hydrologic and hydraulic analyses.
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	Not Applicable	Hydraulic structures penetrating the dikes or underlying the base of the GMF GSP were not present. This requirement was not applicable [8].	Not Applicable	No changes were identified that may affect this requirement.
	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body.	Not Applicable	Inundation of exterior slopes were not expected. This requirement was not applicable [8].	Not Applicable	No changes were identified that may affect this requirement.
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 3.45 and higher [8].	Yes	Safety factors from updated slope stability analyses were calculated to be 3.45 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 3.45 and higher [8].	Yes	Safety factors from updated slope stability analyses were calculated to be 3.45and higher.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.47 and higher [8].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.45 and higher.
	§257.73(e)(1)(iv)	For dike construction of soils that have susceptible to liquefaction, safety factor must be at least 1.20	Not Applicable	Dike soils were not susceptible to liquefaction. This requirement was not applicable [8].	Not Applicable	No changes were identified that may affect this requirement.
Inflow Design Flood Control System Plan						
7	§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 Probable Maximum Precipitation, 24-hr Inflow Design Flood [8].	Yes	The flood control system was found to adequately manage inflow and peak discharge during the Probable Maximum Precipitation, 24-hour Inflow Design Flood, after performing updated hydrologic and hydraulic analyses.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharges into Waters of the United States were not expected to occur during normal and Probable Maximum Precipitation, 24-hr, Inflow Design Flood conditions [8].	Yes	Discharge into Waters of the United States were found to not be expected to occur during both normal and Probable Maximum Precipitation, 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 (USPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Illinois Power Generating Company (IPGC) to document the re-certification of the GMF GSP at the Coffeen Power Plant (CPP), also known as the Coffeen Power Station (COF), located at 134 Cips Lane in Coffeen, Illinois, 62017. The location of CPP is provided in **Figure 1**, and a site plan showing the location of the GMF GSP, among other closed and active CCR units and non-CCR surface impoundments, is provided in **Figure 2**.

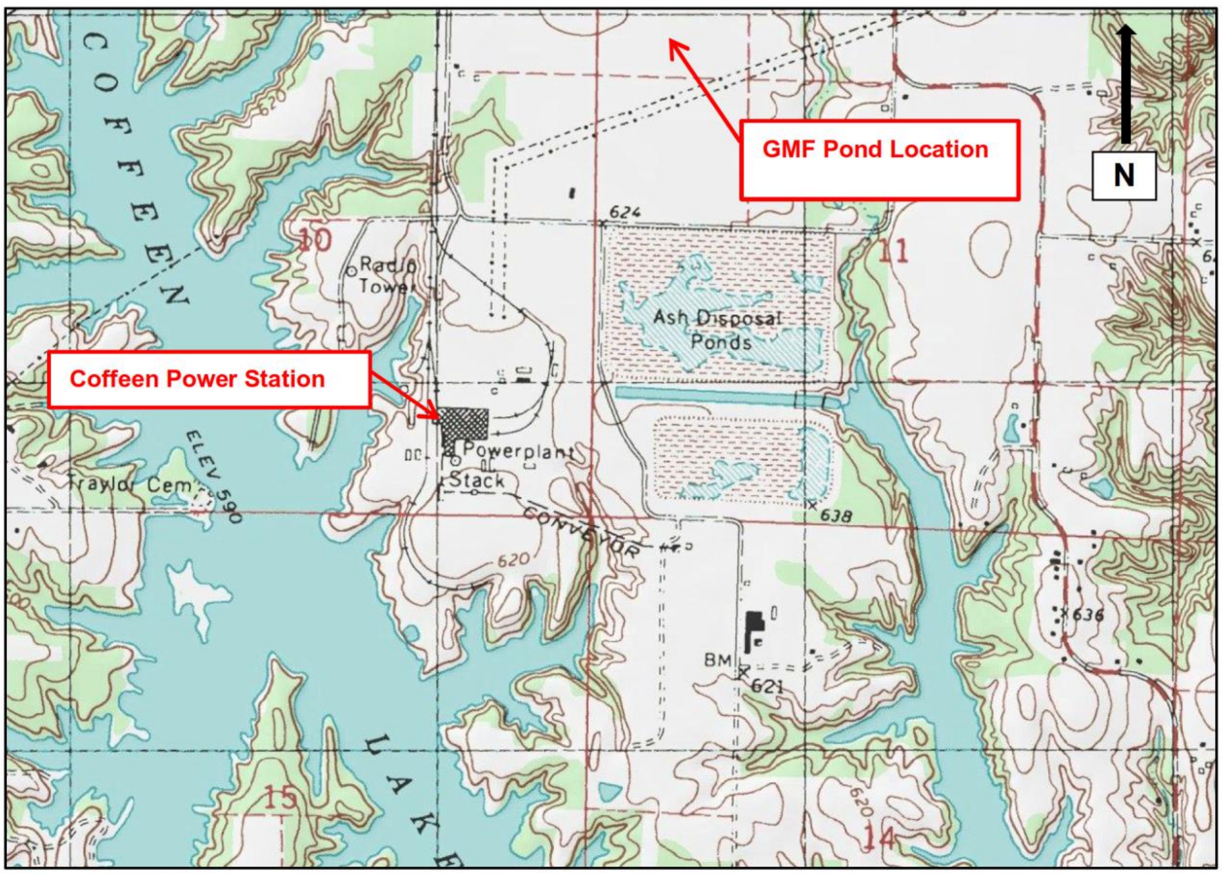


Figure 1 – Site Location Map (from AECOM, 2016)

Figure 2 – Site Plan (adapted from AECOM, 2016)

1.1 GMF GSP Description

CPP was retired in 2019. Prior to retirement, three active CCR surface impoundments – the GMF GSP, the GMF Recycle Pond, and AP1 – and one CCR landfill – were used for managing CCRs generated at CPP. This certification report only pertains to the GMF GSP. The GMF GSP has a High hazard potential, based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with §257.73(a)(2) ([2], [7]).

The GMF GSP formerly served as the primary wet impoundment basin for gypsum produced by the wet scrubber system at CPP. The GMF GSP was constructed between 2008 and 2009 and received inflow from two pairs of high-density polyethylene (HDPE) gypsum slurry pipes. Clear water discharge from the GMF GSP flowed downstream into the GMF Recycle Pond via a lined channel (transfer channel) and a 14-in. diameter HDPE low-flow pipe buried beneath the transfer channel. The transfer channel effectively acts as the primary spillway for the GMF GSP, as the bottom elevation of the transfer channel is equal to the adjacent exterior toe elevation of the dike. The transfer channel is approximately 580 ft in length, trapezoidal in shape, lined with 60-mil HDPE, has three horizontal to one vertical (3H:1V) side slopes, and the bottom elevation[2] decreases from 624 ft at the upstream end to 622 ft at the downstream end.

The 14-in. diameter low-flow pipe has an invert elevation of 619.0 ft at the upstream end and 617.6 ft at the downstream end. A berm was constructed within the transfer channel in 2020 with a crest elevation of approximately elevation 627 ft [9] to retain additional water in the GMF GSP and reduce the pool level in the downstream GMF Recycle Pond. The GMF Recycle Pond formerly acted as a polishing pond, and outflow was pumped to the CPP to be recycled for use in the wet scrubber system [8].

The GMF GSP has a composite liner system that extends up to interior dike crests at elevation 630.5 ft and is present beneath the entire footprint of the pond. The liner system includes a 3-ft thick layer of compacted clay that is overlain by a 60-mil textured HDPE geomembrane. The geomembrane liner is exposed at the pond bottom and side slopes [8].

As formerly operated, the normal pool elevation of the GMF GSP was observed to be 621.2 ft in the 2015 Weaver Consultants survey of the site [10], as controlled by the 14-in. diameter low-level outlet pipe and recycle water inflow and outflow pumping rates [8]. The water elevation in the GMF GSP had increased to 625.2 ft by the time of the periodic survey in December of 2020 [9], due to the construction of the berm in the transfer channel and could rise as high as approximately El. 627 ft due to the berm that was constructed in the transfer channel.

The GMF GSP is approximately 36.2 acres in size and was formed with a continuous embankment, a ring dike, which has a total perimeter length of approximately 5,000 ft. The perimeter dike was constructed to include a crest width of between approximately 15 to 25 ft and a crest height of 5 ft at the north embankment and 9 ft at the east embankment. The interior of the GMF GSP extends deeper than the exterior natural grade, and the maximum interior slope height is approximately 25 ft in the southeast corner of the pond. The elevation of the embankment crest ranges from 631 to 632 ft. Both interior and exterior slopes have 3H:1V orientations [8].

Initial certifications for the GMF GSP 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

---

[2] All elevations in the report are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

completed by Stantec and AECOM in 2016 and 2017 and subsequently posted to IPGC's CCR Website ([2], [3], [4], [5], [6]). Additional documentation for the initial certifications included detailed operating record reports containing calculations and other information prepared for the hazard potential classification by Stantec [7] and for the structural stability assessment, safety factor assessment, and inflow design flood control system plan by AECOM [8]. These operating record reports were not posted to IPGC's CCR Website.

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], [7]), Structural Stability Assessment ([4], [8]), Safety Factor Assessment ([5], [8]), and Inflow Design Flood Control System Plan ([6], [8]) to determine if updates may be required based on technical considerations.
    - The History of Construction report [3] was not independent reviewed for technical consideration, as this report contained historical information primarily developed prior to promulgation of the CCR Rule [1] for the CCR units at CPP, 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.
- Confirm that the GMF GSP meets all of the requirements associated with §257.73(a)(2)-(3), (c), (d), (e), and §257.82, or, if the GMF GSP does not meet any of the requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISION OF INITIAL AND PEROIODIC SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the GMF GSP 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 of the GMF GSP were performed from 2016 to 2020 ([11], [12], [13], [14], [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;
- A statement that no geotechnical instrumentation was present;
- 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; and
- 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 GMF GSP between 2015 and 2020. No signs of instability, structural weakness, or changes which may have affected the operation or stability of the GMF GSP were noted in the inspection reports.

2.3 Review of Instrumentation Data

Nineteen groundwater monitoring wells, (G102, G103, R104, G105, G106, G205, G206, G207, G208, G209, G210, G211, G212, G213, G214, G215, G216, G217, and G218), are present at the GMF GSP. Groundwater level readings were collected generally on a quarterly basis and provided between February 17, 2016 and January 27, 2021. Geosyntec reviewed the groundwater level data to evaluate if significant fluctuations, partially increases in phreatic levels, may have occurred after development of the initial structural stability and factor of safety certifications ([4], [5], [8]), which utilized phreatic conditions estimated from cone penetration testing (CPT) data. Available water level readings are plotted in **Attachment A** and **Figure 3** provides approximate locations of the monitoring wells.

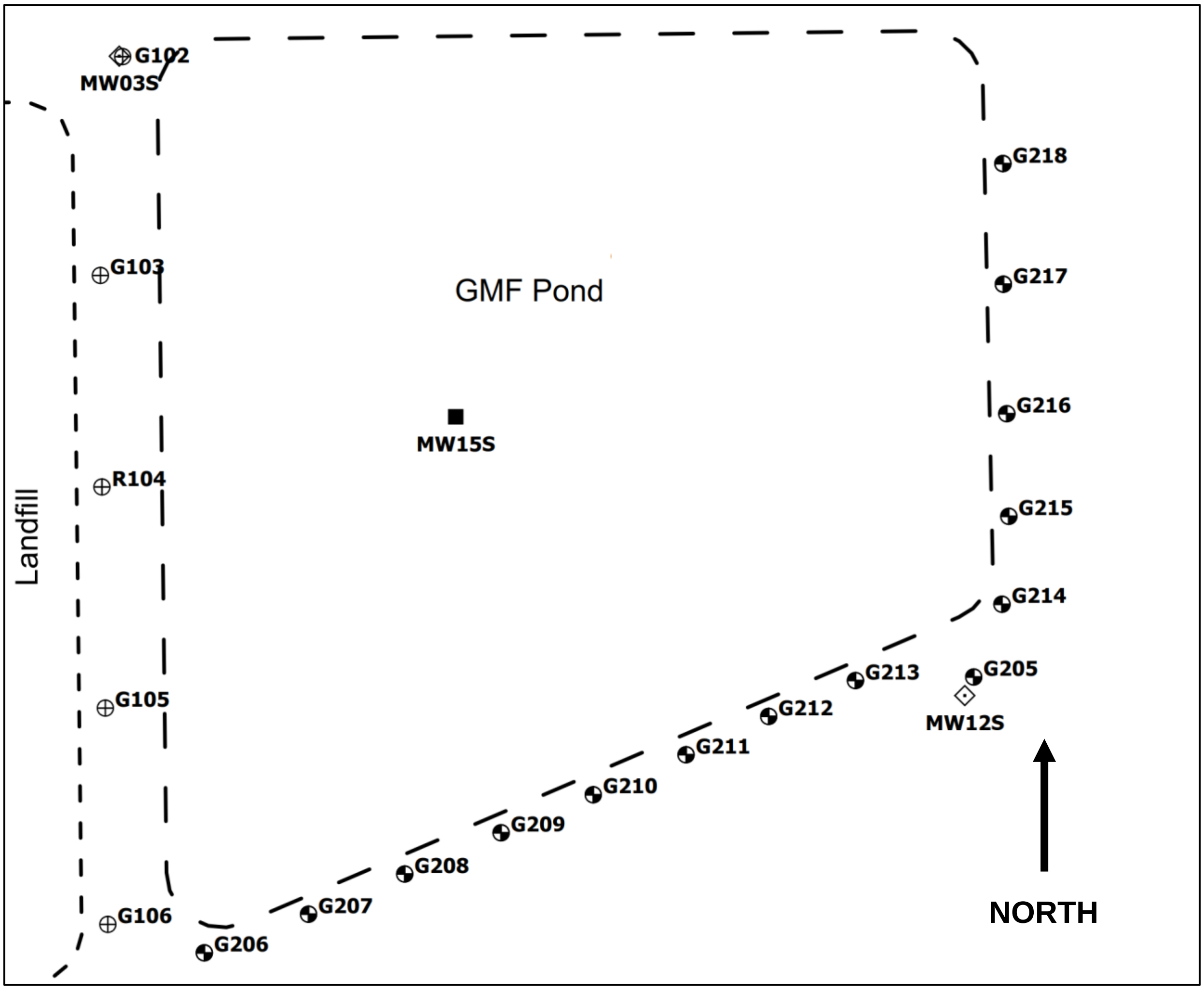


Figure 3 – GMF GSP Monitoring Well Locations
(Not to Scale, adapted from Hanson, 2021)

In summary, groundwater levels in the monitoring well network were observed to be relatively consistent between individual wells. Water levels were typically no more than 1 to 4 ft different between individual wells and seasonal fluctuations were on the order of 1 to 4 ft. Water levels ranged from a low of El. 617 ft to a high of El. 627 ft, resulting in a total fluctuation of 10 ft. These water levels are approximately 1 to 3 ft higher than water levels utilized in the slope stability analyses prepared to support the initial structural stability and safety factor assessments ([4], [5], [8]).

The water levels in the initial assessments were based on cone penetration testing (CPT) pore pressure dissipation (PPD) testing collected at a discrete point in time (August 2015) and are therefore less representative of long-term groundwater trends than the water level data collected from monitoring wells.

2.4 Comparison of Initial to Periodic Surveys

The initial survey of the GMF GSP, conducted at the site by Weaver Consultants (Weaver) in 2015 [10], was compared to the periodic survey of the GMF GSP, conducted by IngenAE, LLC (IngenAE) in 2020 [9], using AutoCAD Civil3D 2021 software. This comparison quantified changes in the volume of CCR placed within the GMF GSP 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 [6]. Potential changes to embankment geometry were also evaluated. This comparison is presented in a side-by-side comparison of the surveys 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 – Initial to Periodic Survey Comparison

Initial Surveyed Pool Elevation (ft)	621.2
Periodic Surveyed Pool Elevation (ft)	625.2
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	621.2
Total Change in CCR Volume (CY)	+74,294
Change in CCR Volume Above SWSE (CY)	+30,006
Change in CCR Volume Below SWSE (CY)	+44,288

The comparison indicated that approximately 74,000 CY of CCR was placed in the GMF GSP between 2015 and 2020, including approximately 30,000 CY above the SWSE, thereby leading to a potential for the peak water surface elevation (PWSE) to increase during the design 1,000-year flood event.

Furthermore, the surveyed pool elevation increased by approximately 4 ft, due to the construction of a berm in the transfer channel. A review of the 2020 survey data indicated the crest elevation of the new berm is approximately 628 ft; this is higher than the periodic surveyed pool level elevation of 625.2 ft. No other significant changes in embankment geometry or other features were noted in the comparison.

2.5 Comparison of Initial to Periodic Aerial Photography

Initial aerial photographs of the GMF GSP collected by Weaver 2015 [10] were compared to periodic aerial photographs collected by IngenAE in 2020 [10] to visually evaluate if potential site changes (i.e., changes to the embankment, outlet structures, limits of CCR, other appurtenances) may have occurred between. A comparison of these aerial photographs is provided in **Drawing 3**, and the following changes were identified:

- The berm in the transfer channel discussed in **Section 2.4** was identified in the channel.

- Minor changes in site conditions outside of the GMF GSP were identified, including the expansion of existing haul roads and the seeding of the GMF GSP exterior embankment near the transfer channel. However, these minor changes are not expected to significantly affect the design and/or operation of the GMF GSP.

2.6 Comparison of Initial to Periodic Site Visits

An initial site visit to the GMF GSP was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [16]. A periodic site visit was conducted by Geosyntec on May 28, 2021, with Mr. Lucas P. Carr, 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, and repairs), in addition to performing visual observations of the GMF GSP to evaluate if the structural stability requirements (§257.73(d)) were still met. The site visit included driving the perimeter of the GMF GSP, periodically stopping to exit the vehicle and visually observe conditions, recording filed notes, and collecting photographs. The site visit is documented in a photographic log provided in **Appendix B**. One significant finding was identified during the periodic site visit and is listed below:

- A berm was constructed in the transfer channel in 2020, as discussed in **Section 2.4**.

2.7 Interview with Power Plant Staff

An interview with Mr. John Romang of CPP was conducted by Mr. Lucas P. Carr, P.E. of Geosyntec on May 28, 2021. Mr. Romang had been, at the time of the interview, employed at CPP for approximately 20 years as the environmental and chemistry manager or supervisor and was responsible for general oversight and compliance for the GMF GSP, including weekly CCR inspections and identifying required repairs. The interview included a discussion of potential changes that may have occurred at the GMF GSP since the development of the initial certifications ([2], [7] [3], [8], [4], [5], [6]). A summary of the interview is provided below.

- Were any construction projects completed for the GMF GSP between 2015 and 2021, and, if so, are design drawings and/or details available?
    - A berm was constructed in the transfer channel between the GMF GSP and the GMF Recycle Pond in 2020 and excess water from the GMF Recycle Pond was pumped into the GMF GSP.
- Were there any changes to the purpose of the GMF GSP between 2015 and 2017?
    - No, outside of plant retirement.

- Were there any changes to the to the instrumentation program and/or physical instruments for the GMF GSP between 2015 and 2021?
  - No instruments are present at the GMF GSP.
- Were there any changes to spillways and/or diversion features for the GMF GSP completed between 2015 and 2021?
  - Yes, the berm was constructed within the GMF GSP transfer channel.
- Have any area-capacity curves been developed for the GMF GSP since 2015?
  - No known curves have been developed.
- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the GMF GSP between 2015 and 2021?
  - No.
- Were there any instances of dike and/or structural instability for the GMF GSP between 2015 and 2021?
  - No known instances occurred.

SECTION 3

HAZARD POTENTIAL CLASSIFICATION - §257.73(A)(2)

3.1 Overview of Initial HPC

The Initial Hazard Potential Classification (Initial HPC) was prepared by Stantec Consulting Services, Inc. (Stantec) in 2016 ([2], [7]), following the requirements of §257.73(a)(2). The Initial HPC included the following information:

- Reviewing a breach analysis prepared by Hanson Professional Services (Hanson) in 2007 [17], as part of the permitting of obtaining a permit to construct the GMF GSP as a regulated dam though the Illinois Department of Natural Resources, Offices of Water Resources (IDNR-OWR).
    - The review indicated that 12 structures were located within an area where the inundation depth was estimated to be 5 ft, including:
        - Eight (8) occupied structures, including seven residential structures, for a breach at the northwest corner of the GMF GSP perimeter dike.
        - Two (2) residential structures for a breach at the east side of the GMF GSP perimeter dike.
        - The CPP plant building, which was frequently occupied, for a breach to at the south side of the GMF GSP perimeter dike.
    - The review also noted that the breach analyses considered the final buildout height of the GMF GSP as a gypsum stack extending approximately 100 ft above the surrounding grades, rather than the current configurations, where the level of CCR and water inf the GMF GSP is approximately equal to surrounding grades.
- While a breach map is not included within the Initial HPC, it included within the §257.73(a)(3) Initial Emergency Action Plan (Initial EmAP) [18].

The breach analysis concluded that a breach of the GMF GSP, at its maximum height, would result in a probable threat to human life at multiple residential and other occupied structures. The Initial HPC therefore recommended a “High” hazard potential classification for the GMF GSP [7].

3.2 Review of Initial HPC

Geosyntec performed a review of the Initial HPC ([2], [7]), in terms of technical approach, input parameters, and assessment of results. The review included the following tasks:

- Reviewing the breach assessment inputs for appropriateness;
- Reviewing the selected HPC for appropriateness based on the results of the breach analysis, including flow velocities and depths;
- Reviewing the HPC vs. applicable requirements of the CCR Rule.

The review noted that the Initial HPC considered ultimate buildout conditions for the GMF GSP, where it extends approximately 100 ft above grade using the upstream method of construction and dikes comprised of CCR, relative to existing conditions where the GMF GSP is essentially at-grade, as discussed in **Section 3.1**. The GMF GSP is unlikely to reach ultimate buildout conditions due to closure of CPP and the cessation of CCR generation. Therefore, the Initial HPC includes a conservative volume of breach material relative to the amount of material than is currently in the pond.

No other significant technical issues were noted in 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

The GMF GSP is currently considered a High hazard potential CCR surface impoundment [2]; this is the highest hazard classification within §257.53 of the CCR Rule [1]. Therefore, the hazard potential classification would not increase if new structures were to be constructed within the existing mapped breach areas, and a visual assessment of these areas was not performed.

3.4 Periodic Hazard Potential Classification

The current hazard potential classification for the GMF GSP, which is “High” per §257.73(a)(2), is considered conservative as the GMF GSP has not reached and is not expected to reach ultimate buildout conditions. The “High” hazard potential classification is conservative and could maintained or could potentially be revised to “Significant” if a revised breach analysis is performed. However, Geosyntec recommends retaining the current “High” hazard potential classification, unless a revised breach analysis is performed to justify a “Significant” hazard potential classification.

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 all CCR surface impoundments at CPP, including AP1, AP2, the GMF GSP, and the GMF Recycle Pond. 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 dike materials,
- Approximate dates and stages of construction,
- Available design and engineering drawings,
- A summary of instrumentation,
- Area-capacity curves for the GMF GSP,
- Information on spillway structures,
- Construction specifications,
- Inspection and surveillance plans,
- Information on operational and maintenance procedures, and
- A statement that no known instability has occurred at the GMF GSP.

4.2 Summary of Site Changes Affecting the Initial HoC

Several significant changes at the site were identified since development of the Initial HOC and required updates to the HoC report. Each change is described below:

- A state identification number (ID) of W1350150004-03 was assigned to the GMF GSP by the Illinois Environmental Protection Agency (IEPA).

- Electricity generation at CPP ceased in 2019 and the GMF GSP is no longer being used to actively store CCR generated by CPP as CCR is no longer being generated. Additionally, the GMF GSP no longer received regular process water inflows our outflows.

- A berm was constructed within the transfer channel between the GMF GSP and GMF Recycle Pond in 2020, as discussed in **Section 2.4**.

- Revised area-capacity curves and spillway design calculations for the GMF GSP were prepared as part of the updated Periodic Inflow Design Flood Control System Plan, as described in **Section 6.3**.

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], following the requirements of §257.73(d)(1), and included the following evaluations:

- Stability of dike foundations, dike abutments, slope protection, dike compaction, and slope vegetation;
- Spillway stability including capacity, structural stability and integrity;
- An evaluation of the effects of liquefaction in the foundation soils using a slope stability analysis considering post-cyclic softening in the foundation soils; and
- An evaluation to determine if downstream water bodies that could induce a sudden drawdown condition to the exterior slopes were present.

The Initial SSA concluded that the GMF GSP met all structural stability requirements for §257.73(d)(1)(i)-(vii).

The Initial SSA referenced the results of the Initial Structural Factor Assessment (Initial SFA) ([5], [8]), 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.

5.2 Review of Initial SSA

Geosyntec performed a review of the Initial SSA ([4], [8]) 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) and sufficiency of dike compaction, per §257.73(d)(1)(iii), in terms of

supporting geotechnical investigation and testing data, input parameters, analysis methodology, selection of critical cross-sections, and loading conditions.

- Review of the methodology used to demonstrate that a downstream water body that could induce a sudden drawdown condition, per §257.73(d)(1)(vii), is not present.

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 Initial SSA

Several changes at the site occurred after development of the Initial SSA were identified. These changes required updates to the Initial SSA. The changes and the recommend 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 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**.

5.4 Periodic SSA

The Periodic SFA (**Section 6**) indicated 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 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 still met for the Periodic SSA.

The updated Periodic IDF (**Section 7**) indicated that spillways are adequately designed and constructed to adequately manage flow during the PMF flood, as the spillway 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.

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 ([5], [8]), following the requirements of §257.73(e)(1). The Initial SFA included the following information:

- A geotechnical investigation program with in-situ testing;
- An assessment of the potential for liquefaction in the dike and foundation soils;
- The development of four (4) slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W software; and
- The analysis of each cross-sections for maximum storage pool, maximum surcharge pool, and seismic loading conditions.
  - Liquefaction (i.e., post-earthquake) loading conditions were analyzed due to the presence of a soft layer in the foundation material that may be susceptible to cyclic softening and/or liquefaction. However, this assessment was utilized to support the Initial SSA rather than the Initial SFA, as liquefaction-susceptible soil layers were not identified in the embankment soils.

The Initial SFA concluded that the GMF GSP 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], [8]) 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; and
  - Input parameters, analysis methodology, selection of critical cross-sections, and loading conditions utilized for slope stability analyses.

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, occurred after development of the Initial SFA ([5], [8]), were identified. These changes required updates to the Initial SFA and are described below:

- The normal pool levels within the GMF GSP increased from 621.2 ft to 625.2 ft, due to the construction of a berm in the transfer channel (**Section 7**), resulting in 4.0 ft of additional water loading on the embankment dikes for the maximum storage pool and seismic loading conditions (§257.73(e)(1)(i) and (iii)), relative to the Initial SFA.

- Peak pool levels in the GMF GSP during the PMP design flood event increased from 623.8 ft to 626.7 ft, per the updated Periodic IDF (**Section 7**), resulting in 2.9 ft of additional water loading on the embankment dikes for the maximum surcharge pool loading conditions (§257.73(e)(1)(iv)), relative to the initial SFA.

- Groundwater levels in foundation soils around the GMF GSP, as measured from the monitoring well network over a multi-year period, were observed to be approximately 1 to 3 ft higher than groundwater levels utilized in the slope stability analyses supporting the Initial SFA (see **Section 2.3**). Therefore, the groundwater levels in the slope stability analysis do not represent long-term trends at the GMF GSP.

6.4 Periodic SFA

Geosyntec revised existing slope stability analyses associated with the Initial SFA ([5], [8]), for the four cross-sections (13+50, 22+50, 46+50, and 58+00) previously evaluated to account for site changes, as described in **Section 6.3**. The following approach and input data were used to revise the analyses:

- Water levels in the GMF GSP for the maximum storage pool, and seismic slope stability analysis loading conditions were increased to El. 625.2 ft in all the cross-sections, based on the Periodic IDF (**Section 7.4)**.

- Water levels in the GMF GSP for the maximum surcharge pool slope stability analysis loading conditions were increased to El. 626.7 ft in al the cross-sections 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. 621.8 to El. 623.3 ft in cross-section 22+50, from El. 623.3 to El. 624.0 ft in cross-section 46+50, and from El. 620.0 to El. 623.0 ft in cross-section 58+00.

- All other analysis input data and settings from the Initial SFA ([5], [8]), 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 GMF GSP 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**	**Foundation Liquefaction §257.73(d)(1)(i) Minimum Required = 1.20**
13+50	3.45*	3.45*	1.6	N/A	2.46
22+50	3.48	3.48	1.45*	N/A	2.39*
46+50	4.17	4.17	1.74	N/A	3.01
58+00	3.57	3.57	1.63	N/A	2.57

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 CONROL 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 ([6], [8]), following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the Probable Maximum Flood design flood event because of the hazard potential classification of "High", which corresponded to 34.25 inches of precipitation over a 24-hour period.

- The Initial IDF utilized a HydroCAD Version 10 [19] model to evaluate spillway flows and pool level increases during the design flood, with a SWSE of 621.2 ft.

The Initial IDF concluded that the GMF GSP met the requirements of §257.82, as the peak water surface estimated by the HydroCAD model was El. 623.8 ft, relative to the minimum GMF GSP dike crest elevation of 631.0 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 unit was not expected, as the GMF GSP does not discharge into waters of the United States and overtopping of the GMF GSP embankments was not expected during the PMF inflow design flood.

7.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([6], [8]) 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 IDF vs. the applicable requirements of the CCR Rule [1].

One comment was identified during review of the Initial IDF. The comment is described below:

- The Initial IDF considered the GMF GSP, but the HydroCAD analysis supporting the Initial IDF did not explicitly consider the downstream GMF Recycle Pond (GMF RP) within the model.

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:

- A berm was constructed in the transfer channel between the GMF GSP and the GMF RP, with a crest elevation of approximately 626 ft, thereby increasing the SWSE in the GMF GSP relative to the Initial IDF.

- Approximately 30,000 CY was placed above the SWSE in the GMF GSP, thereby altering the stage-storage curve relative to the Initial IDF.

7.4 Periodic IDF

Geosyntec revised the Initial IDF to account for the increase in SWSE and additional CCR placement, as described in **Section 7.2** and **7.3**. The following approach and input data were used for the revised analyses: The model was expanded to include the Gypsum Management Facility Recycle Pond (GMF RP) pond and its drainage area.

- The drainage area to the GMF RP was modeled as a subcatchment and assigned an area of 18.3 ac per the 2020 site survey [9]. It was assigned a Curve number (CN) of 98 and a time of concentration of 6 min (direct inflow).

Table 4 – GMF RP Culvert Attributes in Periodic IDF

Parameter	Value
Orifice/Grate	
Invert Elevation (ft)	624.0
Discharge Coefficient	0.6
Orifice Width (in)	60
Orifice Length (in)	60
Culvert	
Inlet Elevation (ft)	615.0
Crest Breadth (ft)	1.0
Outlet Elevation (ft)	613.0
Length (ft)	92.0
Diameter (in)	45
Manning’s n	0.013
Entrance Loss Coefficient	0.5
Contraction Coefficient	0.9

- The GMFR Pond was modeled as a pond with three identical emergency spillway outlets.
    - The outlets were modeled as horizontal orifices routed to culverts, with attributed listed in **Table 4**.
- The routing method for the model was updated to account for routing between the ponds. 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 stage-storage curve was updated for both the GMF GSP and GMF RP Ponds based on the 2020 site survey [9].
    - Revised stage-volume curves for the GMF RP and GMF GSP were prepared based on measuring the storage volume of the GMF RP and GMF GSP at every one-foot increment of depth from an elevation at the bottom of the ponds (621.1 ft for GMF GSP; 604.9 ft for GMF RP) to the approximate minimum perimeter dike embankment crest elevation (632 ft for GMF GSP; 629 ft for GMF RP). This analysis identified an overall decrease of 9.67 ac-ft of storage volume at the GMF GSP from the storage used in the 2016 Initial IDF Certification.
- The subcatchment area draining to the GMF GSP was updated from 33.8 ac to 36.2 ac to reflect the 2020 site survey [9].
- The time of concentration (ToC) for drainage areas to the GMF GSP was updated from 5 minutes to 6 minutes to reflect direct run-on inflow in accordance with TR-20 [20].
- The SWSE within the GMF GSP was updated from 621.2 ft to 625.2 ft to reflect the water surface elevation from 2020 site survey [9].
- The SWSE in the GMF RP was assumed to be El. 622.1 ft, based on the Updated IDF for the GMF RP [21].
- The GMF GSP and transfer channel geometry were updated to reflect the new berm at the inlet to the transfer channel.
    - The outlet invert from the GMF Pond to the transfer channel between the GMF Pond and the GMFR Pond was raised from 625 ft to 626 ft per the 2020 site survey [9]. The geometry of the outlet was updated based on the 2020 site survey, as listed in **Table 5**.

Table 5 – GMF GSP Outlet Geometry in Periodic IDF

Head (ft)	Channel Width (ft)
0	45
2	60
4	75

- The transfer channel geometry was updated based on the 2020 site survey, as listed in **Table 6**.

Table 6 – GMF GSP Transfer Channel Geometry in Periodic IDF

Parameter	Value
Bottom Width (ft)	32.7
Channel Depth (ft)	6
Left Side Slope	3
Right Side Slope	1.6
Channel Length (ft)	450

- The three outlet structures in the GMF RP were updated from 24 ft broad-crested weirs to horizontal, rectangular orifices with dimensions of 5 ft by 5 ft to reflect the riser structures existing on site. The inlet elevation of the orifices was set to 624 ft per the initial certification reports for the GMF RP ([22], [23]).

The results of the Periodic IDF are summarized in **Table 7** and confirm that the GMF GSP meets the requirements of §257.82(a)-(b), as the peak water surface elevation does not exceed the minimum perimeter dike crest elevations, as long as the SWSE in the GMF GSP is maintained at El. 625.2 ft or lower. Additionally, all discharge from the GMF GSP is routed through the existing spillway system to the GMF RP during both normal and IDF conditions. Updated area-capacity curves and HydroCAD model output are provided in **Attachment E**.

Table 7 – Water Levels from Updated Periodic IDF

Analysis	Starting Water Surface Elevation (ft)	Peak Water Surface Elevation (ft)	Minimum Dike Crest Elevation (ft)
Initial IDF	621.2	623.8	631.0
Periodic IDF Update	625.2	626.7	632.0
Initial to Periodic Change[1]	+4.0	+2.9	

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 GMF GSP at CPP was evaluated relative to the USPEPA 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)),
- 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, Coffeen Power Plant, GMF Gypsum Stack Pond

I, Lucas P. Carr, 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.

Lucas P. Carr

10/11/2021

Date

LICENSED PROFESSIONAL ENGINEER
LUCAS PHILIP CARR
062066694
STATE OF ILLINOIS
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 Potential Classification Assessment, EPA Final CCR Rule, GMF Pond, Coffeen Power Station, Montgomery County, Illinois," Fenton, MO, October 12, 2016.

[3] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR §257.73(c), Coffeen Power Station, Coffeen, Illinois," October 2016.

[4] AECOM, "CCR Rule Report: Initial Structural Stability Assessment for GMF Pond At Coffeeen Power Station," St. Louis, MO, October 2015.

[5] AECOM, "CCR Rule Report: Initial Safety Factor Assessment for GMF Pond at Coffeen Power Station," St. Louis, MO, October 2016.

[6] AECOM, "CCR Rule Report: Initial Inflow Design Flood Control System Plan for GMF Pond at Coffeen Power Station," St. Louis, MO, October 2016.

[7] Stantec Consulting Services, Inc., "Documentation of Initial Hazard Potential Classification Assessment, GMF Pond, Coffeen Power Station, Montgomery County, Illinois," October 12, 2016.

[8] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for GMF Pond at Coffeen Power Station," St. Louis, MO, October 2016.

[9] IngenAE, "Luminant, Illinois Power Generating Company, Coffeen Power Station, December 2020 Topography," February 26, 2021.

[10] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 - Coffeen Topography," December 1, 2015.

[11] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Coffeen Power Station, Gypsum Stack Pond*, January 18, 2017.

[12] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Coffeen Power Station, Gypsum Stack Pond*, February 7, 2018.

[13] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer*, *Coffeen Power Station*, *Gypsum Stack Pond*, November 30, 2019.

[14] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer*, *40 CFR §257.83(b), Coffeen Power Station, Gypsum Stack Pond*, January 8, 2020.

[15] J. Knutelski, *Annual Inspection by a Qualified Professional Engineer*, *40 CFR §257.83(b), Coffeen Power Station, Gypsum Stack Pond*, January 6, 2021.

[16] AECOM, "Initial Site Visit CCR Unit Summary, Dynegy CCR Compliance Program, Coffeen Power Station - GMF Gypsum Stack Pond," September 28, 2015.

[17] Hanson Professional Services, Inc., "Breach Analysis for Coffeen Gypsum Stack Dam," 2007.

[18] Stantec Consulting Services, Inc., "Illinois Power Generating Company, Coffeen Power Station, Montgomery County, Illinois, Emergency Action Plan (EAP)," Fenton, MO, April 13, 2017.

[19] HydroCADTM Software Solutions, LLC, "HydroCADTM Stormwater Modeling System, Version 10," Chocorua, New Hampshire, 2016.

[20] National Resoruce Conservation Service, U.S. Department of Agriculture, "WinTR-20 Project Formulation Hydrology," 2021.

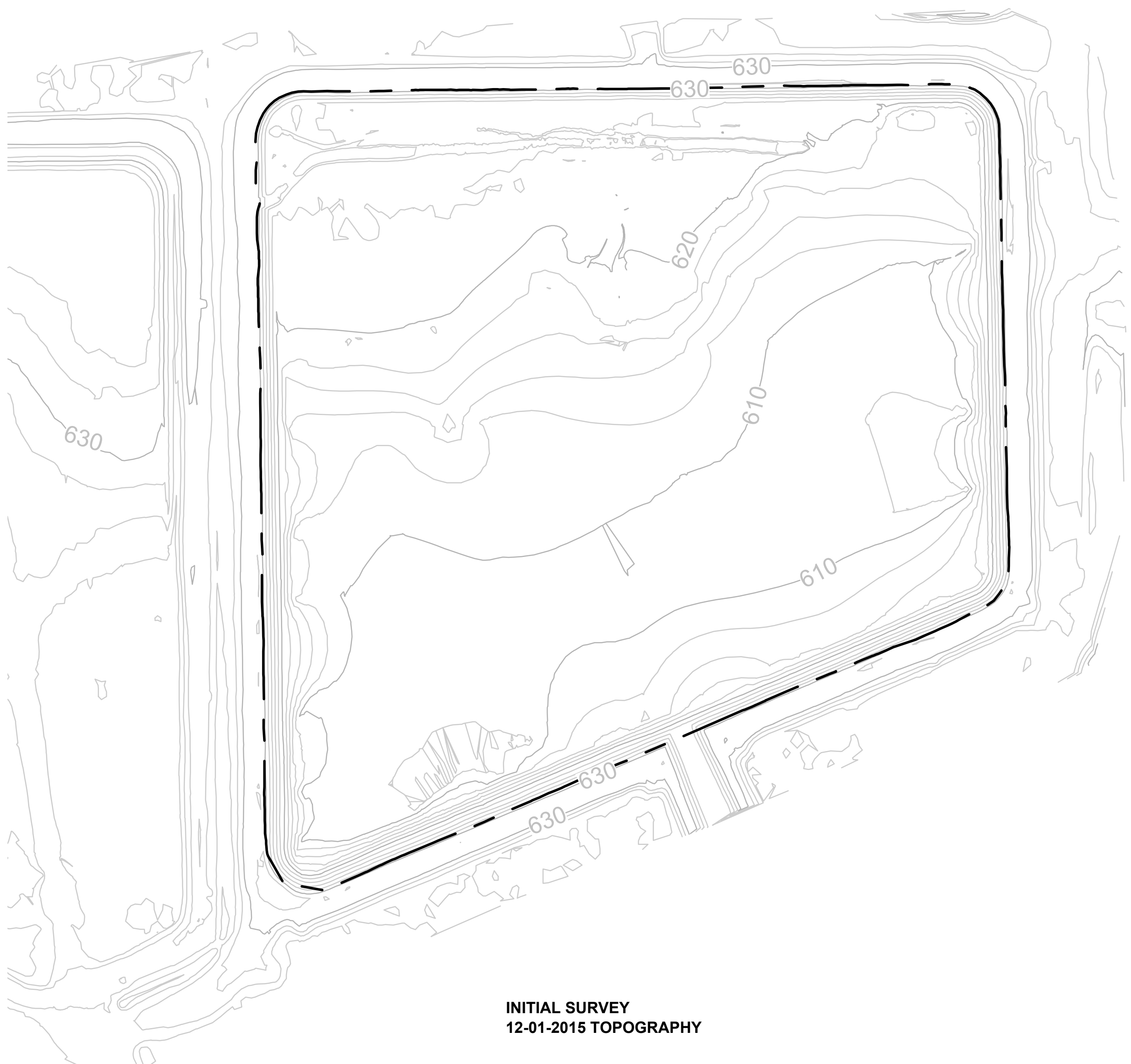
[21] Geosyntec Consultants, "Final Draft 2021 USEPA CCR Rule Periodic Certification Report, §257.73(a)(2), (c), (d), (e), and §257.82, Ash Pond No. 1, Coffeen Power Plant, Coffeen Illinois," Chesterfield, Missouri, September, 2021.

[22] Hanson Professional Services, Inc., "CCR Rule Report: Initial Inflow Design Flood Control System Plan, GMF Recycle Pond, Coffeen Power Station, Montgomery County, Illinois," October 2016.

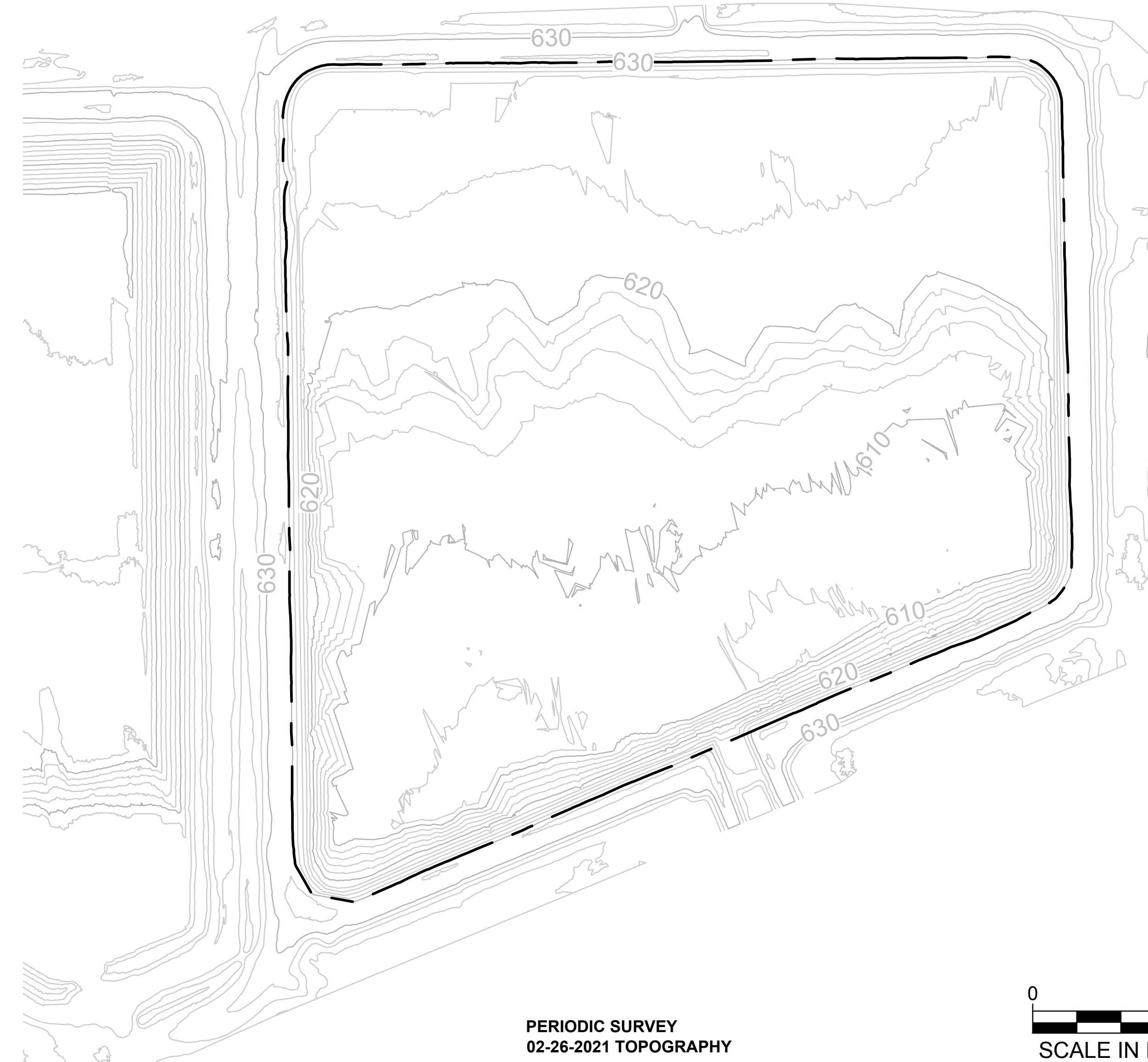
[23] Hanson Professional Services, Inc., "CCR Documentation Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan, GMF Recycle Pond, Coffeen Power Station, Montgomery County, Illinois," October 2016.

DRAWINGS

N



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 - COFFEEN 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, COFFEEN 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
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

Geosyntec consultants

DRAWING

1

GLP8027.02

MAY 2021

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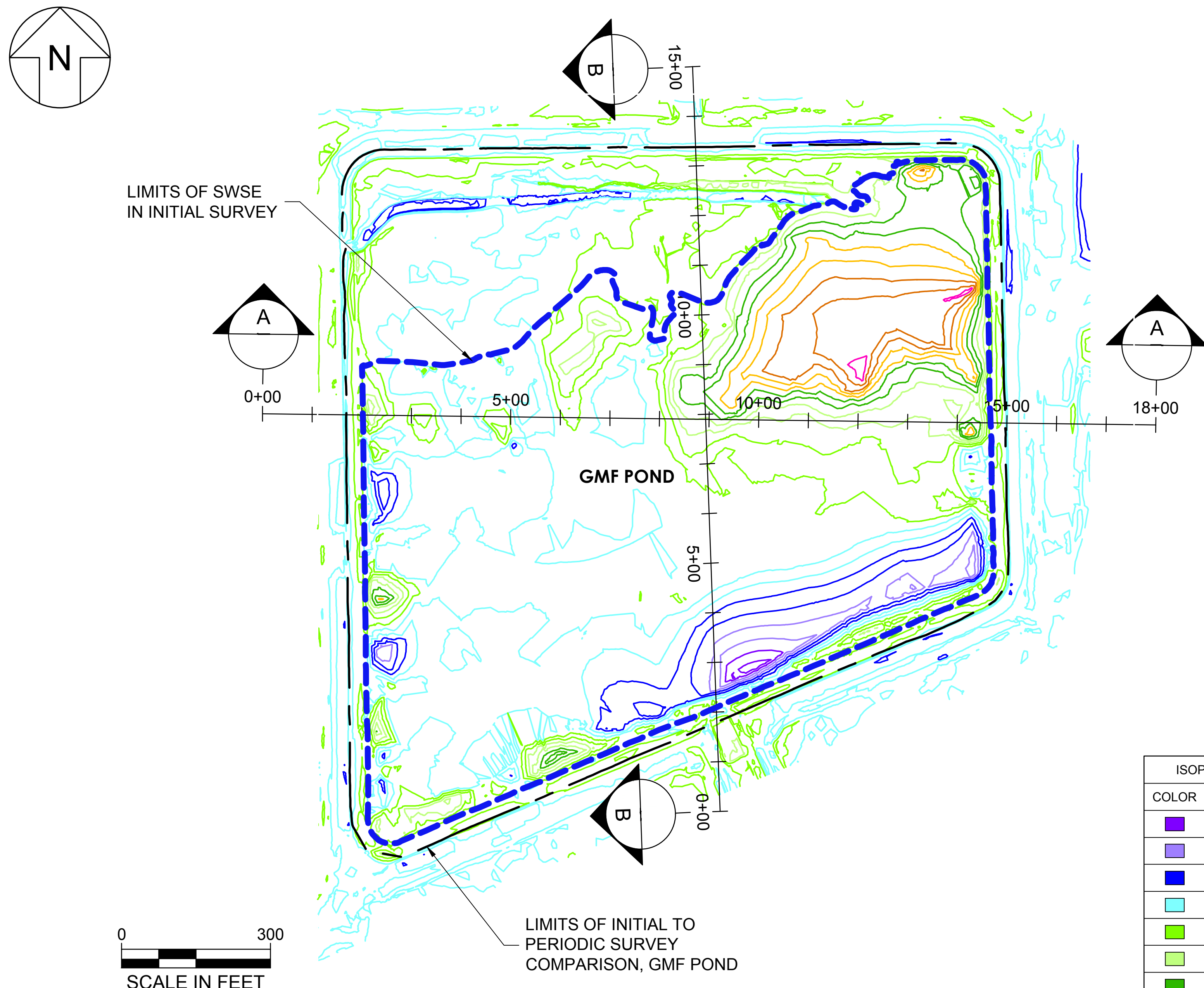

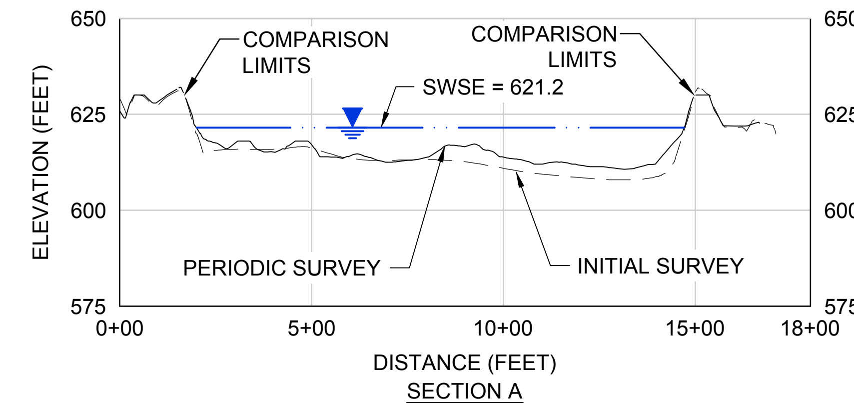

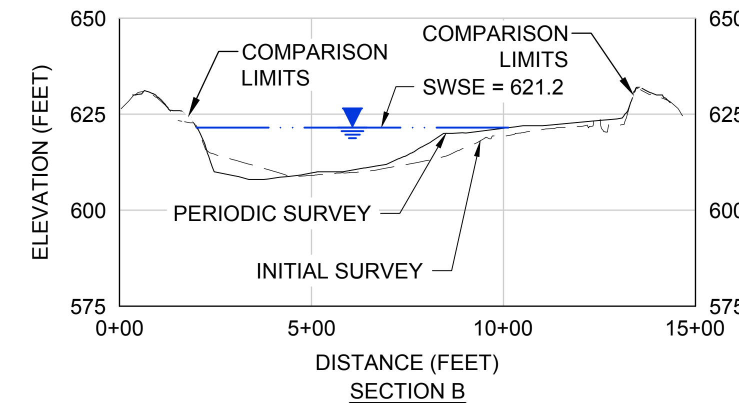

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	-4	-2
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	2	4
	4	6
	6	8
	8	10
	10	11

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - COFFEEN 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, COFFEEN 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 GMF POND IS EL. 621.2 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 GMF POND AT COFFEEN POWER STATION”, PREPARED BY AECOM, DATED OCTOBER, 2016.

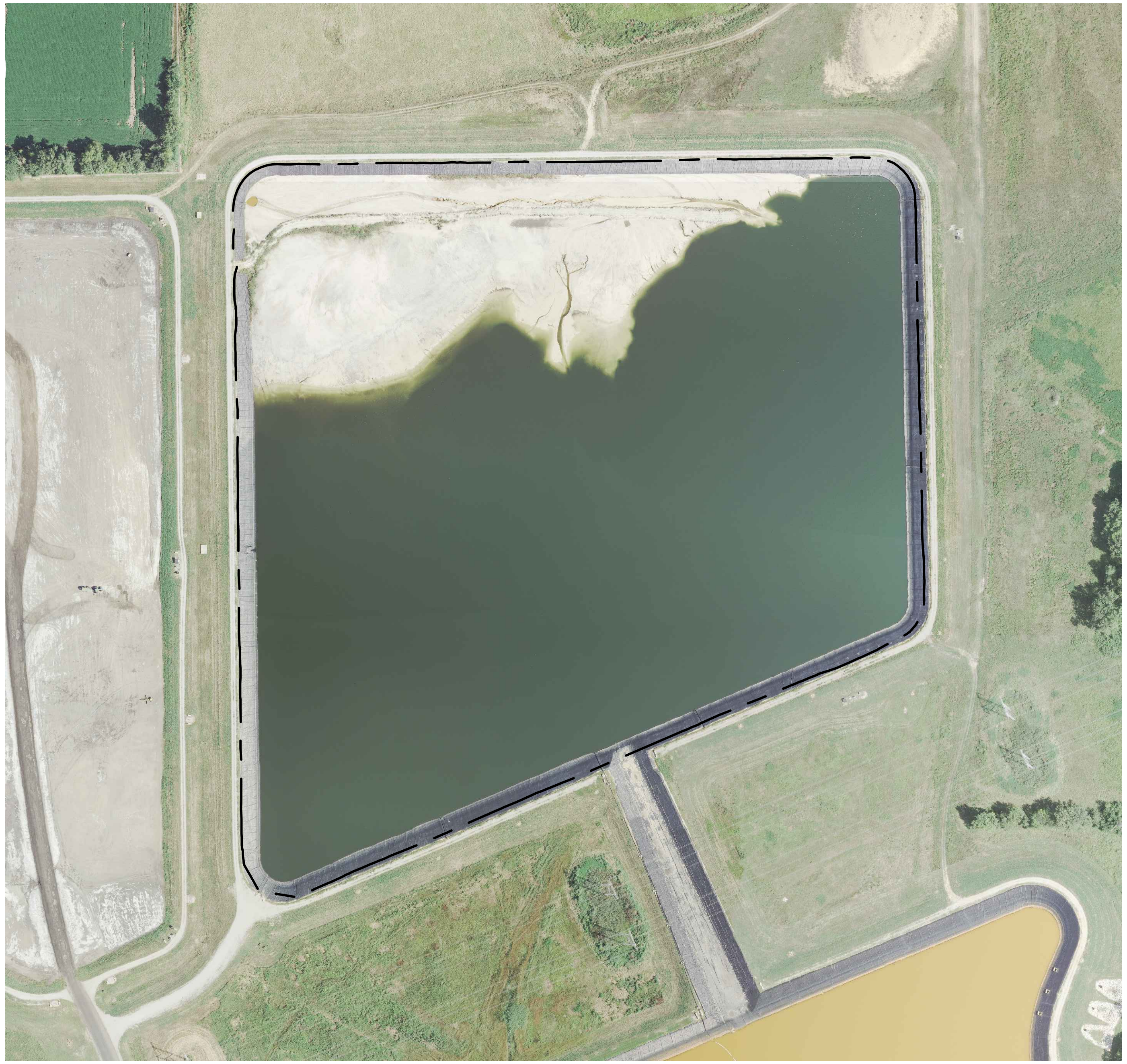
INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY			
	CUT	FILL	NET (CU. YD.)
GMF POND	20,320	94,614	74,294 (FILL)
ABOVE SWSE	2,168	32,174	30,006 (FILL)
BELOW SWSE	18,152	62,440	44,288 (FILL)

SURVEY COMPARISION ISOPACH
GMF GYPSUM STACK POND
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

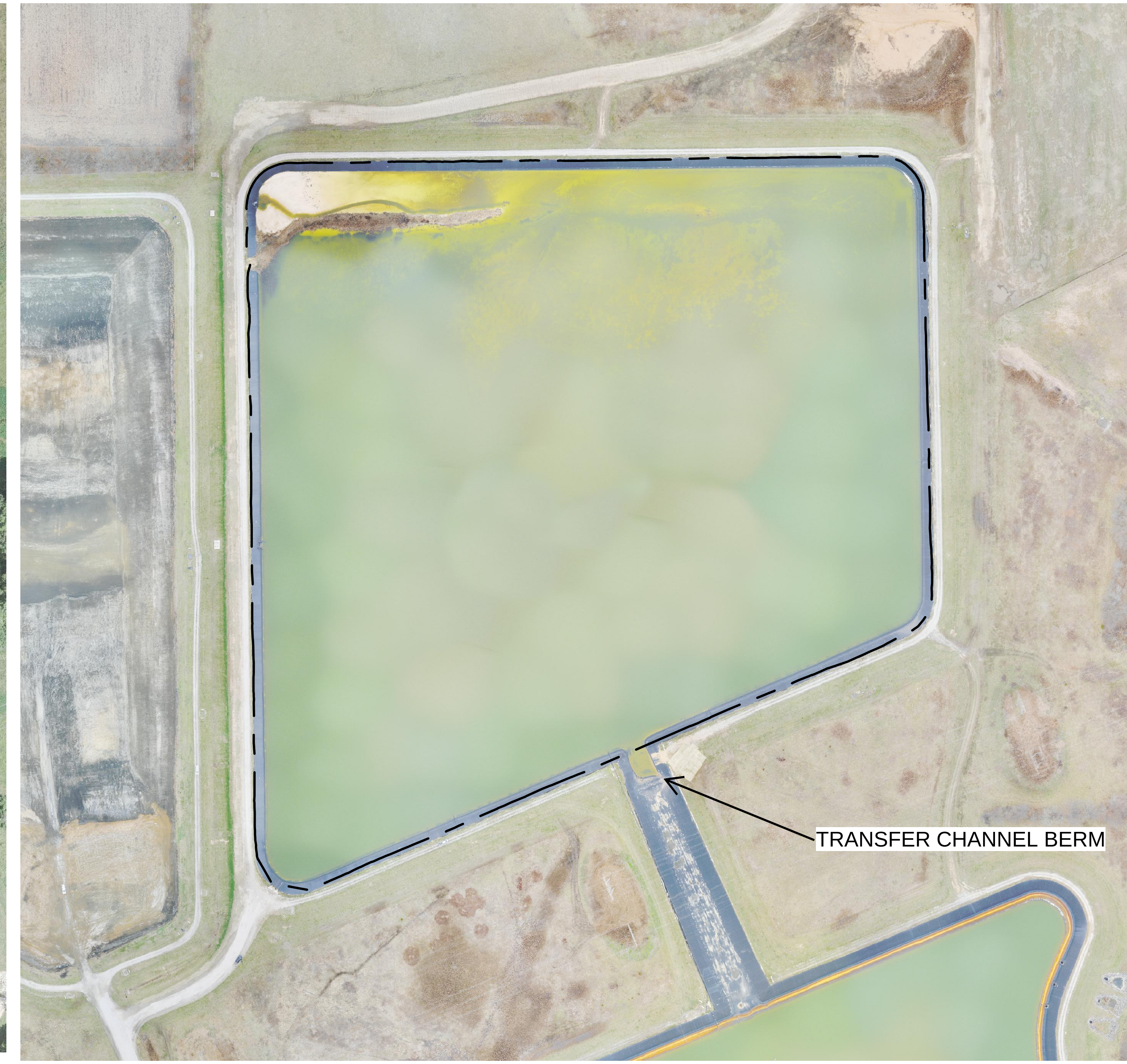
Geosyntec consultants

DRAWING 2

GLP8027.02 | MAY 2021



INITIAL AERIAL
12-01-2015 IMAGERY



PERIODIC AERIAL
02-26-2021 IMAGERY

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NOTES:

1. THE INITIAL IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED “DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - COFFEEN 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, COFFEEN POWER STATION, DECEMBER 2020 TOPOGRAPHY”, PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.

INITIAL TO PERIODIC AERIAL IMAGERY COMPARISON GMF GYPSUM STACK POND COFFEEN POWER STATION COFFEEN, ILLINOIS		
Geosyntec consultants		DRAWING 3
GLP8027.02	MAY 2021	

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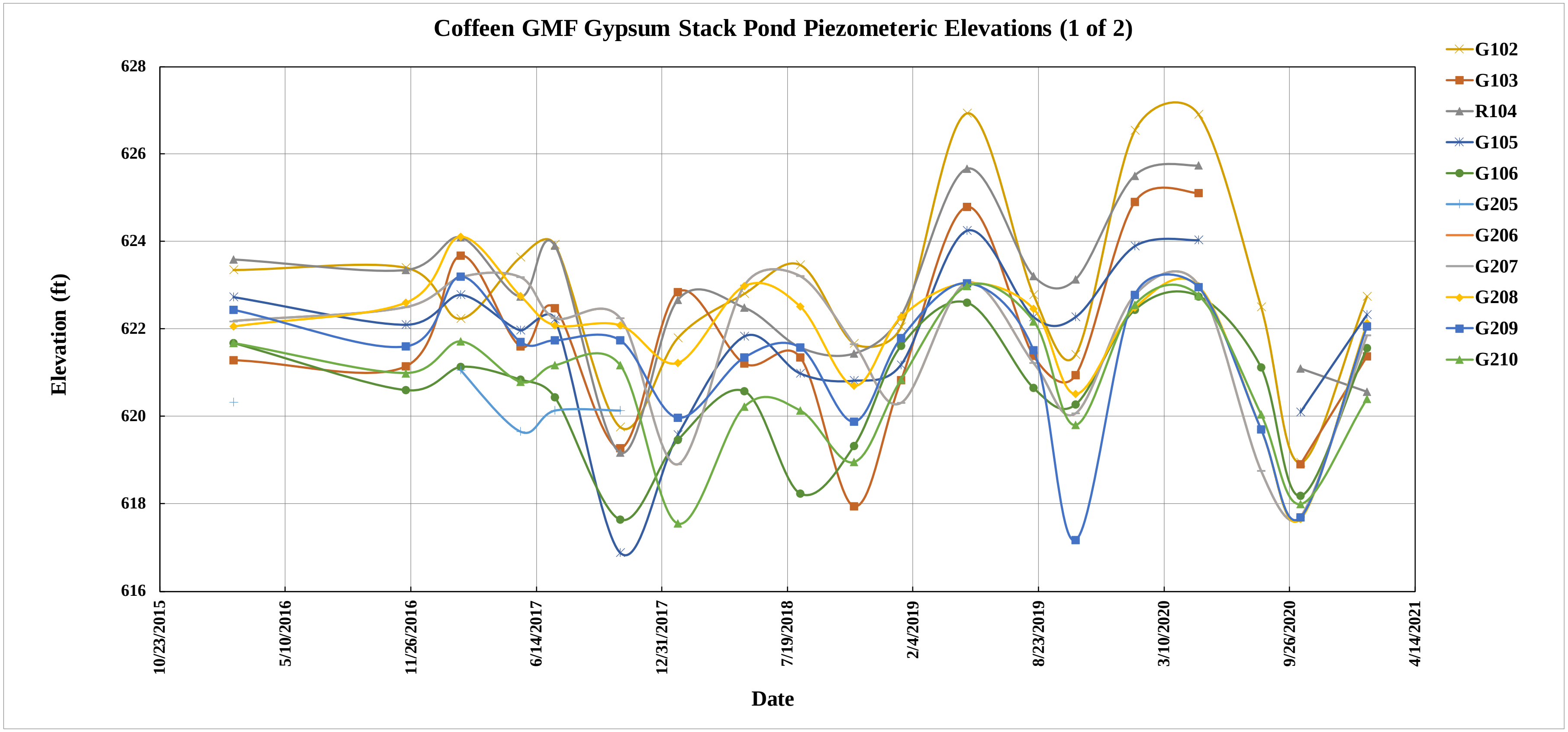
ATTACHMENTS

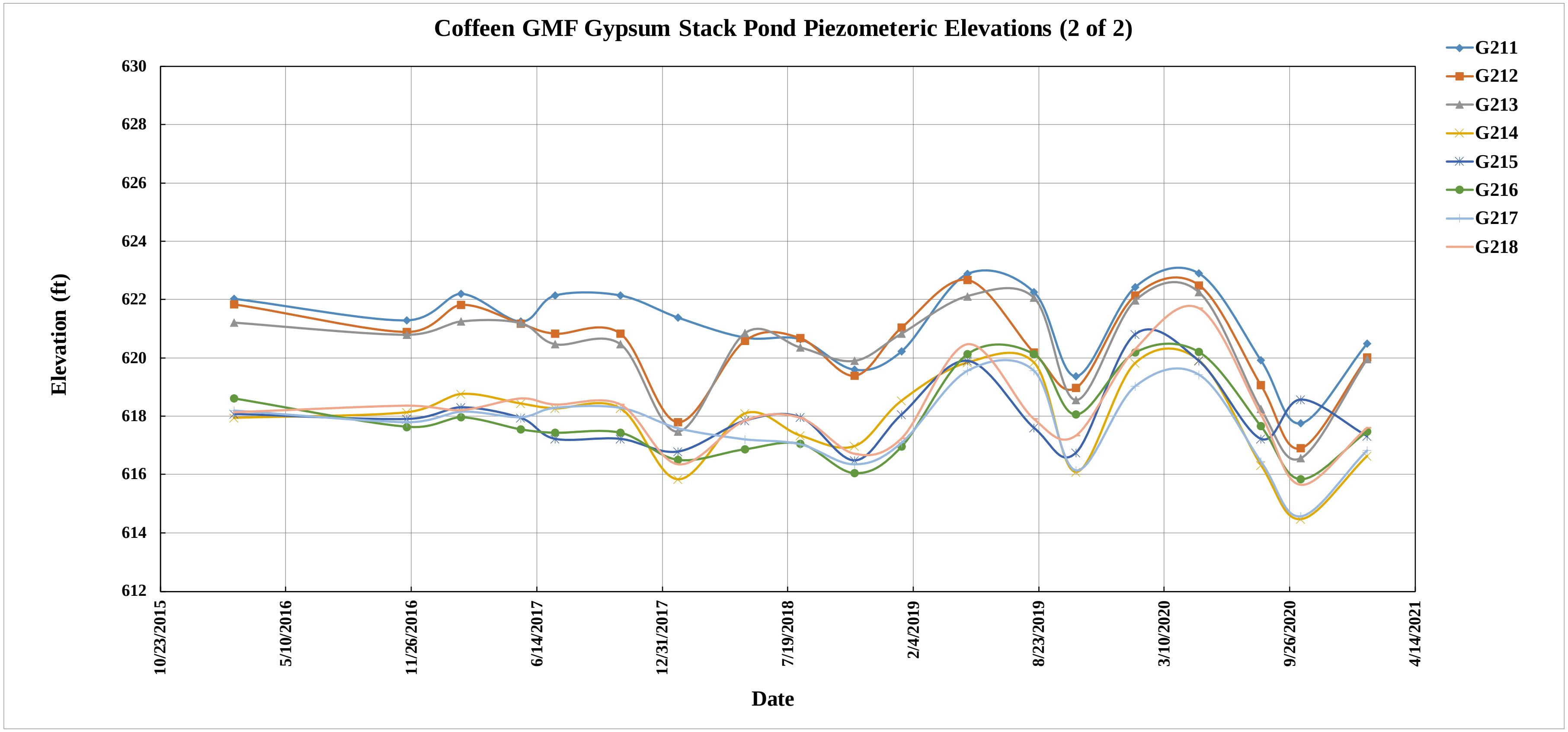
Attachment A

GMF GSP Phreatic Data Plots



NOTES:
1. Piezometer data was taken from the spreadsheets titled " Coffeen GW 1017", " Coffeen GW 1018", " Coffeen GW 1019", " Coffeen GW 1020", " Coffeen GW 1021", provided by the Coffeen Power Plant.

PIEZOMETER DATA PERIODIC CERTIFICATION, GMF GSP COFFEEN POWER PLANT COFFEEN, ILLINOIS		
Geosyntec consultants		Figure A-1
GLP8027	7/8/2021	



NOTES:
1. Piezometer data was taken from the spreadsheets titled " Coffeen GW 1017", " Coffeen GW 1018", " Coffeen GW 1019", " Coffeen GW 1020", " Coffeen GW 1021", provided by the Coffeen Power Plant.

PIEZOMETER DATA PERIODIC CERTIFICATION, GMF GSP COFFEEN POWER PLANT COFFEEN, ILLINOIS		
Geosyntec consultants		Figure A-2
GLP8027	7/8/2021	

Attachment B

GMF Gypsum Stack Pond Site Visit Photolog

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 01

Date: 05/28/2021

Direction Facing: SE

Comments: Berm installed in the transfer channel to reduce the water level in the downstream GMF Recycle Pond.

Photo: 02

Date: 05/28/2021

Direction Facing: W

Comments: Southwestern interior slopes.

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Illinois Power Generating Company **Project Number:** GLP8027

CCR Unit: GMF Gypsum Stack Pond (GMF GSP) **Site:** Coffeen Power Plant

Photo: 07

Date: 05/28/2021

Direction Facing:
N

Comments:
West dike exterior slope. Note leachate valve sump.

Photo: 08

Date: 05/28/2021

Direction Facing:
NE

Comments:
Gypsum discharge pipes.

GEOSYNTEC CONSULTANTS

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 09

Date: 05/28/2021

Direction Facing: E

Comments: North dike exterior overview

Photo: 10

Date: 05/28/2021

Direction Facing: E

Comments: North dike interior overview

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 11

Date: 05/28/2021

Direction Facing: NE

Comments: North dike exterior overview

Photo: 12

Date: 05/28/2021

Direction Facing: S

Comments: East dike interior overview

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 13

Date: 05/28/2021

Direction Facing: S

Comments: East dike exterior overview.

Photo: 14

Date: 05/28/2021

Direction Facing: S

Comments: Southeast corner interior overview

Geosyntec consultants

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 15

Date: 05/28/2021

Direction Facing: SE

Comments: Southeast corner exterior overview

Photo: 16

Date: 05/28/2021

Direction Facing: N

Comments: Area where geomembrane has bulged slightly due to air.

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: GMF Gypsum Stack Pond (GMF GSP)	**Site:** Coffeen Power Plant

Photo: 17

Date: 05/28/2021

Direction Facing:
E

Comments:
Southeast embankment exterior overview

Photo: 18

Date: 05/28/2021

Direction Facing:
E

Comments:
Southeast embankment interior overview

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 11, 2021

Illinois Power Generating Company
134 Cips Lane
Coffeen, Illinois 62017

Subject: Periodic History of Construction Report Update Letter
USEPA Final CCR Rule, 40 CFR §257.73(c)
Coffeen Power Plant
Coffeen Illinois

At the request of Illinois Power Resources Generation Company (IPRG), Geosyntec Consultants (Geosyntec) has prepared this Letter to documents updates to the Initial History of Construction (HoC) report for the Coffeen Power Plant (CPP), also known as the Coffeen Power Station (COF). 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 CPP, which included four existing CCR surface impoundments, Ash Pond No. 1 (AP1), Ash Pond No. 2 (AP2), the GMF Gypsum Stack Pond (GMF GSP, also known as the GMF Pond), and the GMF Recycle Pond (GMF RP), 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).

IPRG retained Geosyntec to review the Initial HoC report, review reasonably and readily available information for AP1, AP2, the GMF GSP, and the GMF RP generated since the Initial HoC report was prepared, and perform a site visit to CPP 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 AP1, AP2, the GMF GSP, and the GMF RP, as they pertain the requirements of §257.73(c)(1)(i)-(xii).

UPDATES TO HISTORY OF CONSTRUCTION REPORT

Geosyntec's evaluation for the CPP AP1, AP2, GMF GSP, and GMF RP determined that no known significant changes requiring updates to the information in the Initial HoC report pertaining to §257.73(c)(1)(ii), (iv), (v), (vi), (vii), (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 CPP AP1, AP2, GMF GSP, and GMF RP, pertaining to §257.73(c)(1)(i), (iii), (viii), (ix), 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>Ash Pond No. 1</u>

The AP1 was in operation from 1964 until CPP was retired in 2019 and received CCR for approximately 55 years. As of the date of this report, the AP1 has been present for approximately 57 years [4].

CCR placed in the AP1 included bottom ash [4].

<u>Ash Pond No. 2</u>

The AP2 was in operation from 1971 to 1984, for a total of approximately 13 years. The AP2 was closed in 1984-1985 by installing a clay cover and has not since been active or received CCR. As of the date of this report, AP2 has been present for approximately 50 years. [4].

CCR placed in the AP2 was used to store and dispose of fly ash and bottom ash [4].

GMF Gypsum Pond

The GMF GSP was in operation from 2010 until CPP was retired in 2019 and received CCR for approximately 9 years. As of the date of this report, the GMF GSP has been present for a total of approximately 11 years [4].

CCR placed in GMF GSP included gypsum [4].

GMF Recycle Pond

The GMF RP was in operation from 2010 until CPP was retired in 2019, for a total of 9 years [4]. As of the date of this report, the GMF RP has been present for approximately 11 years.

§ 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.

State identification numbers (IDs) for AP1, AP2, the GMF GSP, and the GMF RP have been assigned by the Illinois Environmental Protection Agency (IEPA). Each ID is listed in **Table 1**.

Table 1 – IEPA ID Numbers

CCR Surface Impoundment	State ID
Ash Pond No. 1 (AP1)	W1350150004-01
Ash Pond No. 2 (AP2)	W1350150004-02
GMF Gypsum Stack Pond (GMF GSP)	W1350150004-03
GMF Recycle Pond (GMF RP)	W1350150004-04

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

AP2 was closed in 2020, in substantial compliance with the written closure plan posted to IPRG's CCR Website [5], and as documented by a certified Notification of Completion of Closures posted to DMG's CCR Website [6].

The CPP was retired in December of 2019, with the generation of electricity ceased at that time. Therefore, AP1, the GMF GSP, and the GMF RP are no longer being used to store and dispose of new CCR that is actively generated by CPP, as CCR generation as ceased. All three impoundments still contain CCR and liquids that was present at the time of plant retirement. The GMF RP also previously received dewatering discharge from AP2; this inflow was ceased after AP2 was closed in 202.

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

Instrumentation monitoring at AP2 is no longer required as the CCR surface impoundment was closed in accordance with §257.102 [6], and the instrumentation network was modified at that time. Therefore, the instrumentation locations shown in Appendix C of the Initial HoC report are no longer applicable to AP2.

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

Updated area-capacity curves were prepared for AP1, the GMF GSP, and the GMF RP in 2021 and are provided in **Figures 1**, **2**, and **3**, respectively.

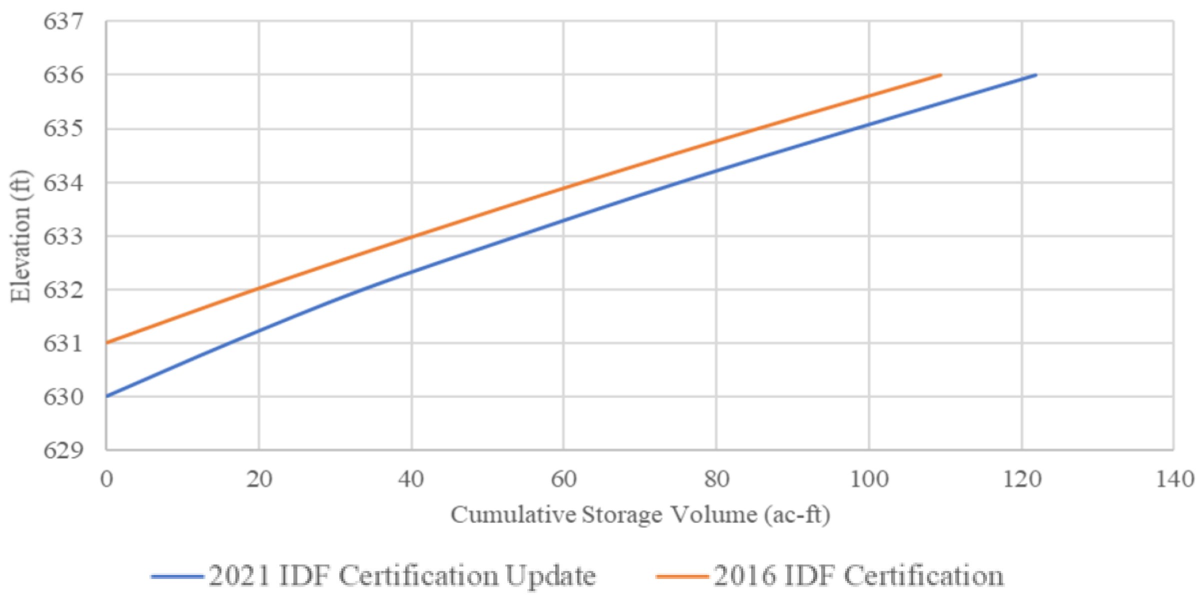


Figure 1 – Area-Capacity Curve for AP1

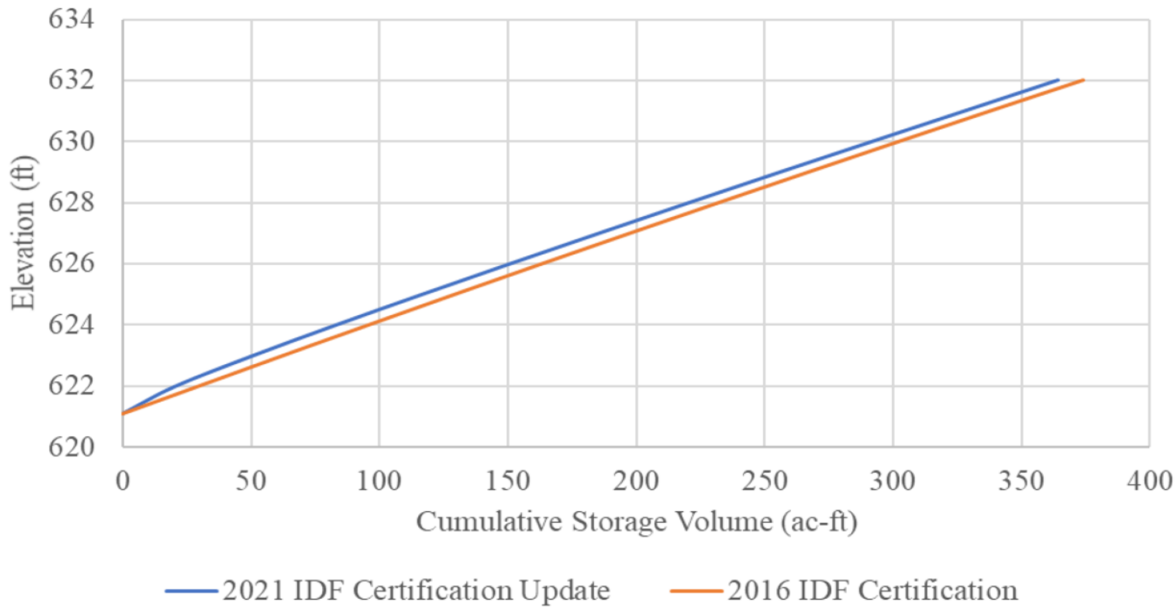


Figure 2 – Area-Capacity Curve for GMF GSP

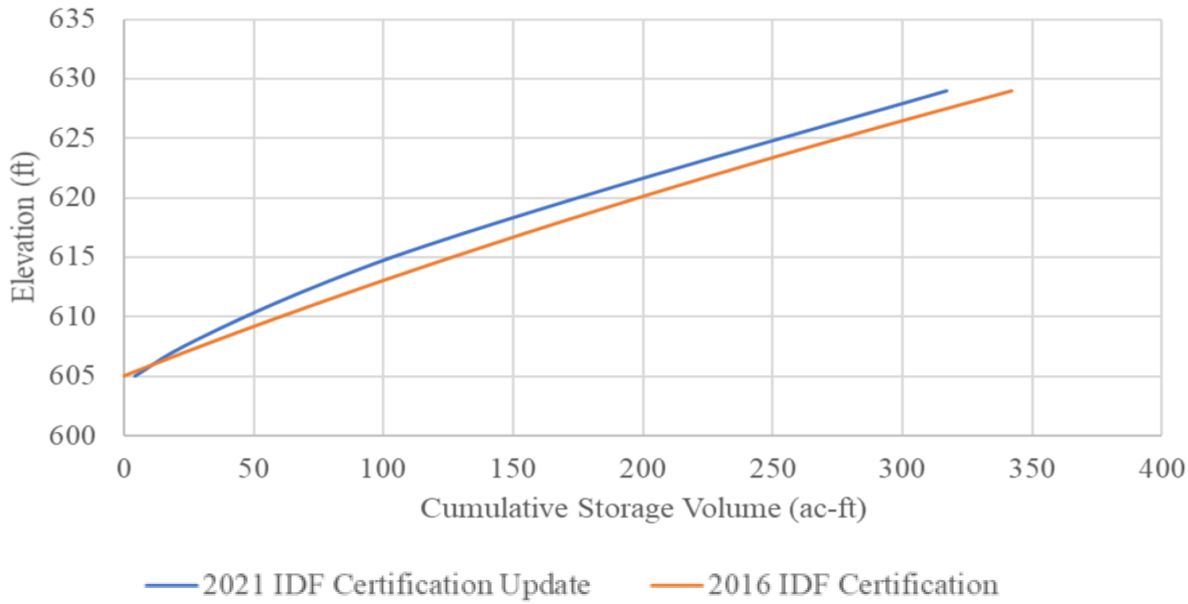


Figure 3 – Area-Capacity Curve for GMF RP

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

The primary spillway structure for AP1 was modified in 2020 by constructing a berm of bottom ash around the entrance to the spillway, to reduce the potential for freezing around the spillway during post-CPP closure conditions, with a berm crest elevation of approximately 630 ft. Design drawings for the bottom ash berm are not reasonably or readily available.

The transfer channel between the GMF GSP and the GMF RP was modified in 2020 by constructing a geomembrane-lined berm, in order to allow the normal pool level of the GMF GSP to be increased. Design drawings for the berm are not reasonably or readily available. However, survey data [3] indicates the berm has an elevation of approximately 628 ft, a top width (perpendicular to the flow direction) of approximately 75 ft, a total length (parallel to the flow direction) of 25 ft, and side slopes of approximately 4 horizontal to 1 vertical.

Valves were installed on the intake pipes for the GMF RP after the CPP was closed and plant process water intake pumping was ceased. Design drawings for these valves are not reasonably or readily available.

Updated discharge capacity calculations for the existing spillways of AP1, the GMF GSP, and the GMF RP were prepared in 2021 using HydroCAD 10 modeling software. The calculations indicate that the AP1 and the GMF RP have sufficient storage capacity and will not overtop the embankments during the 1,000-year, 24-hour, storm event. The calculations also indicate that the GMF GSP 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

	AP1	GMF GSP	GMF RP
Approximate Berm Minimum Elevation[1], ft	636.0	632.0	629.0
Approximate Emergency Spillway Elevation[1], ft	Not Present	Not Present	624.0
Starting Water Surface Elevation[1] (SWSE), ft	630.2	625.2	622.1
Peak Water Surface Elevation[1] (PWSE), ft	631.4	626.7	623.9
Time to Peak, hr	No Discharge	10.6	No Discharge
Surface Area[2], ac	18.1	34.8	16.1
Storage[3], ac-ft	19.5	52.9	29.0

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

AP2 no longer retains free water as the CCR surface impoundments was closed in 2020 [6]. Therefore, the spillways are no longer present and the information regarding these structures, as presented in the Initial HoC report, is no longer applicable to AP2.

CLOSING

This letter has been prepared to document Geosyntec's evaluation of changes that have occurred at AP1, AP2, the GMF GSP, and the GMF RP since the Initial HoC was developed, based on reasonably and readily available information provided by IPRG, observed by Geosyntec during the site visit, or generated by Geosyntec as part of subsequent calculations.

Sincerely,

Lucas P. Carr, 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), Coffeen Power Station, Coffeen, 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.

[4] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Hennepin Power Station, Hennepin, Illinois," October 2016.

[5] V. Modeer, "Closure Plan for Existing CCR Surface Impoundment, Coffeen Power Station, Illinois Power Generating Company, Ash Pond No. 2," October 17, 2016.

[6] D. Tickner, "Coffeen Power Station; Ash Pond No. 2; Notification of Completion of Closure," December 17, 2020.

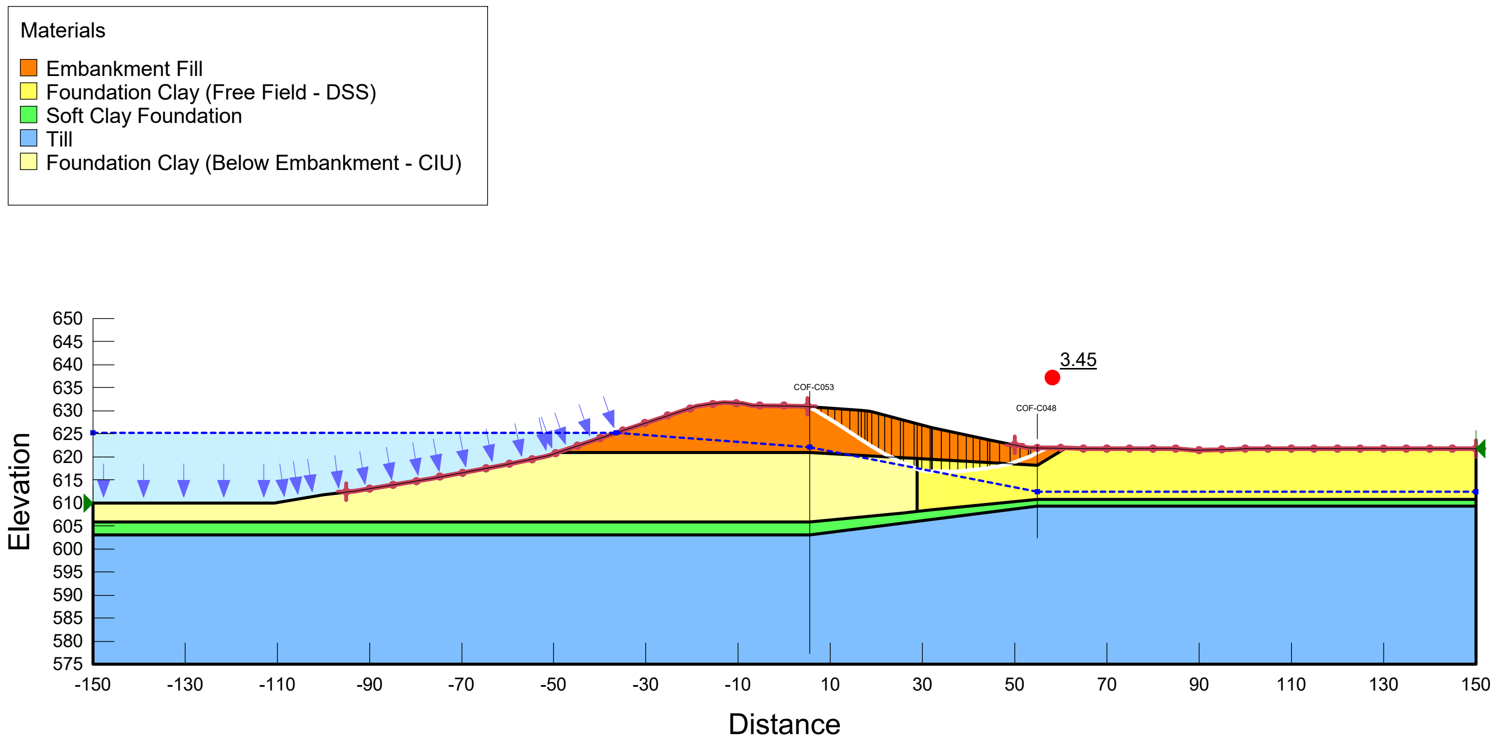
Attachment D

Periodic Structural Stability and Safety Factor Assessment Analyses

Coffeen Power Plant
GMF Gypsum Stack Pond
Station 13+50
Slope Stability - Static Drained

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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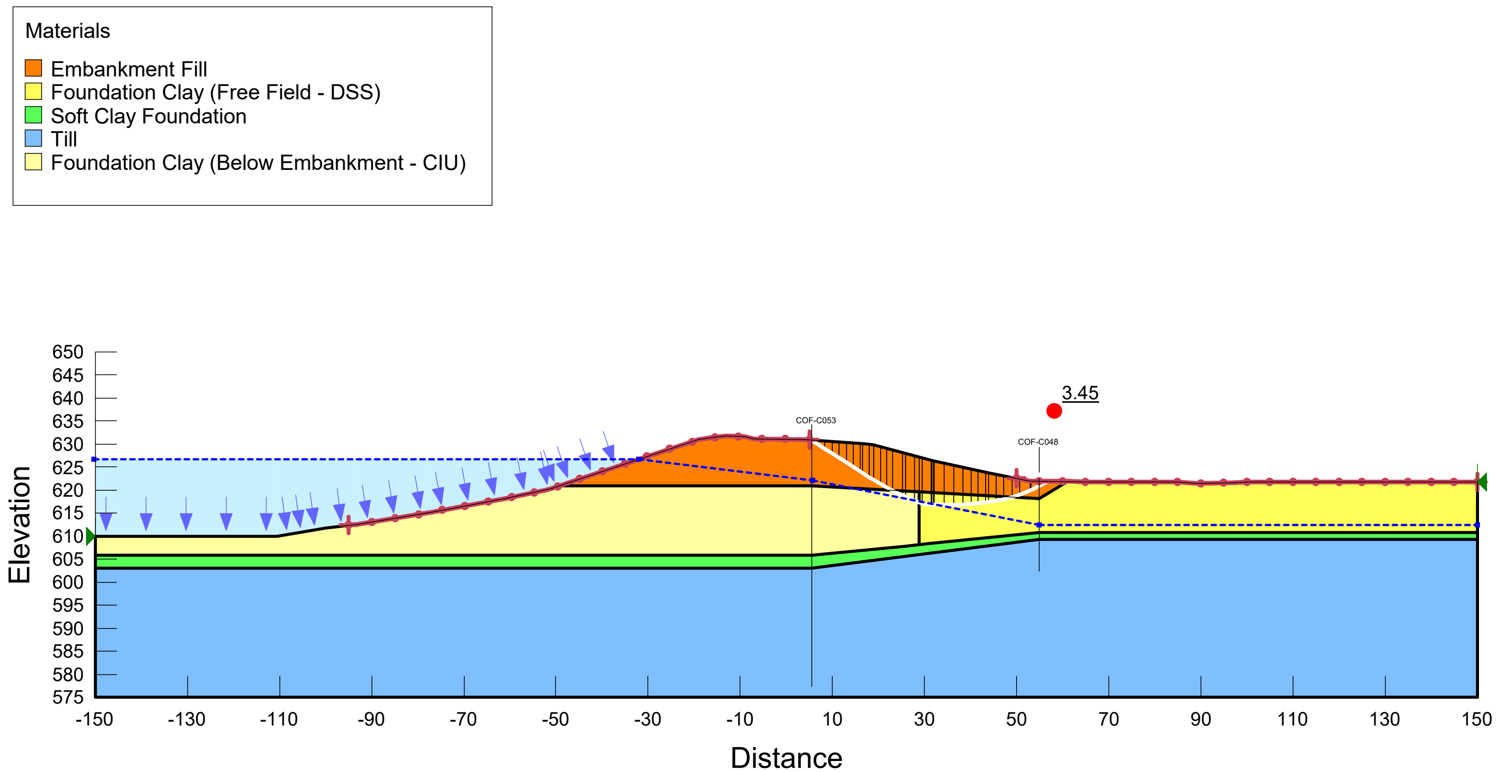
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 13+50
Slope Stability - Static Drained

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/13/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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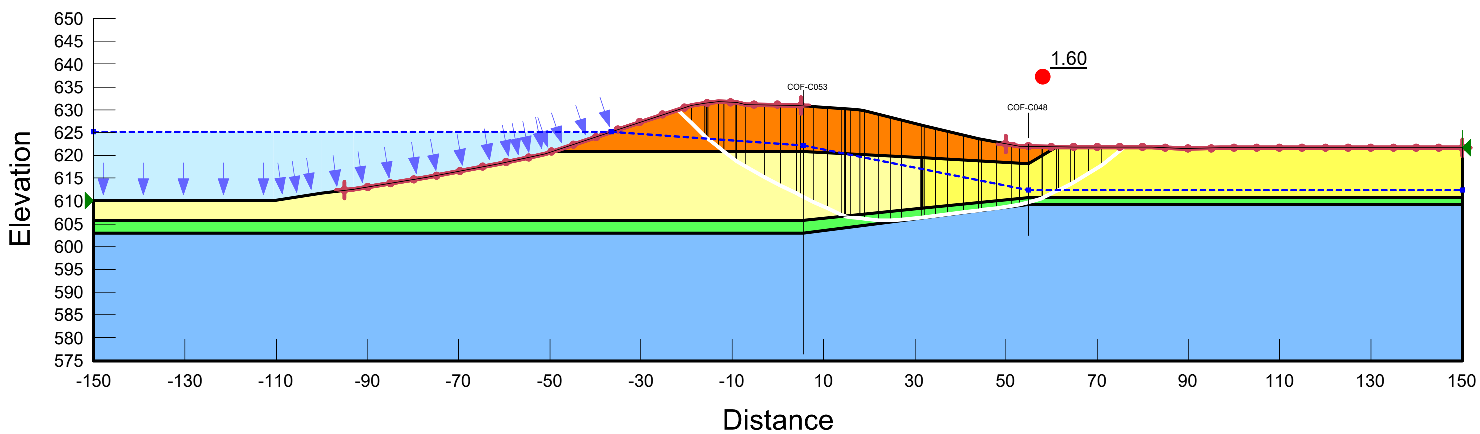
Dynegy Coffeen
GMF Gypsum Stack Pond
Station 13+50
Peak Undrained Soil Strengths
Pseudostatic - Entry-Exit

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 275 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1

Materials
- Embankment Fill
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till
- Foundation Clay (Below Embankment - CIU)

Seismic Load:
kh = 0.13 g



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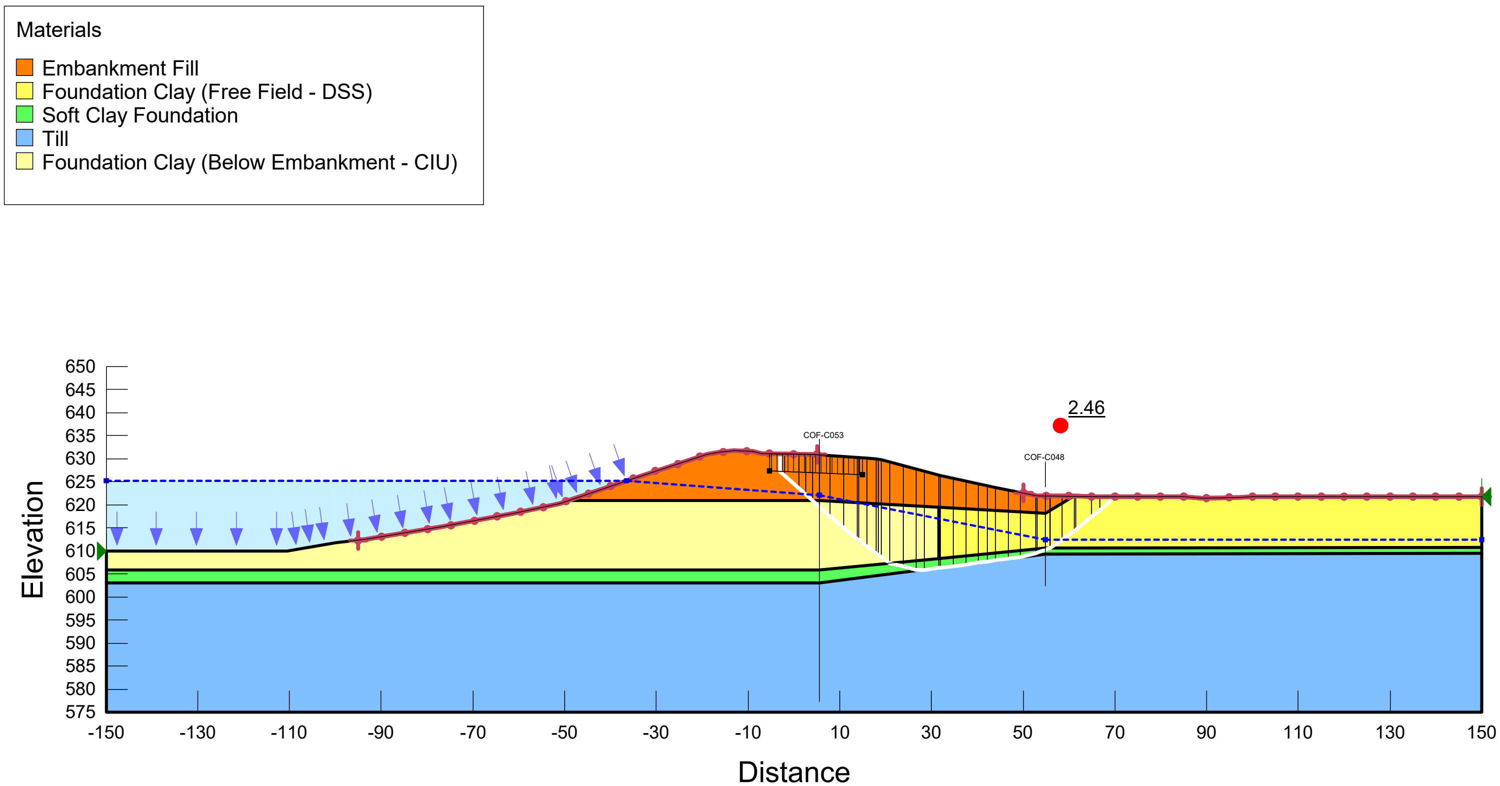
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 13+50
Slope Stability - Post Earthquake

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.16 Minimum Strength: 200 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1



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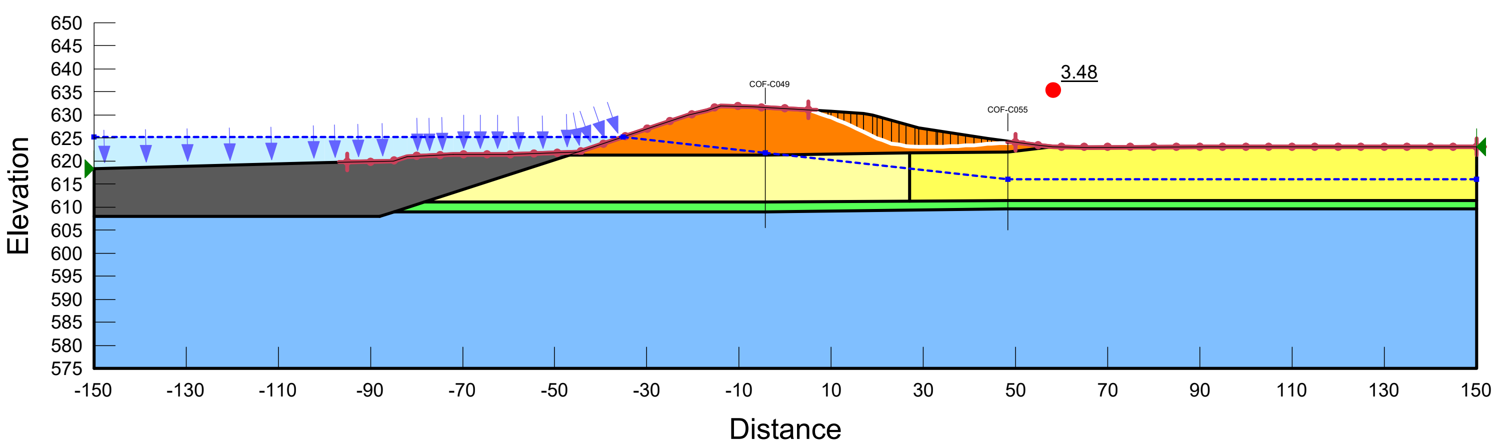
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 22+50
Slope Stability - Static Drained

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Ash Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1

Materials
- Ash
- Embankment Fill
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till
- Foundation Clay (Below Embankment - CIU)



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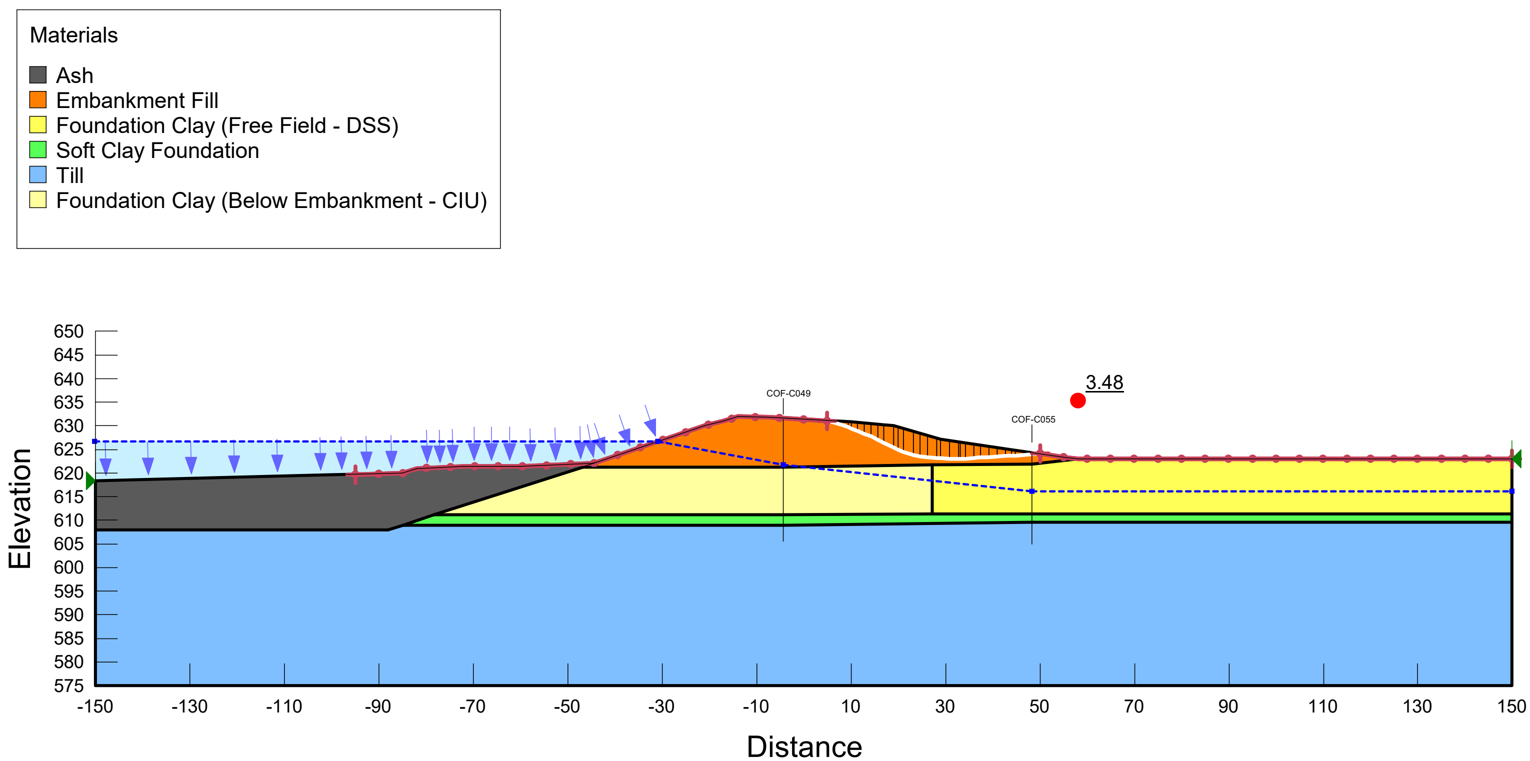
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 22+50
Slope Stability - Static Drained

Design by: Lucas Carr
Modidfied by: Betty Tesfu
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/13/2021

Name: Ash Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1
Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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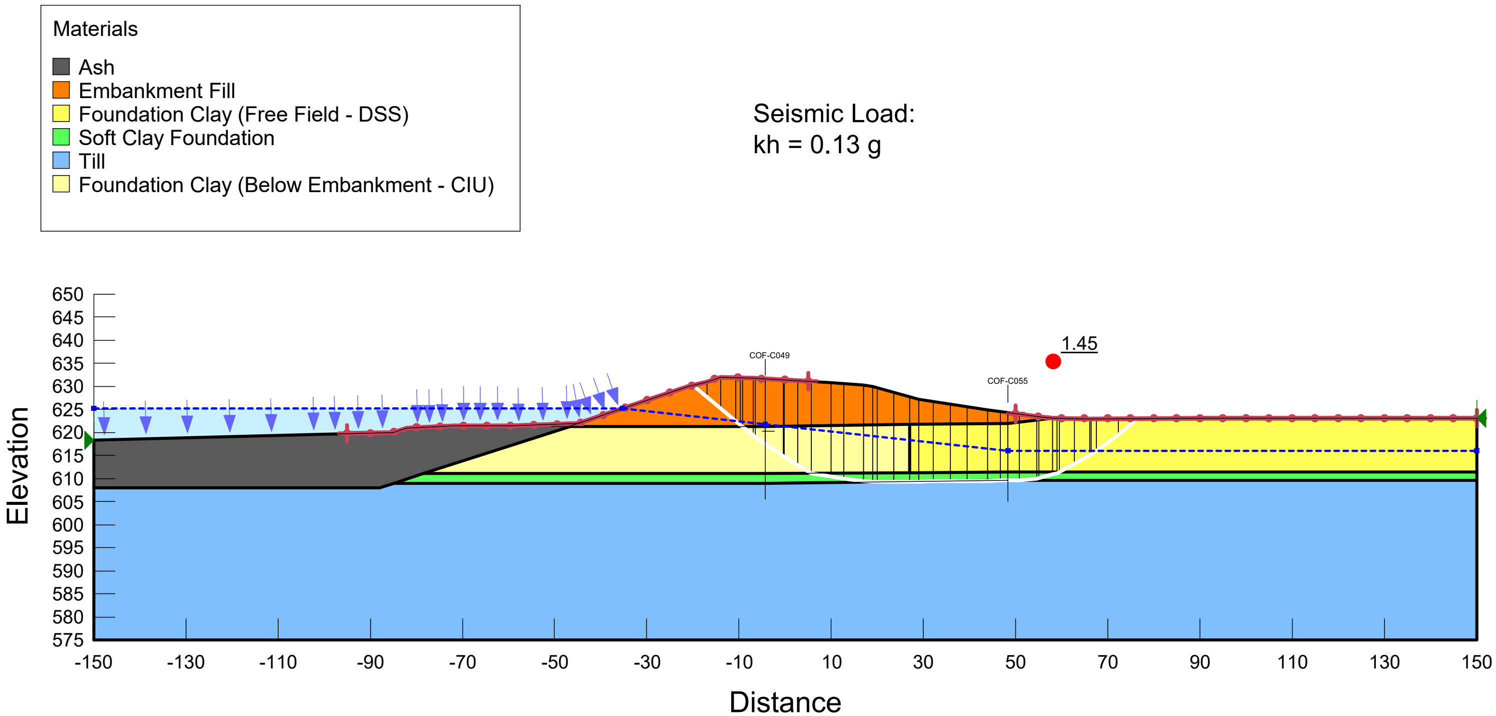
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 22+50
Peak Undrained Soil Strengths
Pseudostatic - Entry & Exit

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Ash Model: S=f(overburden) Unit Weight: 112 pcf Tau/Sigma Ratio: 0.4 Minimum Strength: 0 psf Piezometric Line: 1
Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.24 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.22 Minimum Strength: 275 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.39 Minimum Strength: 700 psf Piezometric Line: 1



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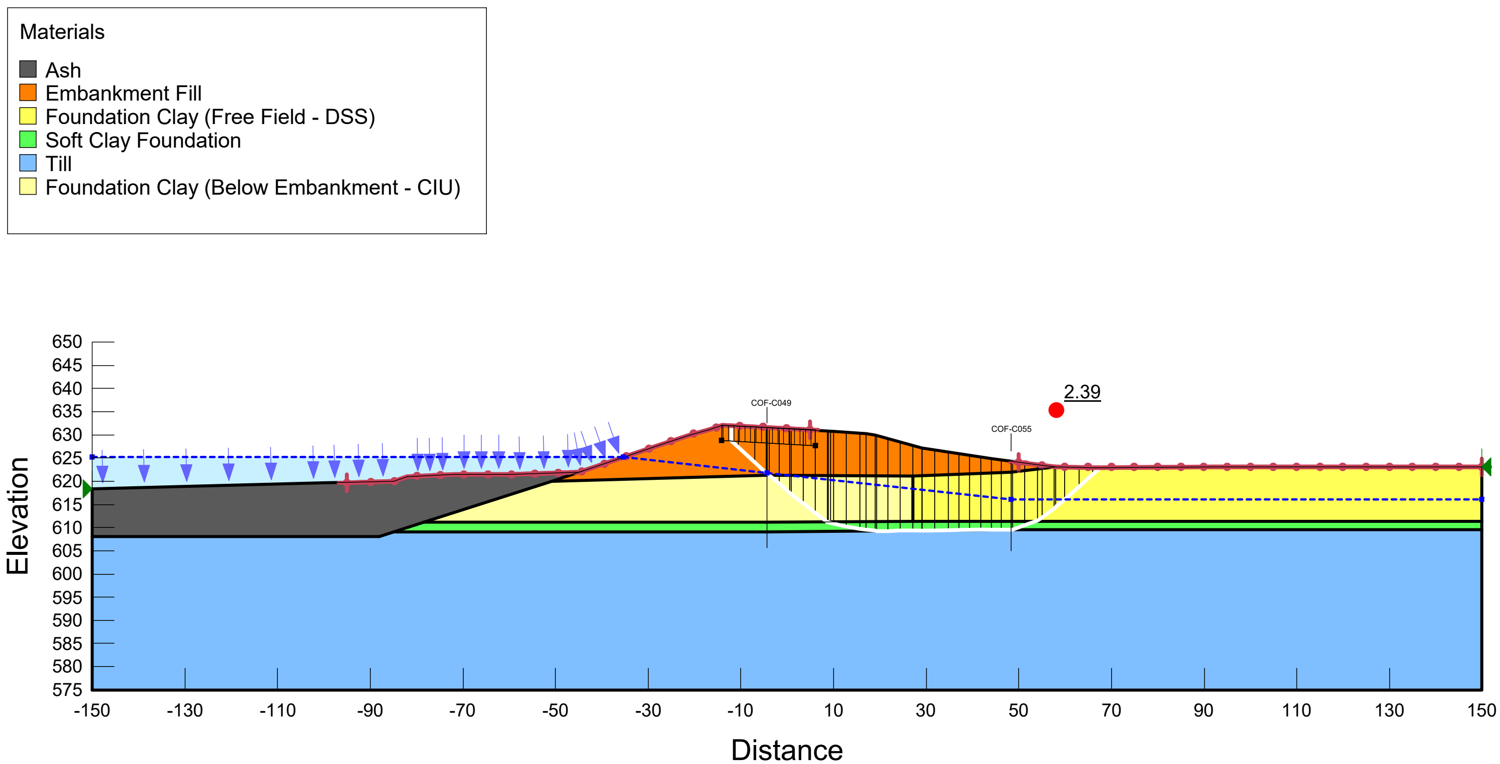
Coffeen_GMF_22+50_Peak_Undrained_LPC_20160902v1.gsz

Coffeen Power PlantGMF Gypsum Stack Pond
Station 22+50
Slope Stability - Post Earthquake

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Ash Model: S=f(overburden) Unit Weight: 112 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf Piezometric Line: 1
Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.24 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.13 Minimum Strength: 200 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.39 Minimum Strength: 700 psf Piezometric Line: 1



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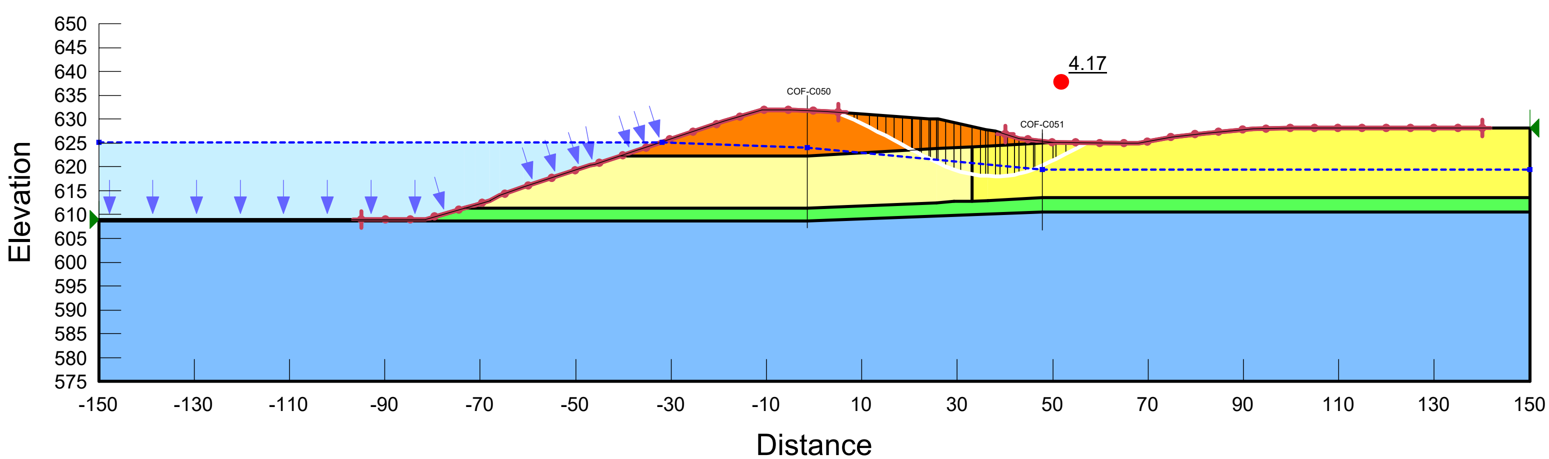
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 46+50
Static Drained - Entry & Exit

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/8/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1

Materials
- Embankment Fill
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till
- Foundation Clay (Below Embankment - CIU)



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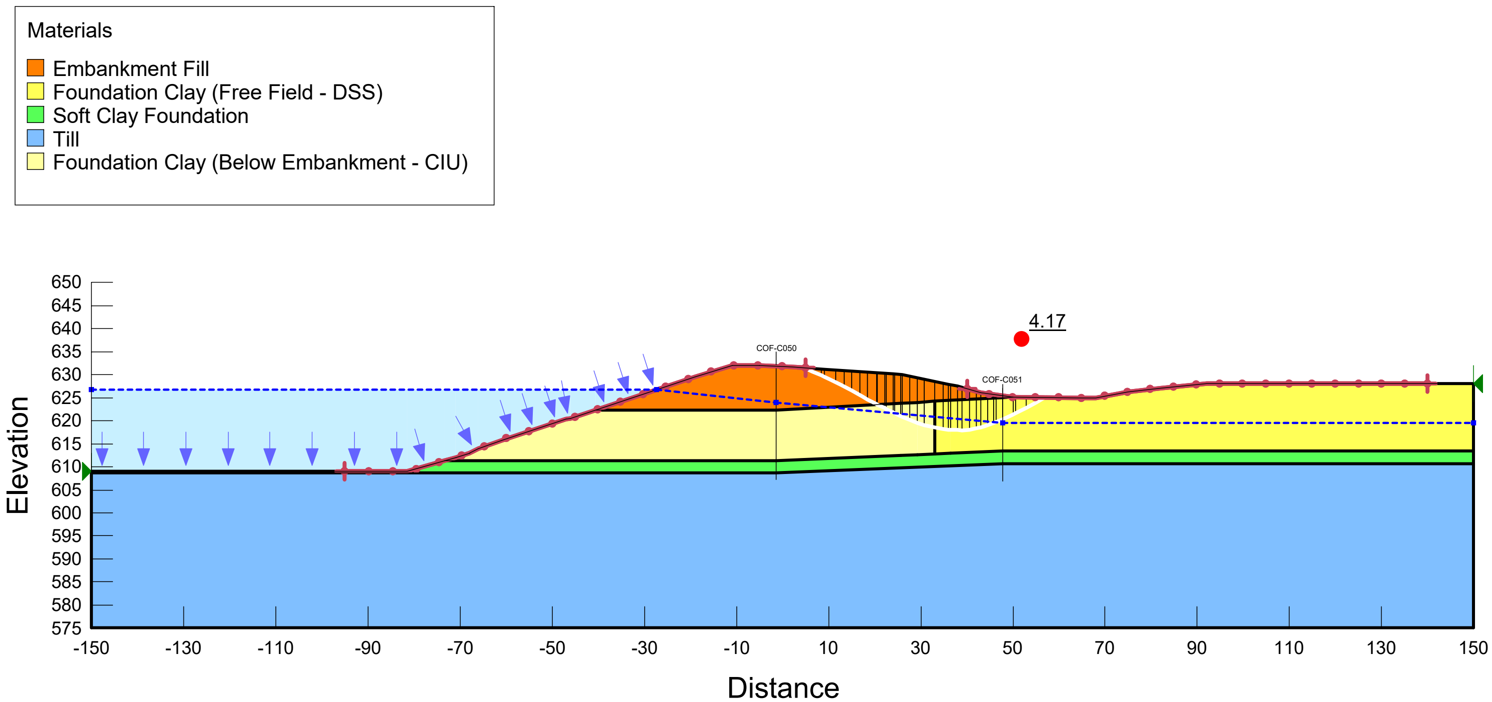
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 46+50
Surcharge Pool - Entry & Exit

Design by: Lucas Carr
Modidfied by: Betty Tesfu
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/13/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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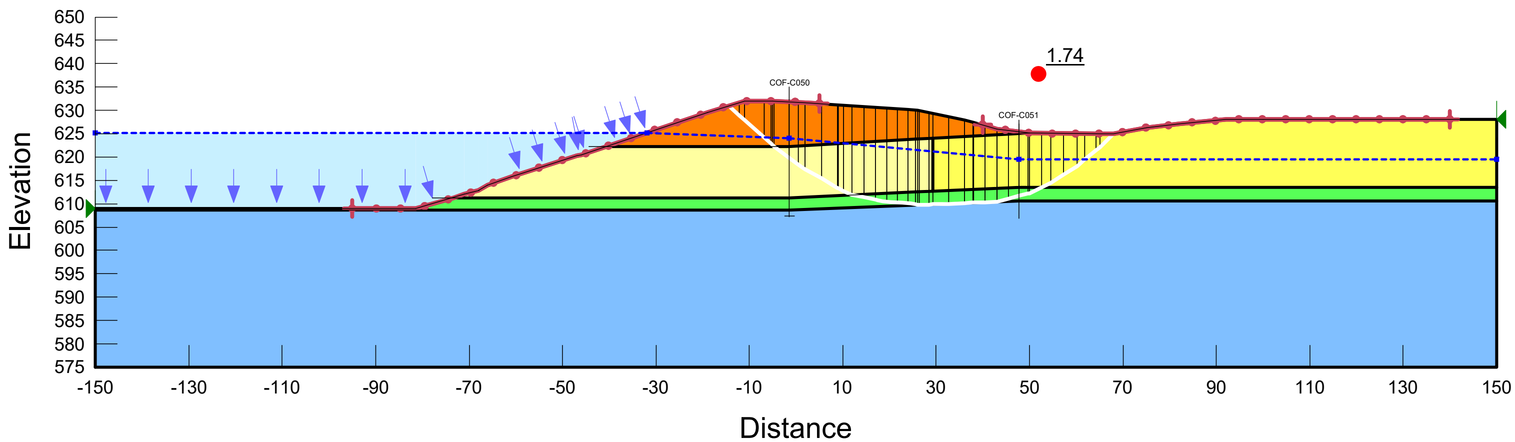
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 46+50
Peak Undrained Soil Strengths
Name: Pseudostatic - Entry & Exit

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 275 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1

Materials
- Embankment Fill
- Foundation Clay (Free Field - DSS)
- Soft Clay Foundation
- Till
- Foundation Clay (Below Embankment - CIU)

Seismic Load
kh = 0.13 g



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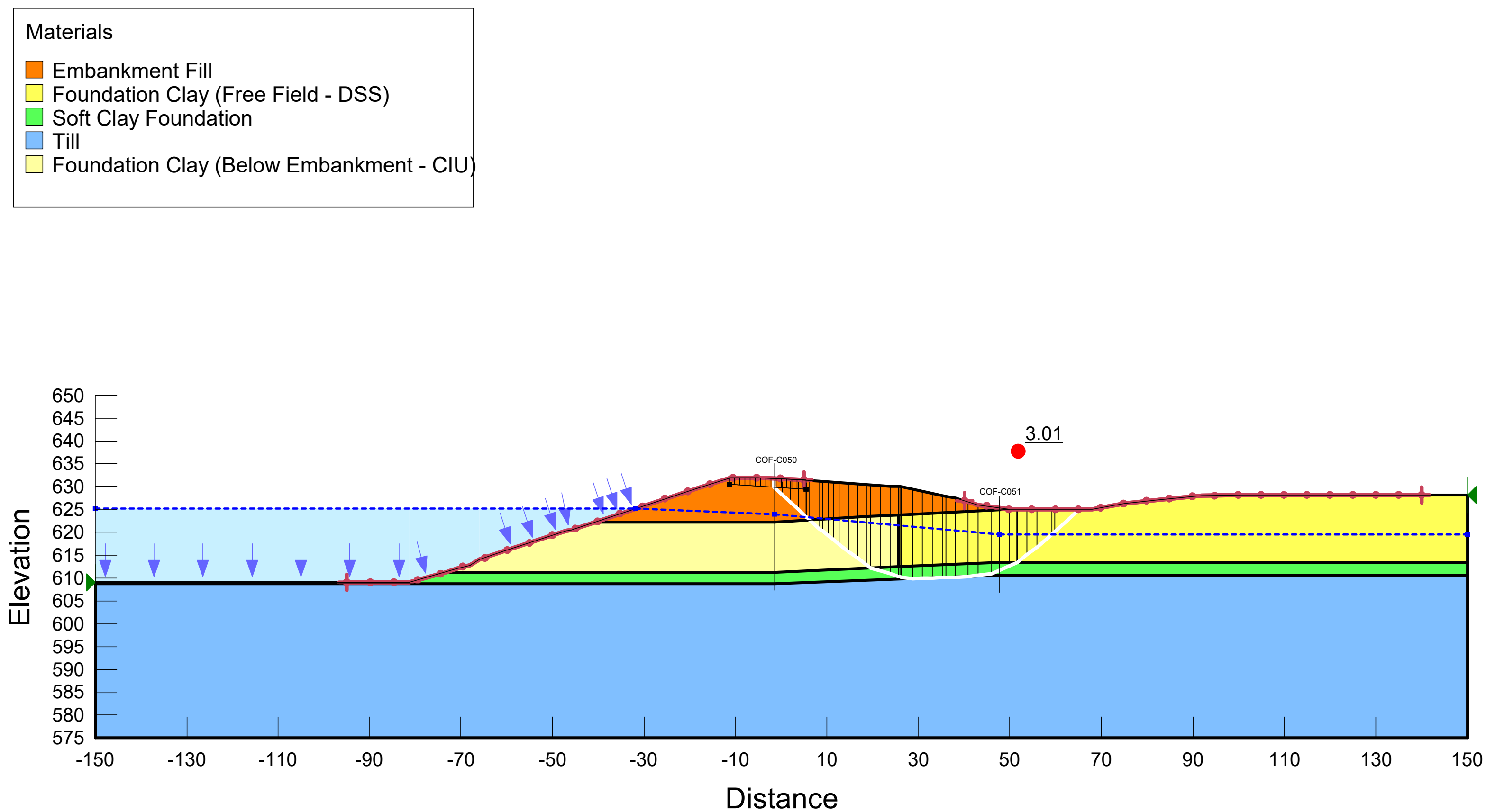
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 46+50
Slope Stability - Post Earthquake

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.28 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.16 Minimum Strength: 200 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1



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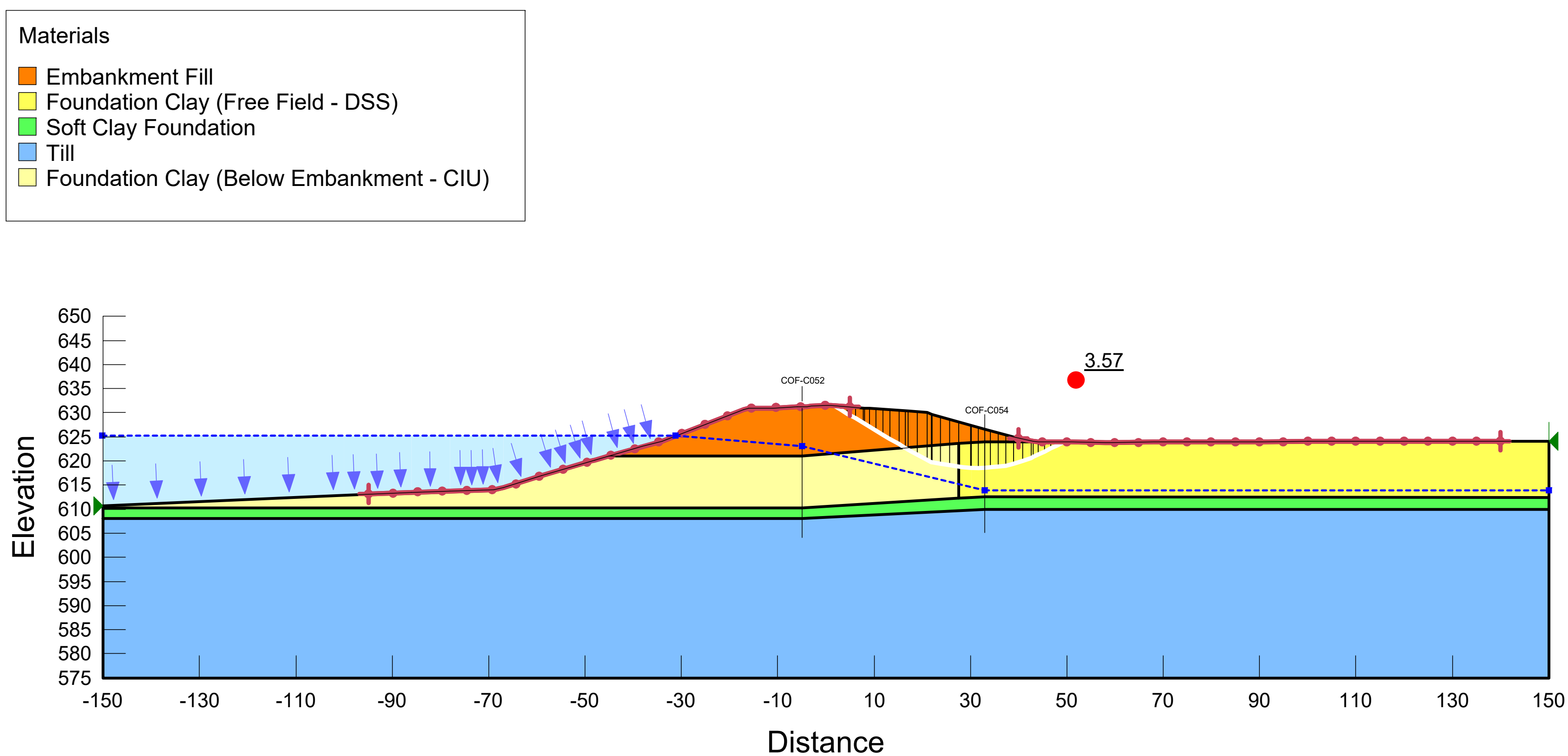
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 58+00
Slope Stability - Static Drained

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/8/2021

Name: Embankment Fill   Model: Mohr-Coulomb   Unit Weight: 135 pcf   Cohesion': 0 psf   Phi': 31 °   Phi-B: 0 °   Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS)   Model: Mohr-Coulomb   Unit Weight: 125 pcf   Cohesion': 0 psf   Phi': 30 °   Phi-B: 0 °   Piezometric Line: 1
Name: Soft Clay Foundation   Model: Mohr-Coulomb   Unit Weight: 125 pcf   Cohesion': 0 psf   Phi': 30 °   Phi-B: 0 °   Piezometric Line: 1
Name: Till   Model: Mohr-Coulomb   Unit Weight: 135 pcf   Cohesion': 0 psf   Phi': 40 °   Phi-B: 0 °   Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU)   Model: Mohr-Coulomb   Unit Weight: 125 pcf   Cohesion': 0 psf   Phi': 32 °   Phi-B: 0 °   Piezometric Line: 1



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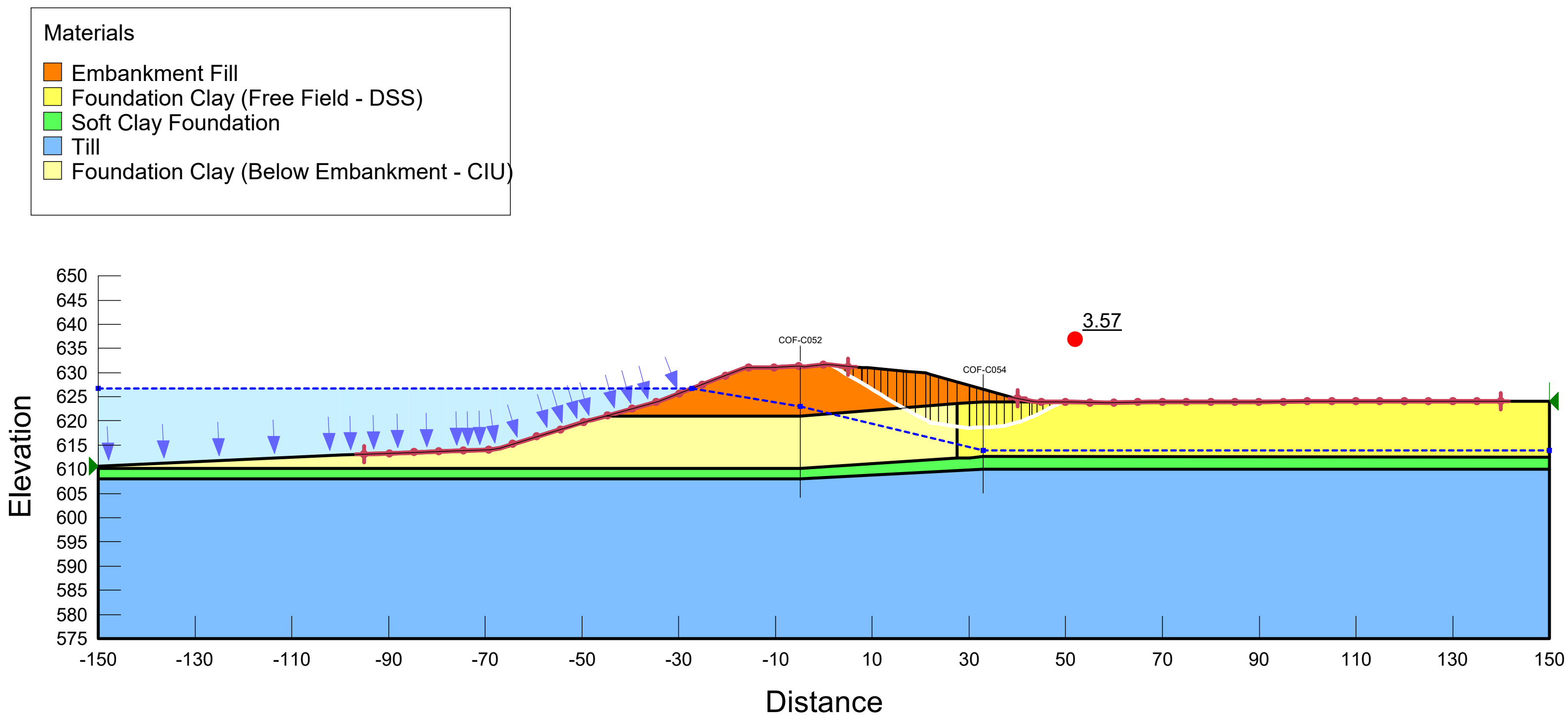
Coffeen Power Plant
GMF Gypsum Stack Pond
Station 58+00
Slope Stability - Static Drained

Design by: Lucas Carr
Modidfied by: Betty Tesfu
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/13/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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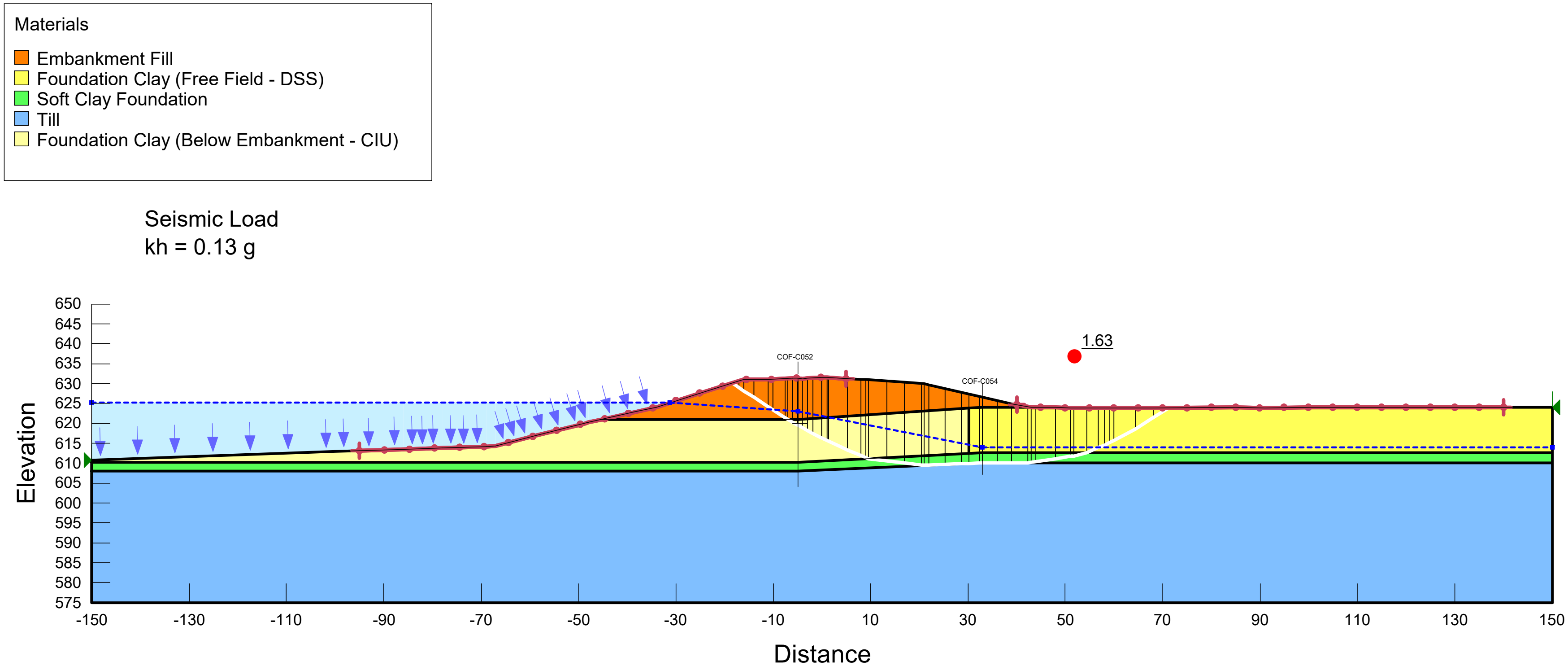
Coffeen_GMF_58+00_Surcharge_Drained_LPC_20160902v2_BT.gsz

Coffeen Power Plant
GMF Gypsum Stack Pond
Station 58+00
Peak Undrained Soil Strengths
Pseudostatic - Entry-Exit

Design by: Lucas Carr
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/14/2021

Name: Embankment Fill Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.6 Minimum Strength: 450 psf Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.24 Minimum Strength: 450 psf Piezometric Line: 1
Name: Soft Clay Foundation Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.23 Minimum Strength: 275 psf Piezometric Line: 1
Name: Till Model: S=f(overburden) Unit Weight: 135 pcf Tau/Sigma Ratio: 0.45 Minimum Strength: 700 psf Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: S=f(overburden) Unit Weight: 125 pcf Tau/Sigma Ratio: 0.39 Minimum Strength: 700 psf Piezometric Line: 1

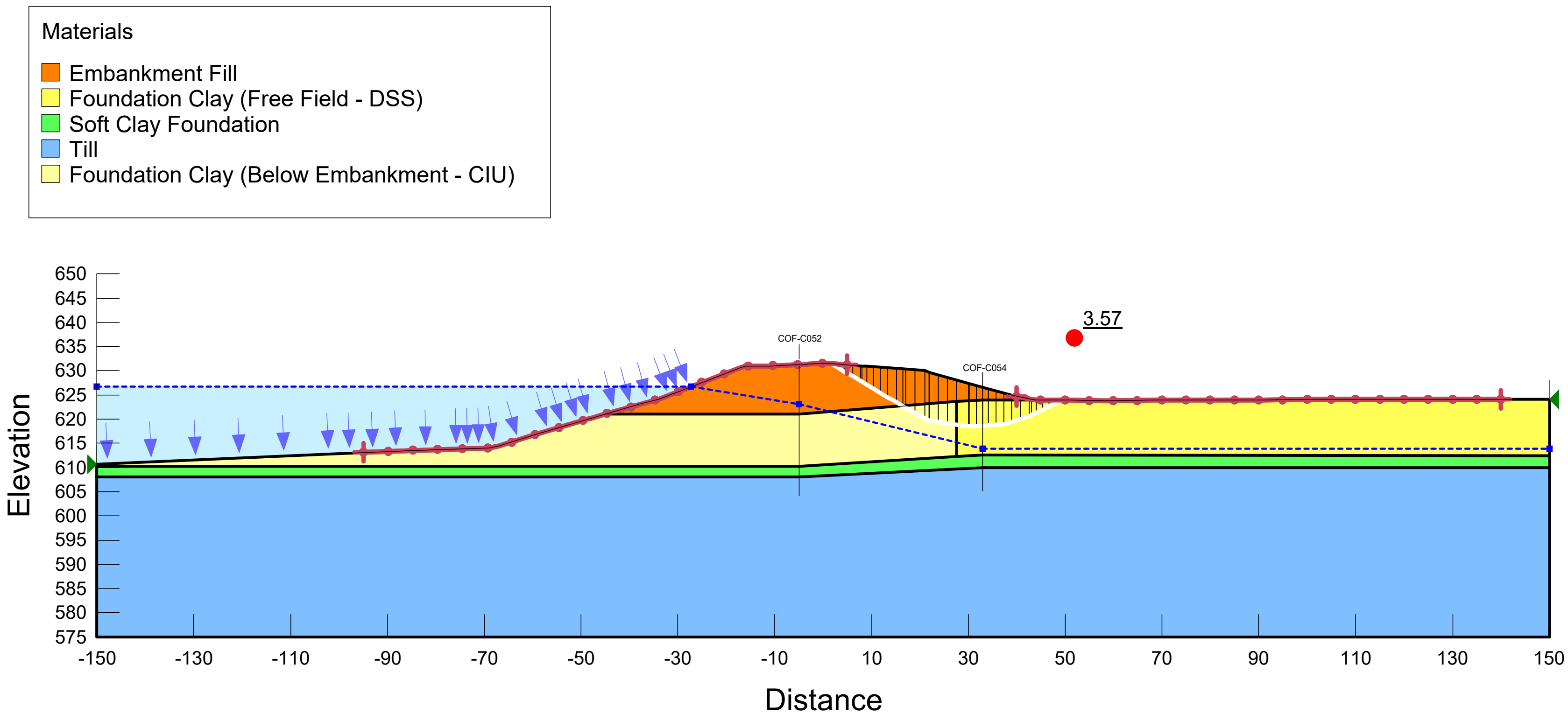


\\STLOUISMO-01\Data\Company\Projects_post_2014\GLP8027_CCR_ReCert\500_Technical\502_COF\502d_Periodic_Report\GMF\Revised SFA\58+00\
Coffeen_GMF_58+00_Peak_Undrained_LPC_20160902v1.gsz

Coffeen Power Plant
GMF Gypsum Stack Pond
Station 58+00
Slope Stability - Static Drained

Design by: Lucas Carr
Modidfied by: Betty Tesfu
Checked by: Nick Sanna
Modified by: Pourya Kargar
Checked by: Zachary Fallert
Date: 9/13/2021

Name: Embankment Fill Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 31 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Free Field - DSS) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Soft Clay Foundation Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 30 ° Phi-B: 0 ° Piezometric Line: 1
Name: Till Model: Mohr-Coulomb Unit Weight: 135 pcf Cohesion': 0 psf Phi': 40 ° Phi-B: 0 ° Piezometric Line: 1
Name: Foundation Clay (Below Embankment - CIU) Model: Mohr-Coulomb Unit Weight: 125 pcf Cohesion': 0 psf Phi': 32 ° Phi-B: 0 ° Piezometric Line: 1



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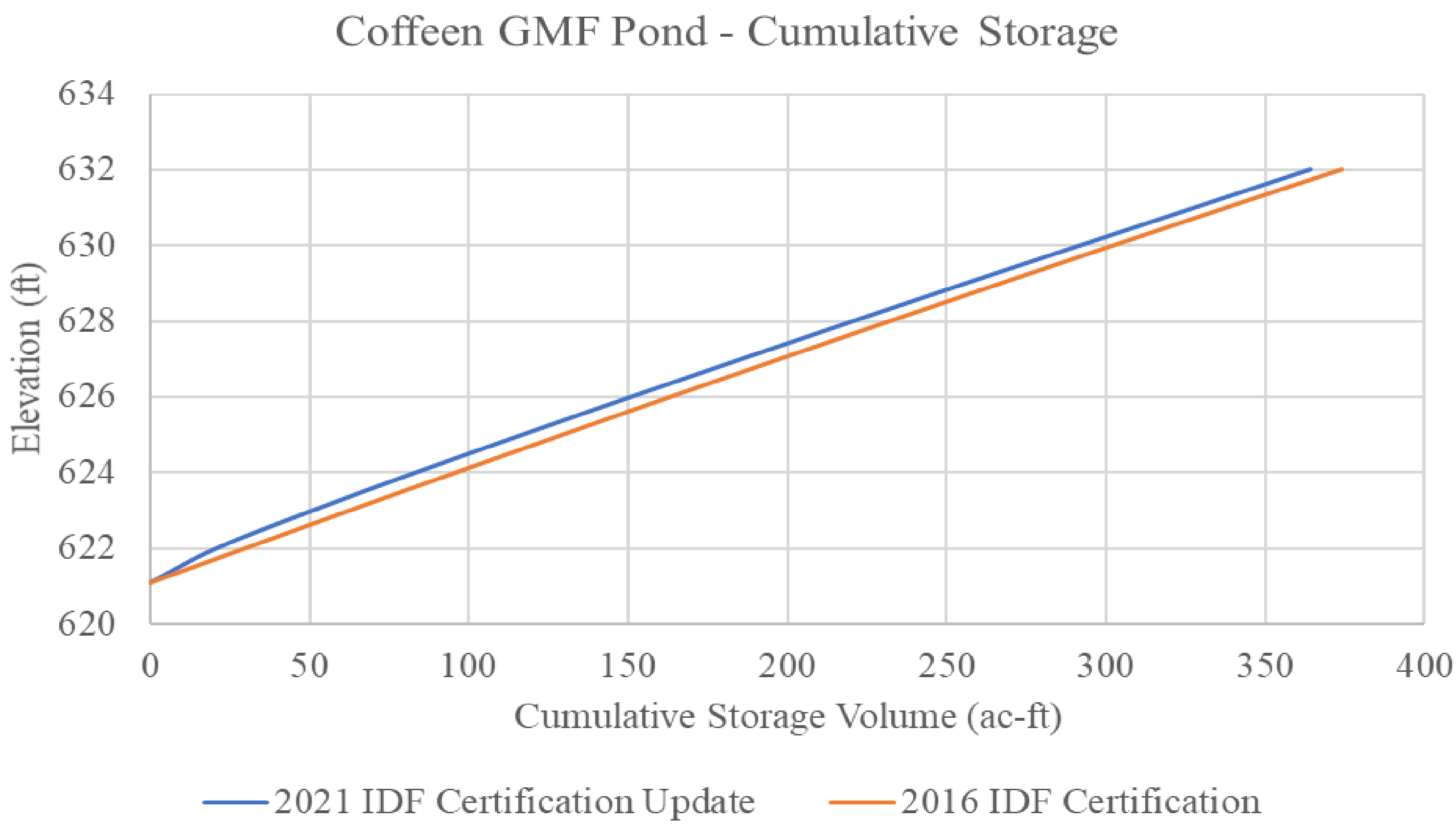
Coffeen_GMF_58+00_Surcharge_Drained_LPC_20160902v2_BT.gsz

Attachment E

Periodic Inflow Design Flood Control System Plan Analyses



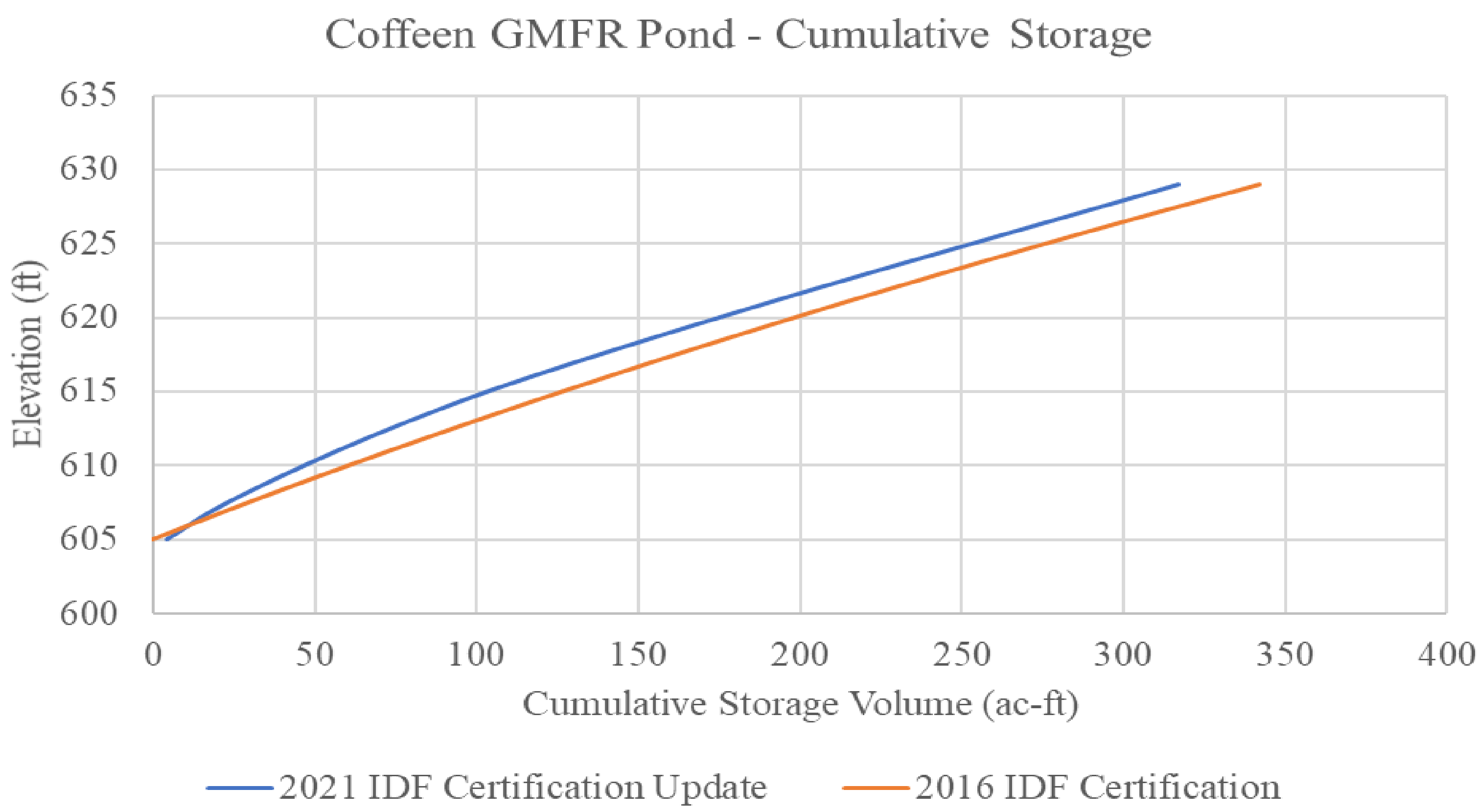
COFFEEN GMF GSP CUMULATIVE STORAGE
PERIODIC CERTIFICATION
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

Geosyntec consultants

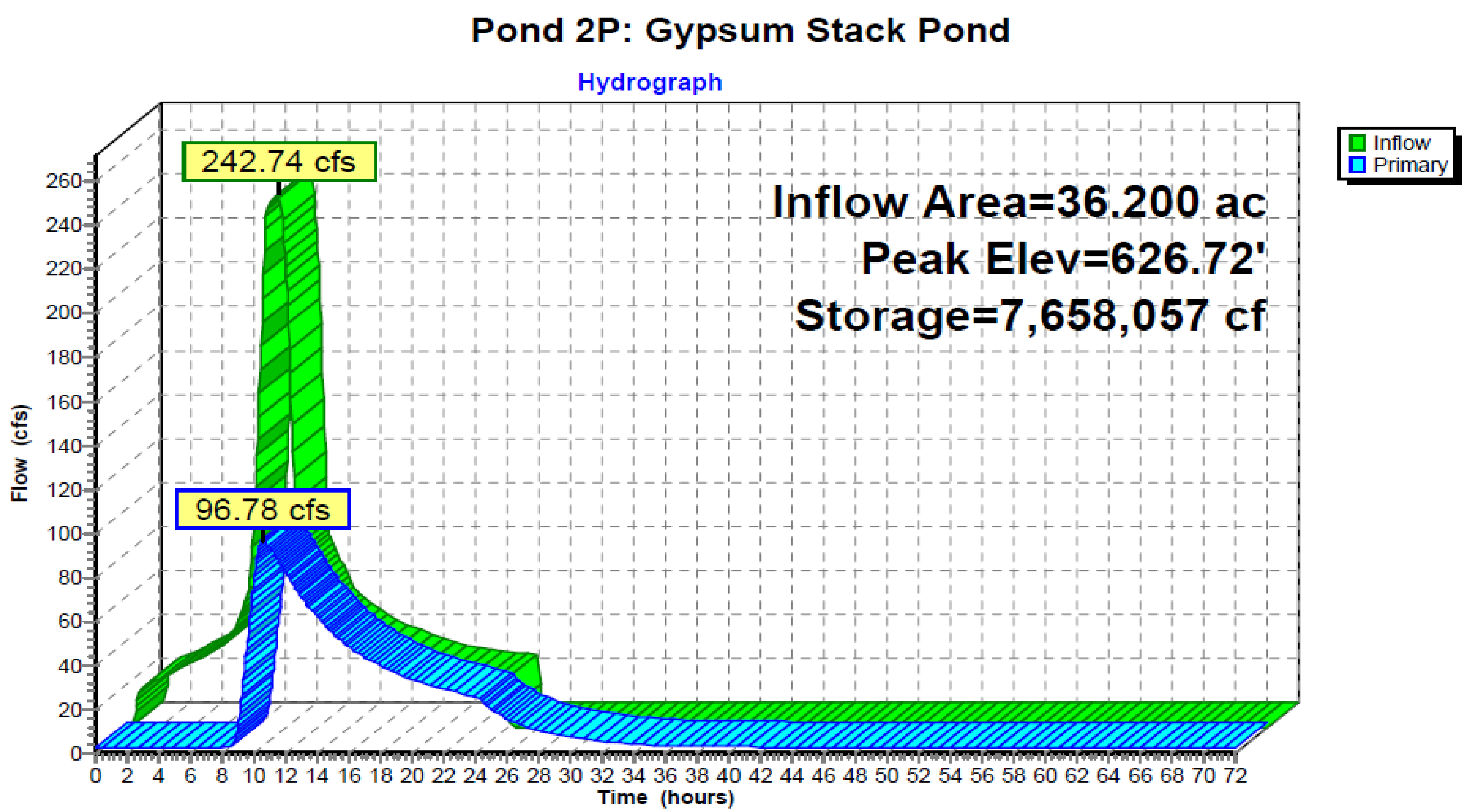
Figure E-1

GLP8027

9/14/2021



COFFEEN GMF RECYCLE POND CUMULATIVE STORAGE PERIODIC CERTIFICATION COFFEEN POWER PLANT COFFEEN, ILLINOIS		
Geosyntec consultants		Figure E-2
GLP8027	9/14/2021	



GMF GSP IDF HYDROGRAPH
PERIODIC CERTIFICATION
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

Geosyntec consultants

Figure E-3

GLP8027 9/14/2021

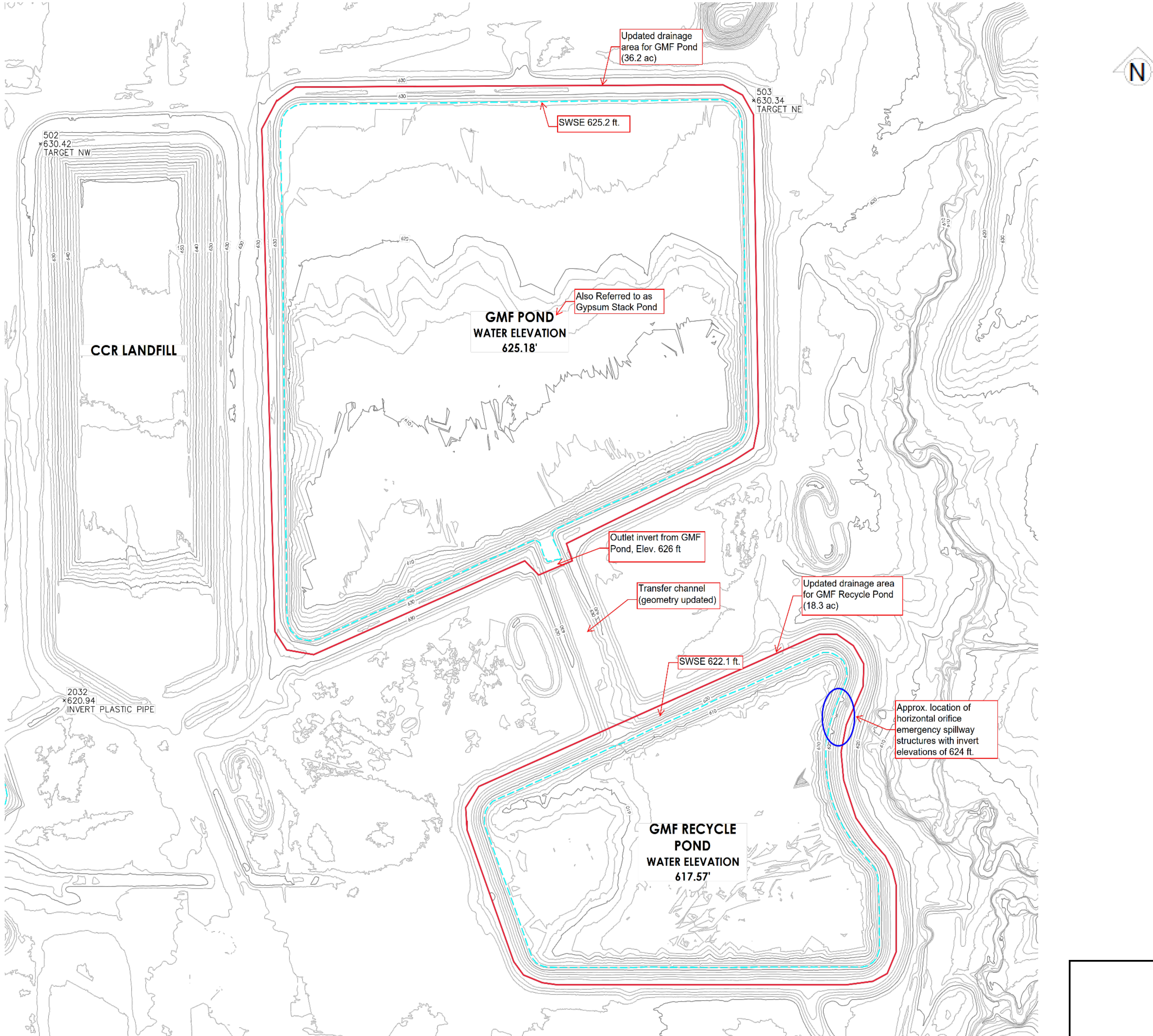
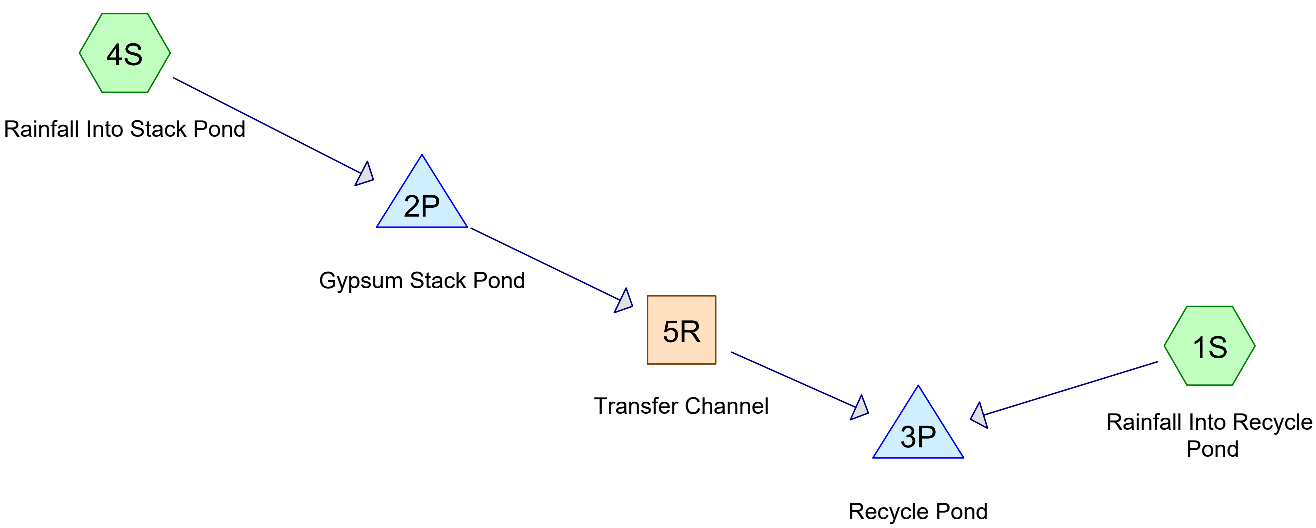
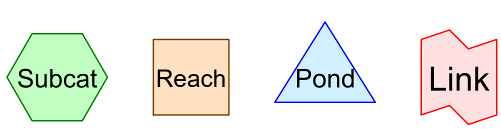


Figure based on IngenAE 2020 Site Topo

NOT TO SCALE

Coffeen Power Plant GMF and GMFR Pond Hydrologic Workmap		
Geosyntec consultants		**Figure**
GLP8027	September 2021	**E-4**





Routing Diagram for 2021-08-25_GMF_Periodic_Review
Prepared by SCCM, Printed 9/14/2021
HydroCAD® 10.00-26 s/n 00928 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
54.500	98	Water Surface, HSG C (1S, 4S)
54.500	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
54.500	HSG C	1S, 4S
0.000	HSG D	
0.000	Other	
54.500		**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	54.500	0.000	0.000	54.500	Water Surface	1S, 4S
0.000	**0.000**	**54.500**	**0.000**	**0.000**	**54.500**	**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	2P	619.00	617.60	580.0	0.0024	0.013	14.0	0.0	0.0
2	3P	615.00	613.00	92.0	0.0217	0.013	45.0	0.0	0.0
3	3P	615.00	613.00	92.0	0.0217	0.013	45.0	0.0	0.0
4	3P	615.00	613.00	92.0	0.0217	0.013	45.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 1S: Rainfall Into Recycle Runoff Area=18.300 ac 100.00% Impervious Runoff Depth=34.01"
Tc=6.0 min CN=98 Runoff=122.71 cfs 51.860 af

Subcatchment 4S: Rainfall Into Stack Runoff Area=36.200 ac 100.00% Impervious Runoff Depth=34.01"
Tc=6.0 min CN=98 Runoff=242.74 cfs 102.586 af

Reach 5R: Transfer Channel Avg. Flow Depth=0.48' Max Vel=5.94 fps Inflow=96.78 cfs 82.274 af
n=0.010 L=450.0' S=0.0044 '/' Capacity=7,454.18 cfs Outflow=96.77 cfs 82.255 af

Pond 2P: Gypsum Stack Pond Peak Elev=626.72' Storage=7,658,057 cf Inflow=242.74 cfs 102.586 af
Outflow=96.78 cfs 82.274 af

Pond 3P: Recycle Pond Peak Elev=624.70' Storage=10,813,783 cf Inflow=183.51 cfs 134.115 af
Primary=38.24 cfs 34.428 af Secondary=38.24 cfs 34.428 af Tertiary=38.24 cfs 34.428 af Outflow=114.71 cfs 103.284 af

Total Runoff Area = 54.500 ac Runoff Volume = 154.445 af Average Runoff Depth = 34.01"
0.00% Pervious = 0.000 ac 100.00% Impervious = 54.500 ac

Summary for Subcatchment 1S: Rainfall Into Recycle Pond

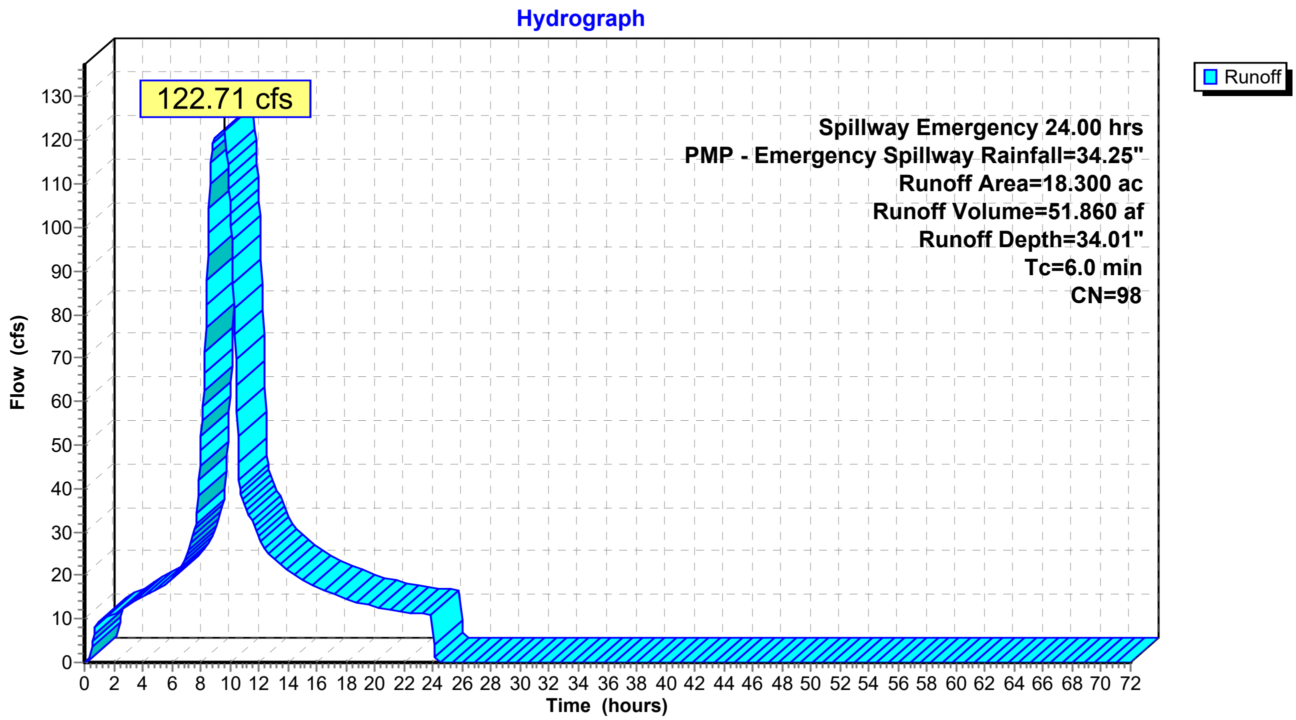
Runoff = 122.71 cfs @ 9.62 hrs, Volume= 51.860 af, Depth=34.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Spillway Emergency 24.00 hrs PMP - Emergency Spillway Rainfall=34.25"

	Area (ac)	CN	Description
*	18.300	98	Water Surface, HSG C
	18.300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Fall**

Subcatchment 1S: Rainfall Into Recycle Pond



Summary for Subcatchment 4S: Rainfall Into Stack Pond

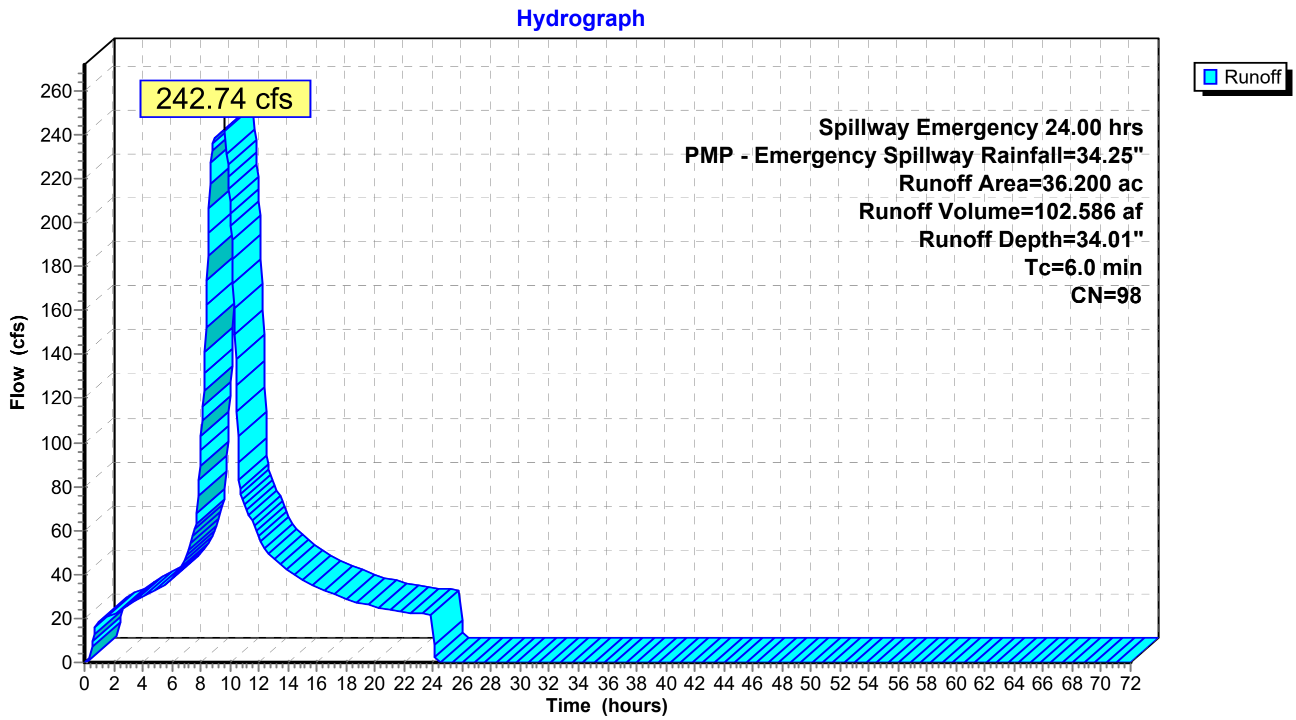
Runoff = 242.74 cfs @ 9.62 hrs, Volume= 102.586 af, Depth=34.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Spillway Emergency 24.00 hrs PMP - Emergency Spillway Rainfall=34.25"

Area (ac)	CN	Description
36.200	98	Water Surface, HSG C
36.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Direct Fall**

Subcatchment 4S: Rainfall Into Stack Pond



Summary for Reach 5R: Transfer Channel

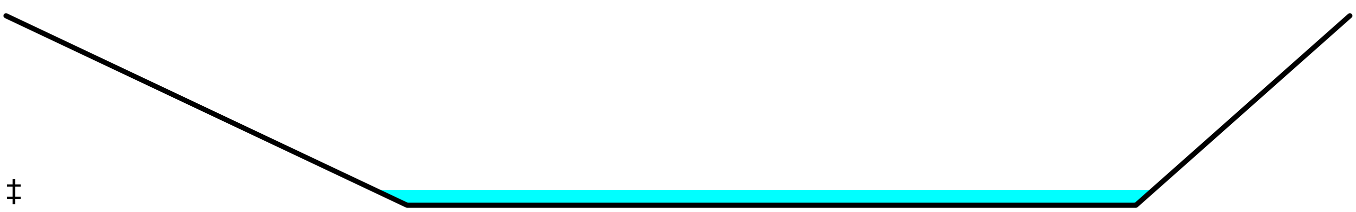
Inflow Area = 36.200 ac,100.00% Impervious, Inflow Depth > 27.27" for PMP - Emergency Spillway event
Inflow = 96.78 cfs @ 10.58 hrs, Volume= 82.274 af
Outflow = 96.77 cfs @ 10.59 hrs, Volume= 82.255 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.94 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 3.3 min

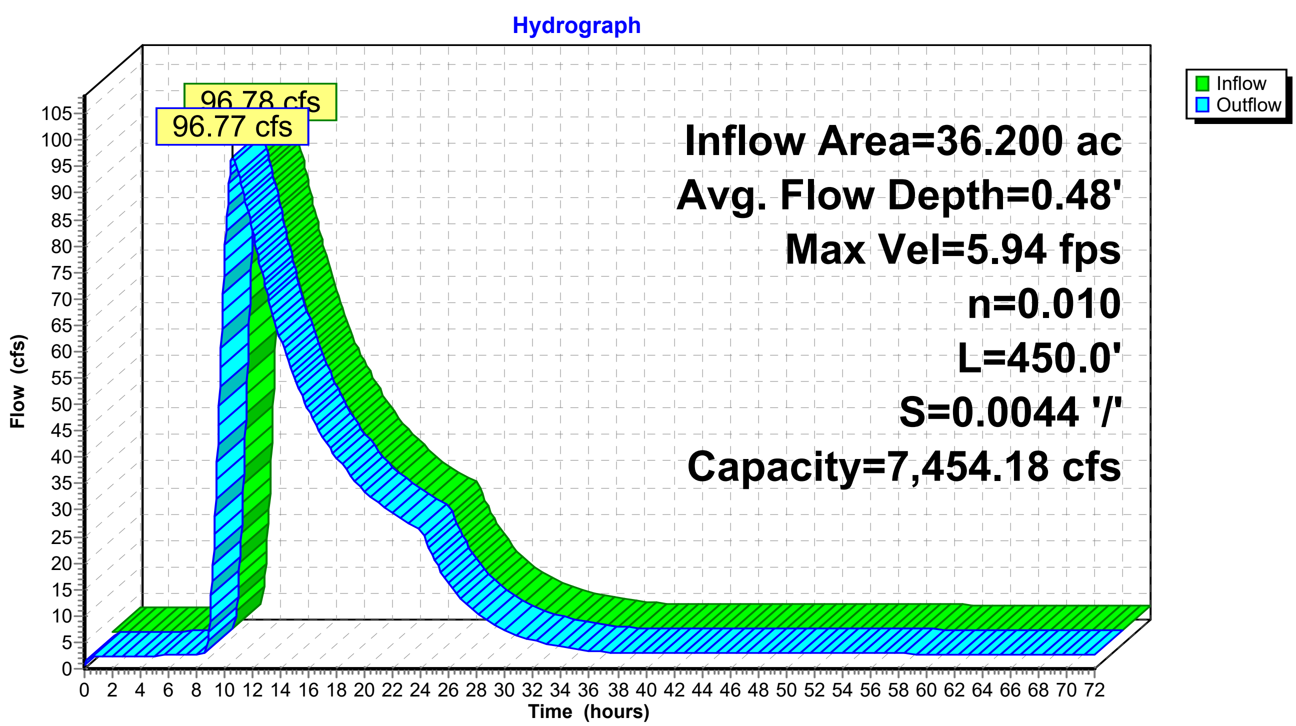
Peak Storage= 7,334 cf @ 10.59 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 6.00' Flow Area= 279.0 sf, Capacity= 7,454.18 cfs

32.70' x 6.00' deep channel, n= 0.010 PVC, smooth interior
Side Slope Z-value= 3.0 1.6 '/' Top Width= 60.30'
Length= 450.0' Slope= 0.0044 '/'
Inlet Invert= 624.00', Outlet Invert= 622.00'

‡



Reach 5R: Transfer Channel



Summary for Pond 2P: Gypsum Stack Pond

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 36.200 ac,100.00% Impervious, Inflow Depth = 34.01" for PMP - Emergency Spillway event
Inflow = 242.74 cfs @ 9.62 hrs, Volume= 102.586 af
Outflow = 96.78 cfs @ 10.58 hrs, Volume= 82.274 af, Atten= 60%, Lag= 57.2 min
Primary = 96.78 cfs @ 10.58 hrs, Volume= 82.274 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 625.18' Surf.Area= 0 sf Storage= 5,353,910 cf
Peak Elev= 626.72' @ 10.58 hrs Surf.Area= 0 sf Storage= 7,658,057 cf (2,304,147 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 554.6 min (1,215.4 - 660.8)

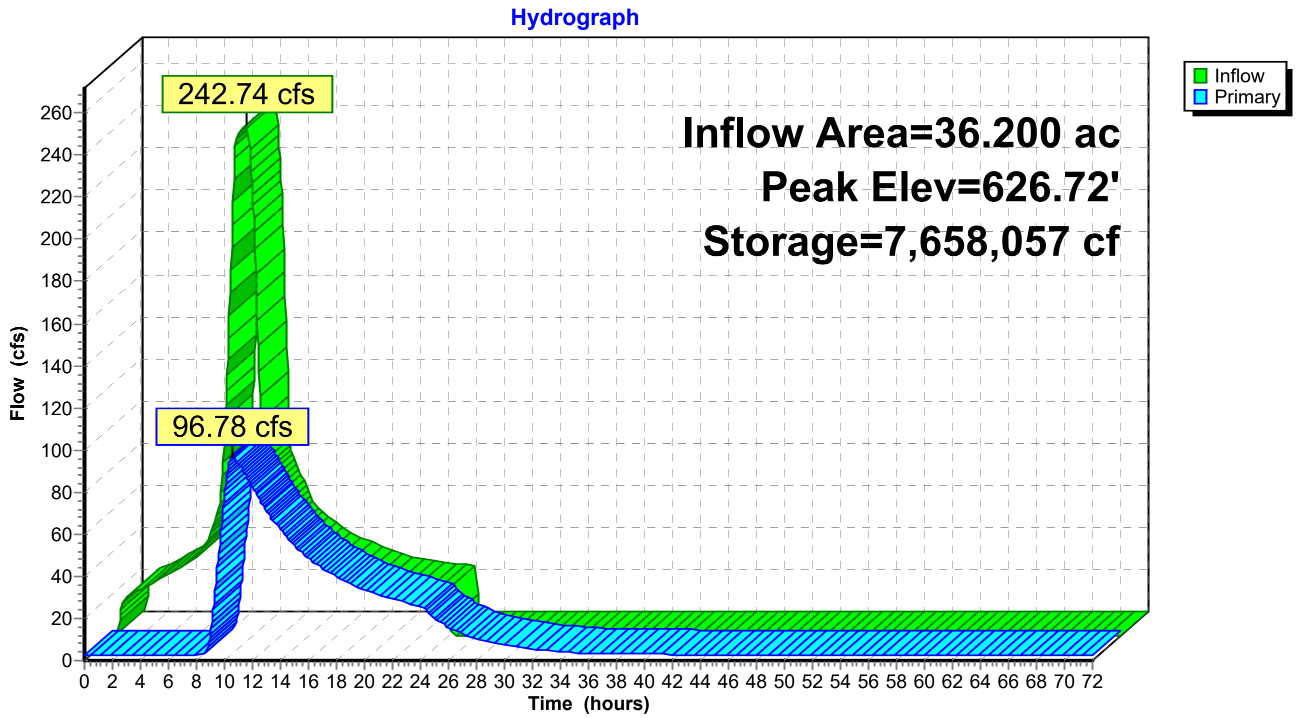
Volume	Invert	Avail.Storage	Storage Description
#1	621.10'	15,871,813 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
621.10	0
622.00	898,355
623.00	2,215,071
624.00	3,622,761
625.00	5,085,824
626.00	6,575,189
627.00	8,086,603
628.00	9,615,334
629.00	11,161,695
630.00	12,725,625
631.00	14,298,658
632.00	15,871,813

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 2.00 4.00 Width (feet) 45.00 60.00 75.00
#2	Primary	619.00'	**14.0" Round Culvert** L= 580.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 619.00' / 617.60' S= 0.0024 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.07 sf

Primary OutFlow Max=96.75 cfs @ 10.58 hrs HW=626.72' TW=624.48' (Dynamic Tailwater)
—**1=Custom Weir/Orifice** (Weir Controls 93.61 cfs @ 2.74 fps)
—**2=Culvert** (Outlet Controls 3.14 cfs @ 2.93 fps)

Pond 2P: Gypsum Stack Pond



Summary for Pond 3P: Recycle Pond

[63] Warning: Exceeded Reach 5R INLET depth by 0.26' @ 12.35 hrs

Inflow Area = 54.500 ac,100.00% Impervious, Inflow Depth > 29.53" for PMP - Emergency Spillway event
Inflow = 183.51 cfs @ 10.06 hrs, Volume= 134.115 af
Outflow = 114.71 cfs @ 11.82 hrs, Volume= 103.284 af, Atten= 37%, Lag= 105.4 min
Primary = 38.24 cfs @ 11.82 hrs, Volume= 34.428 af
Secondary = 38.24 cfs @ 11.82 hrs, Volume= 34.428 af
Tertiary = 38.24 cfs @ 11.82 hrs, Volume= 34.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 622.10' Surf.Area= 0 sf Storage= 9,024,347 cf
Peak Elev= 624.70' @ 11.82 hrs Surf.Area= 0 sf Storage= 10,813,783 cf (1,789,436 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 234.9 min (1,236.7 - 1,001.8)

Volume	Invert	Avail.Storage	Storage Description
#1	604.90'	13,809,827 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
604.90	0
605.00	193,406
607.00	824,155
609.00	1,613,462
611.00	2,487,712
613.00	3,446,903
615.00	4,502,797
617.00	5,698,519
619.00	6,966,115
621.00	8,279,014
623.00	9,634,165
624.00	10,326,769
625.00	11,023,294
626.00	11,719,818
627.00	12,416,342
628.00	13,112,867
629.00	13,809,827

Device	Routing	Invert	Outlet Devices
#1	Primary	615.00'	**45.0" Round Culvert** L= 92.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 615.00' / 613.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 11.04 sf
#2	Secondary	615.00'	**45.0" Round Culvert** L= 92.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 615.00' / 613.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 11.04 sf
#3	Tertiary	615.00'	**45.0" Round Culvert** L= 92.0' CPP, square edge headwall, Ke= 0.500

			Inlet / Outlet Invert= 615.00' / 613.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 11.04 sf
#4	Device 1	624.00'	**60.0" x 60.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	624.00'	**60.0" x 60.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 3	624.00'	**60.0" x 60.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=38.23 cfs @ 11.82 hrs HW=624.70' (Free Discharge)
└─**1=Culvert** (Passes 38.23 cfs of 148.75 cfs potential flow)
  └─**4=Orifice/Grate** (Weir Controls 38.23 cfs @ 2.73 fps)

Secondary OutFlow Max=38.23 cfs @ 11.82 hrs HW=624.70' (Free Discharge)
└─**2=Culvert** (Passes 38.23 cfs of 148.75 cfs potential flow)
  └─**5=Orifice/Grate** (Weir Controls 38.23 cfs @ 2.73 fps)

Tertiary OutFlow Max=38.23 cfs @ 11.82 hrs HW=624.70' (Free Discharge)
└─**3=Culvert** (Passes 38.23 cfs of 148.75 cfs potential flow)
  └─**6=Orifice/Grate** (Weir Controls 38.23 cfs @ 2.73 fps)

Pond 3P: Recycle Pond